DWG. NO. H333000-WP700-00-042-0001

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H333000-WP401-05-030-0002	GROUP B - HEAVY NON-FORKLIFT - WASTE PACKAGE HANDLING METHODS - PACKAGE FLOW DIAGRAMS
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H333000-WP408-05-042-0002	P2 EMPLACEMENT ROOM - ALLOCATION OF WASTE PACKAGES TO EMPLACEMENT ROOMS
H333000-WP408-05-042-0003	P3 EMPLACEMENT ROOM - ALLOCATION OF WASTE PACKAGES TO EMPLACEMENT ROOMS
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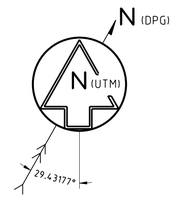

NOTE:

ALL DIMENSIONS ARE IN MM
UNLESS NOTED OTHERWISE

ABBREVIATIONS & SYMBOLS

B.G.S.	BELOW GROUND SURFACE	F/L	FORK LIFT
A.M.S.L.	ABOVE MEAN SEA LEVEL	⌖	CENTERLINE
N	NORTHING	W.P.	WORK POINT
E	EASTING	TYP.	TYPICAL
DGR	DEEP GEOLOGIC REPOSITORY	EXP.	EXPANSION
WWMF	WESTERN WASTE MANAGEMENT FACILITY	NTS	NOT TO SCALE
AZI	AZIMUTH	DWG	DRAWING
G	GANTRY	DPG	DOUGLAS POINT GRID

PRELIMINARY
NOT FOR CONSTRUCTION

THIS DRAWING IS FOR ESTIMATING USE ONLY
All ratings and sizes of equipment, concrete, steel, and materials, shown on this drawing are approximations only and must not be considered as final design requirements.
DO NOT USE FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE
01	NOTES & ABREVIATIONS MODIFIED	GK	SA	04/26/2010

REVISIONS

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01	APPROVED FOR USE	GK	SA 04/26/2010
00	APPROVED FOR USE	GK	SA 12/01/2010

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY S. AARONS DATE 12/01/2010	DRAWN BY A. SHAW DATE 12/01/2010
CHECKED BY DATE	DISCIP. ENGR. G. KRAMER DATE 12/01/2010
PROJ. DES. COORD. N/A DATE	PROJ. ENGR. N/A DATE
PROJ. MGR. M. DAWBORN DATE 12/01/2010	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

PRELIMINARY DESIGN REPORT

APPENDIX E – VOLUME 1
INDEX OF DRAWINGS
GENERAL NOTES AND SYMBOLS

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OR AS NOTED	H333000-WP700-00-042-0001	01

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DWG. NO. H333000-WP401-05-030-0001

Receiving Bay | Waste Package Receiving Building | Package Staging Area

Waste from WWMF on Forklift, Flat Bed, or Covered Truck

Inspection on Delivery Vehicle. Review/Update Data on IWTS.

Package OK and Matches Roster?

Yes

No

Return Package to Source.

Offload Truck With Light Duty Forklift, Transport Package(s) to Staging Area.

Secondary Inspection (If Required) Meets DGR WAC?

Yes

No

Correct, Return to Source, or Handle Using ALARA Plan.

Pick Up Package With Light Duty Forklift and Load Onto Cart.

Cart Fully Loaded With Packages?

Yes

No

Load Additional Package.

Move Cart Onto Cage and Secure.

Shaft Transport. (Described Elsewhere)

Main Shaft

Release Cart and Remove From Cage.

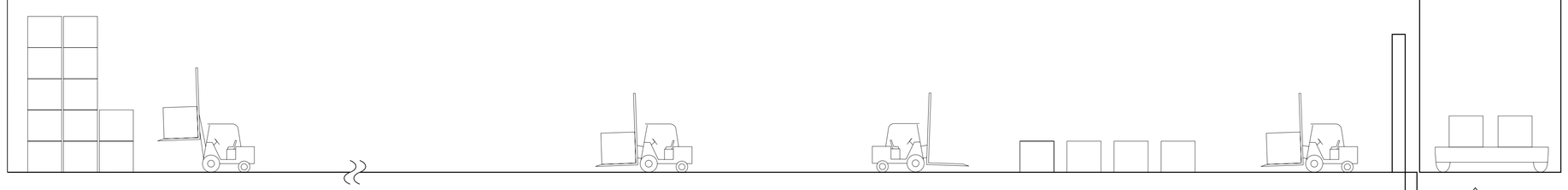
Offload Package from Cart to Staging With Light Duty Forklift.

Type A Package Staging Area.

Transport Package Via Light duty Forklift To Emplacement Room.

Access Emplacement Room Via Access Tunnel.

Emplace/Stack Package with Light Duty Forklift. Update IWTS Status as "Emplaced" and Enter Final Location.



Emplacement Room | Access Tunnel | Underground Staging Area | Station

Note: Empty carts will be returned to surface as required via rail network and shaft transport in the cage.

NOT FOR CONSTRUCTION

Includes:

- Compactor Boxes
- Non-pro Bins
- Drum Bins
- LL Resin Pallet Tanks
- LLW Container Overpacks
- Other Similar Containers

Notes:

1. ALARA Plan not described in this document. To be determined elsewhere.

This Illustration for Information Purposes Only

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Area Lead — G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.09.15 16:24:37 -04'00'
Engineering Mangager — Shenein Aarons — 2009.09.16 18:22:01 -04'00'
Project Manager — Digitally signed by M.R Dawborn Date: 2009.09.17 11:16:07 -04'00'
Accepted by Owner — R.J. Heystee — 2009.09.24 19:11:50 -04'00'

REV.	ISSUE FOR	AUTH. BY	DATE
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ISSUE AUTHORIZATION			

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NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

DESIGNED BY	DRAWN BY
D. WITOW	R. SETO
DATE 2009-09-15	DATE 2009-09-15
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M. R. DAWBORN	
DATE	

GROUP A – BIN TYPE WASTE

WASTE PACKAGE HANDLING METHODS
PACKAGE FLOW DIAGRAM

SCALE N.T.S. OR AS NOTED

DWG. NO. H333000-WP401-05-030-0001

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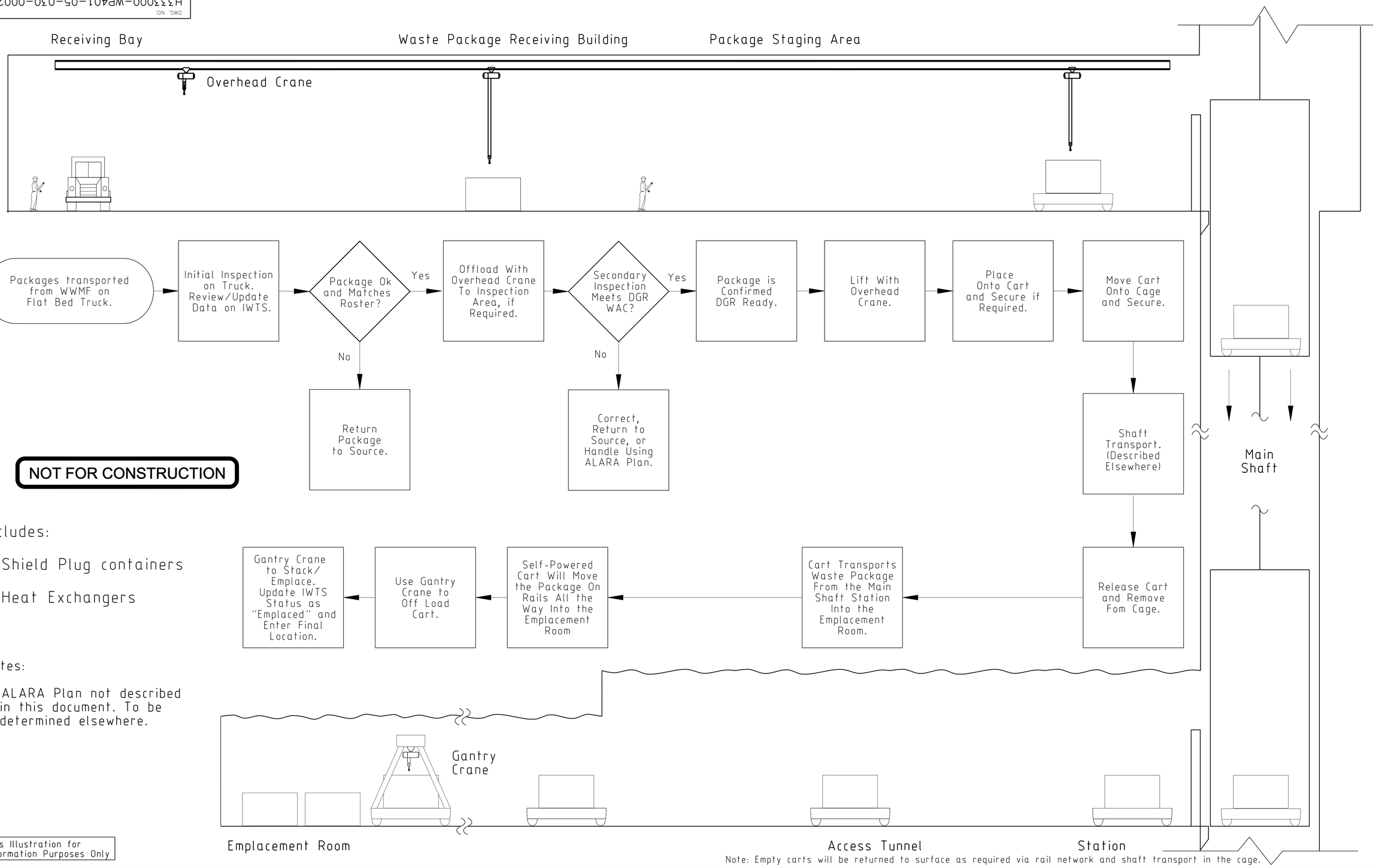

NOT FOR CONSTRUCTION

Includes:

- Shield Plug containers
- Heat Exchangers

Notes:

1. ALARA Plan not described in this document. To be determined elsewhere.

Note: Empty carts will be returned to surface as required via rail network and shaft transport in the cage.

This Illustration for Information Purposes Only

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REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Area Lead — Digitally signed by G.R. Davidge, Date: 2009.09.15 16:25:53 -04'00'
Engineering Manager — Sherwin Aarons 2009.09.16 18:22:14 -04'00'
Project Manager — Digitally signed by M.R. Dawborn, Date: 2009.09.17 11:16:29 -04'00'
Accepted by Owner — R.J. Heystee 2009.09.24 19:12:38 -04'00'

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NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

GROUP B – HEAVY NON-FORKLIFT

WASTE PACKAGE HANDLING METHODS
PACKAGE FLOW DIAGRAM

DESIGNED BY	DRAWN BY
D. WITOW	R. SETO
DATE 2009-09-15	DATE 2009-09-15
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M. R. DAWBORN	
DATE	

SCALE N.T.S. OR AS NOTED

DWG. NO. H333000-WP401-05-030-0002

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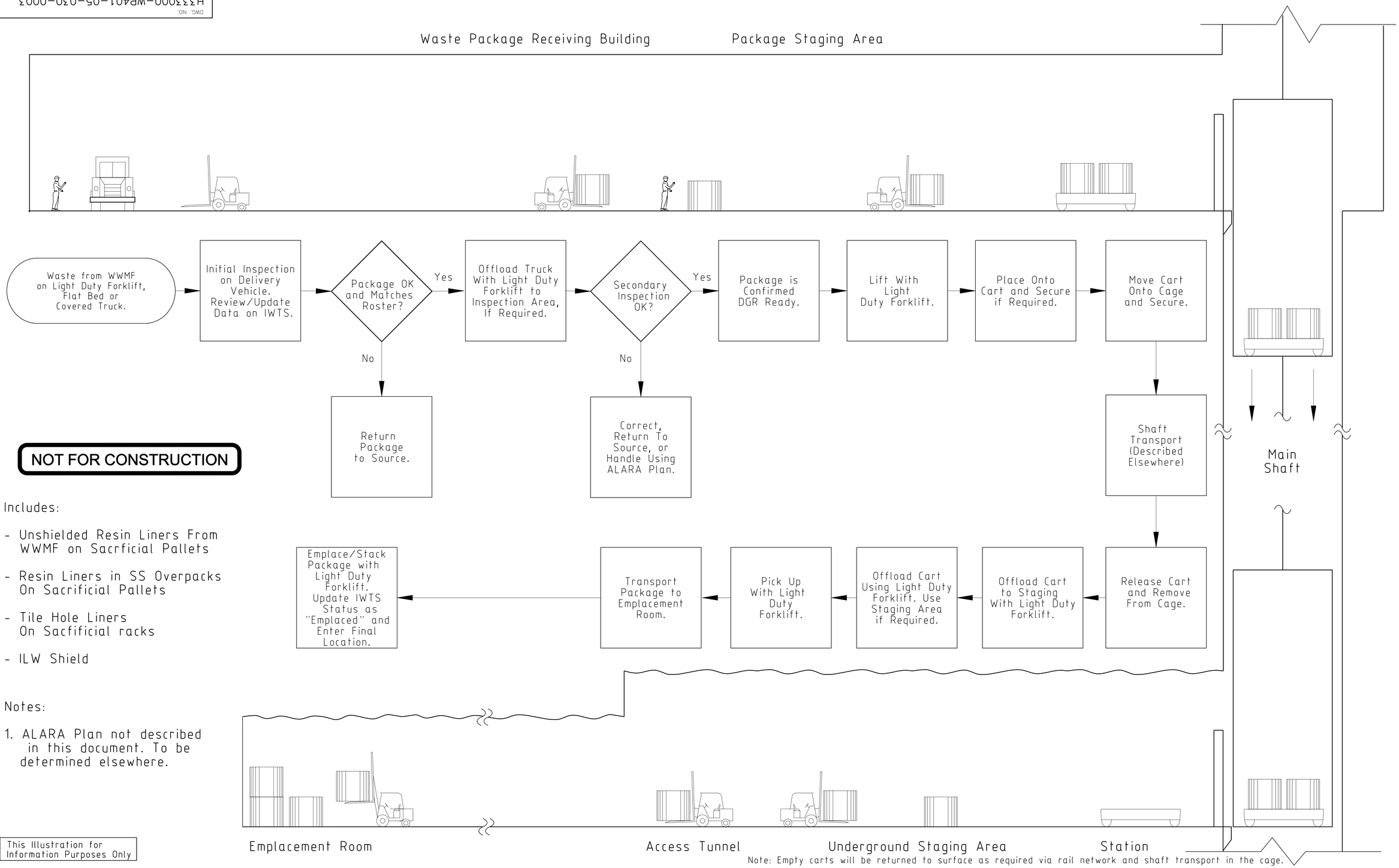

NOT FOR CONSTRUCTION

Includes:

- Unshielded Resin Liners From WWMF on Sacrficial Pallets
- Resin Liners in SS Overpacks On Sacrificial Pallets
- Tile Hole Liners On Sacfificial racks
- ILW Shield

Notes:

1. ALARA Plan not described in this document. To be determined elsewhere.

This Illustration for Information Purposes Only

Note: Empty carts will be returned to surface as required via rail network and shaft transport in the cage.

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Area Lead — G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.09.15 16:27:30 -04'00'
Engineering Mangager — Sherwin Aarons 2009.09.16 18:22:27 -04'00'
Project Manager — Digitally signed by M R Dawborn Date: 2009.09.17 11:16:48 -04'00'
Accepted by Owner — R.J. Heystee 2009.09.24 19:13:15 -04'00'

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DESIGNED BY D. WITOW DATE 2009-09-15	DRAWN BY R. SETO DATE 2009-09-15
CHECKED BY G. DAVIDGE DATE	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. M. R. DAWBORN DATE	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

GROUP C – LIGHT ILW

WASTE PACKAGE HANDLING METHODS PACKAGE FLOW DIAGRAM

SCALE	DWG. NO.	REV.
N.T.S. OR AS NOTED	H333000-WP401-05-030-0003	00

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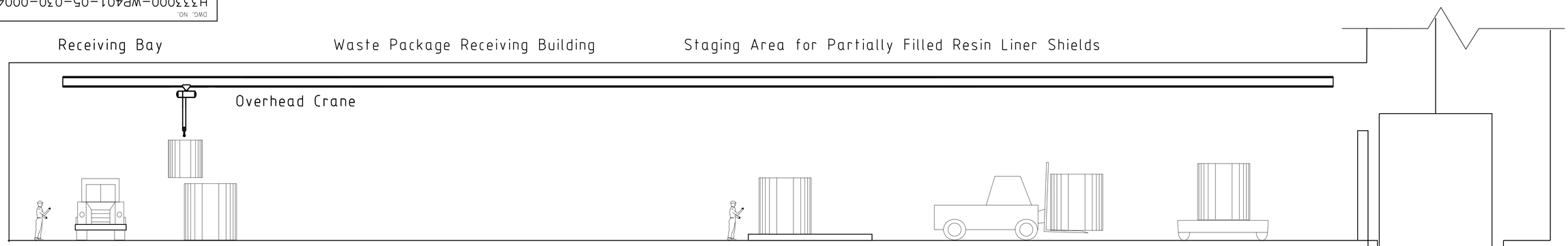


Package Transported From Nuclear Station On Flat Bed Truck, Using "Trillium Cask" or Equivalent. Initial Entry of New Package into IWTS.

Package Ok and Dose Rate Measured to Be Acceptable?

Yes

Remove Resin Liner From Cask With Overhead Crane. (Remotely if Required)

Shield Required?

Yes

Load Resin Liner Directly Into Shield. Apply IWTS Tag to Shield.

Shield Full?

Yes

Re-Measure Dose Rate. Shielding Adequate ?

Yes

Review/Update Data on IWTS. Replace Lid on Shield Using Overhead Crane.

Lift With Light Duty or Heavy Duty Forklift and Place Onto Cart. (See Note 2)

Move Cart Onto Cage and Secure.

Shaft Transport. (Described Elsewhere)

Release Cart and Remove From Cage.

Offload Cart With Light Duty or Heavy Duty Forklift. (See Note 2)

Transport Resin Liner to Emplacement Room

Use Light Duty or Heavy Duty Forklift to Stack/Emplace. (See Note 1)

Update IWTS Status as "Emplaced" and Enter Final Location.

No

Return Truck to Source, or Handle Using ALARA plan. (See Note 1)

No

Load Directly Onto Sacrificial Pallet. Apply IWTS Tag.

No

Review/Update Data on IWTS. Replace Lid on Shield Using Overhead Crane. Use Heavy Duty Forklift to Move to Shield Resin Liner Staging Area.

No

Move Liners to Appropriate Shield or Handle Using ALARA Plan.

NOT FOR CONSTRUCTION

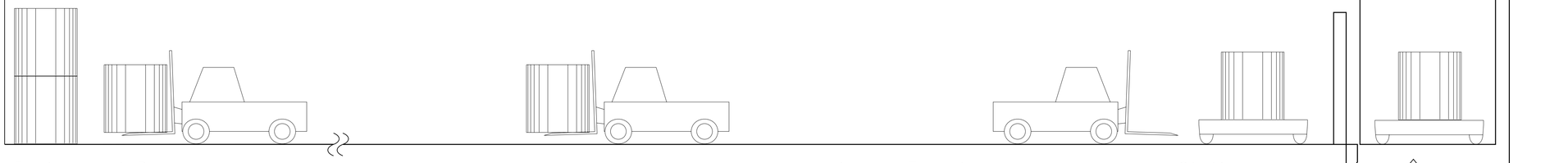
Includes:

- Fresh Resin Liners Arriving Directly from Nuclear Stations

Notes:

1. Handling may include transfer to Emplacement Room or to WWMF to allow Decay.
2. Unshielded Liners move with Light Duty Forklift. Shielded Liners move with Heavy Duty Forklift.
3. ALARA Plan not described in this document. To be determined elsewhere.

This Illustration for Information Purposes Only



Note: Empty carts will be returned to surface as required via rail network and shaft transport in the cage.

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Area Lead — G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.09.15 10:27:58 -04'00'
Engineering Manager — Sherwin Aarons 2009.09.16 18:22:41 -04'00'
Project Manager — Digitally signed by M R Dawborn Date: 2009.09.17 11:14:47 -04'00'
Accepted by Owner — R.J. Hélystee 2009.09.24 19:13:54 -04'00'

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NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

GROUP E – FRESH RESIN LINER

WASTE PACKAGE HANDLING METHODS
PACKAGE FLOW DIAGRAM

DESIGNED BY	DRAWN BY
D. WITOW	R. SETO
DATE 2009-09-15	DATE 2009-09-15
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M. R. DAWBORN	
DATE	

SCALE N.T.S. OR AS NOTED

DWG. NO. H333000-WP401-05-030-0004

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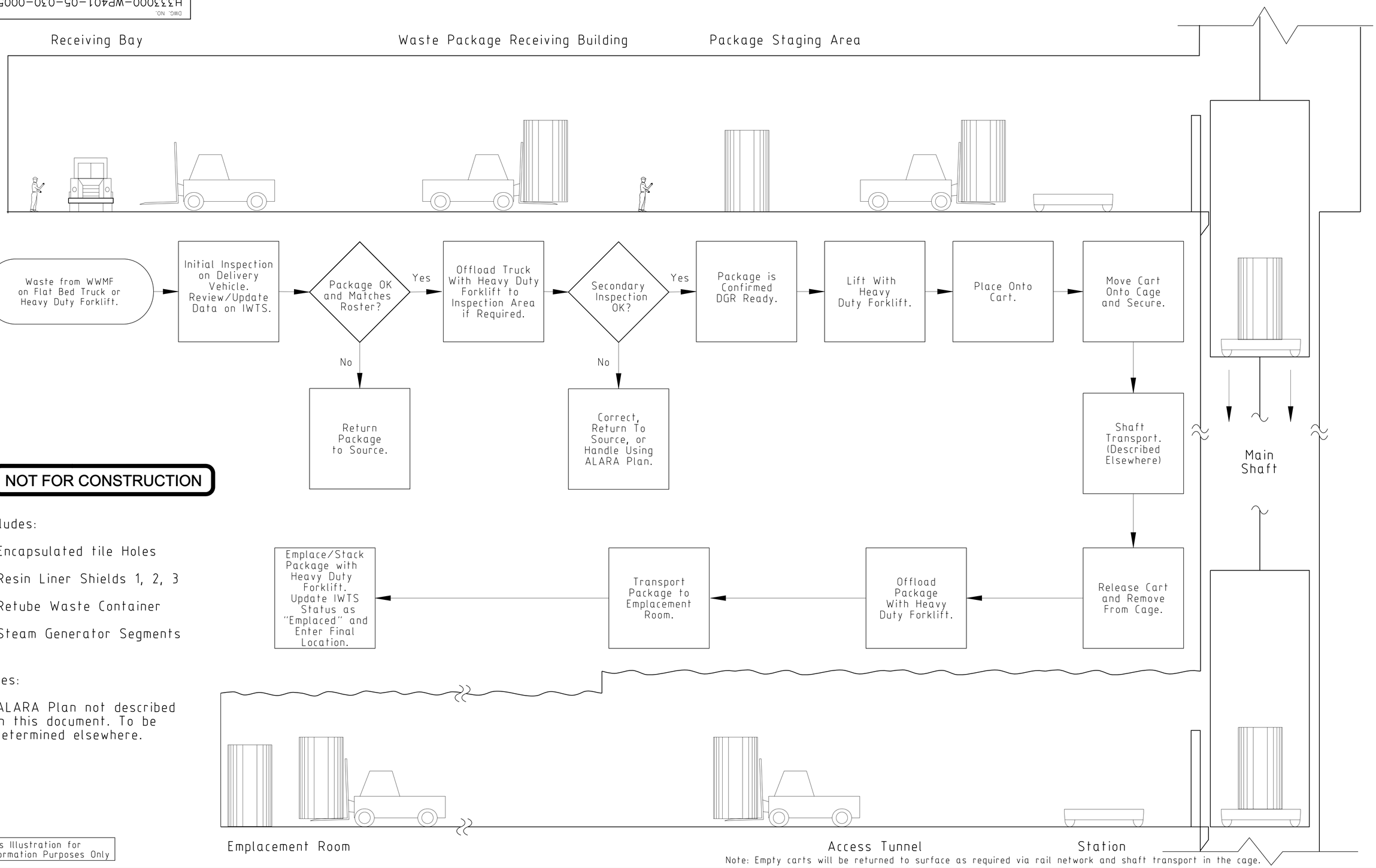

NOT FOR CONSTRUCTION

Includes:

- Encapsulated tile Holes
- Resin Liner Shields 1, 2, 3
- Retube Waste Container
- Steam Generator Segments

Notes:

1. ALARA Plan not described in this document. To be determined elsewhere.

Note: Empty carts will be returned to surface as required via rail network and shaft transport in the cage.

This Illustration for Information Purposes Only

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Area Lead — Digitally signed by G.R. Davidge Date: 2009.09.15 16:28:34 -04'00'
Engineering Mangager — Sherwin Aarons 2009.09.16 18:21:44 -04'00'
Project Manager — Digitally signed by M.R Dawborn Date: 2009.09.17 11:15:43 -04'00'
Accepted by Owner — R.J. Heystee 2009.09.24 19:14:28 -04'00'

REV.	ISSUE FOR	AUTH. BY	DATE
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DESIGNED BY	DRAWN BY
D. WITOW	R. SETO
DATE 2009-09-15	DATE 2009-09-15
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR. M. R. DAWBORN	
DATE	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

GROUP F – HEAVY FORKLIFTABLE

WASTE PACKAGE HANDLING METHODS
PACKAGE FLOW DIAGRAM

SCALE	DWG. NO.	REV.
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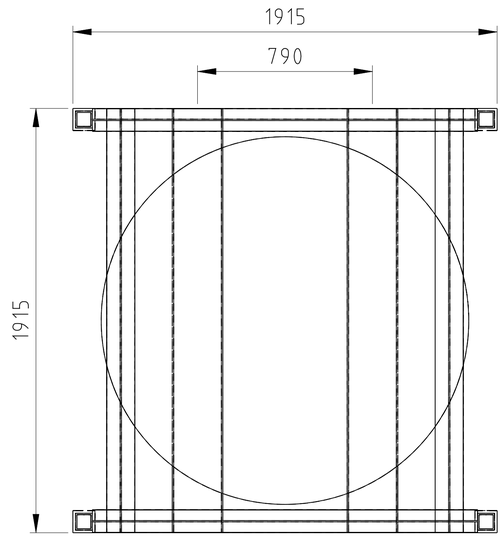
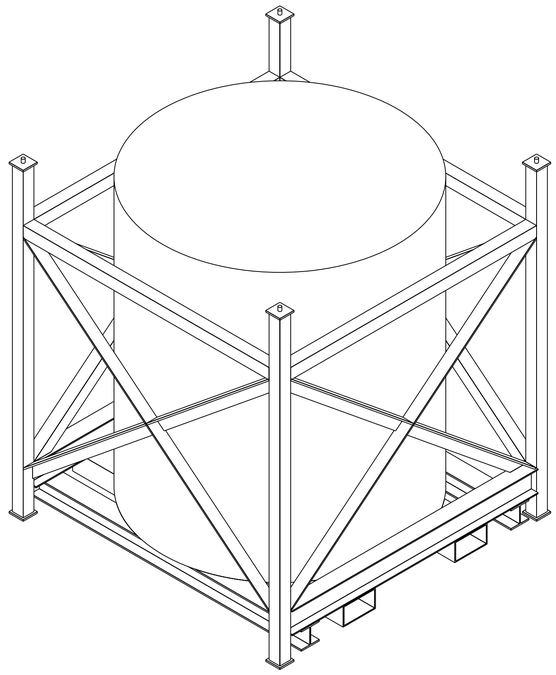
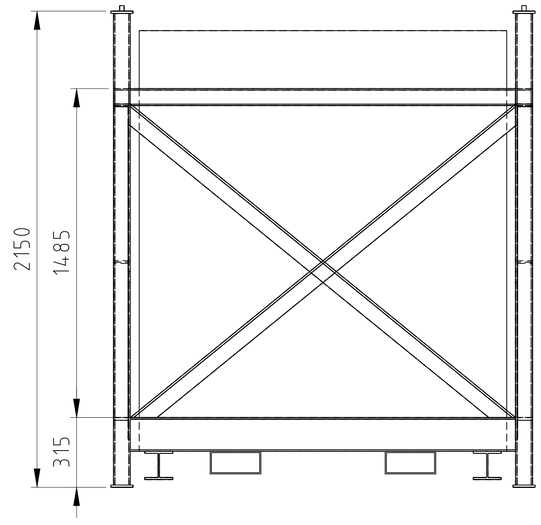


PLAN



ISOMETRIC VIEW



FRONT

MASS OF STRUCTURE = 670kg
DESIGN LOAD = 6000kg
TOTAL MASS FOR HANDLING = 6670kg
CAPACITY = ONE UNSHIELDED RESIN LINER (WITH OR WITHOUT STAINLESS STEEL OVERPACK)

STACKING: 2-HIGH MAX

FOR DESIGN CRITERIA
SEE H333000-WP401-10-220-0001

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner

Area Lead
Digitally signed by M R Dawborn
Reason: On behalf of Glen Davidge
Date: 2009.10.28 10:48:11 -04'00'

Engineering Mangager
Sherwin Aarons
2009.10.28 10:12:40 -04'00'

Project Manager
Digitally signed by M R Dawborn
Date: 2009.10.28 10:48:18 -04'00'

Accepted by Owner
R.J. Heystee
2009.10.30 16:27:14 -04'00'

NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

NO.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD | SAA	2009-10-22

ISSUE AUTHORIZATION

DESIGNED BY D. BHATTAL DATE 2009-09-23	DRAWN BY K. BUSHEY DATE 2009-09-23
CHECKED BY DATE	DISCIP. ENGR. DATE
PROJ. MGR. M. DAWBORN DATE	PROJ. ENGR. DATE

HATCH

SCALE NTS OR AS NOTED

NWMO DEEP GEOLOGIC REPOSITORY PROJECT

GENERAL ARRANGEMANT
SACRIFICIAL PALLET
UNSHIELDED RESIN LINERS

DRAWING NO. H333000-WP401-35-042-0001 | SHT. | REV. 00

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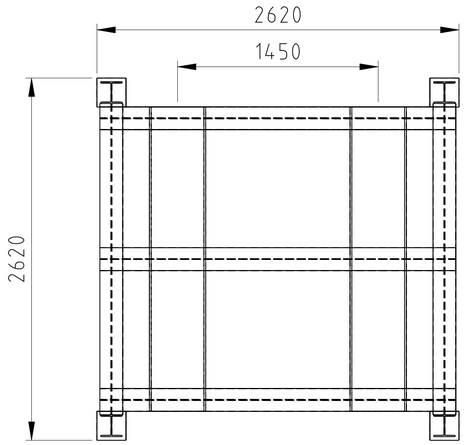
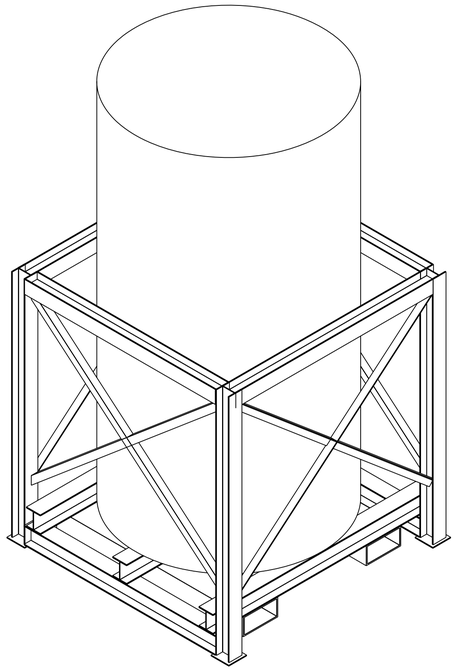
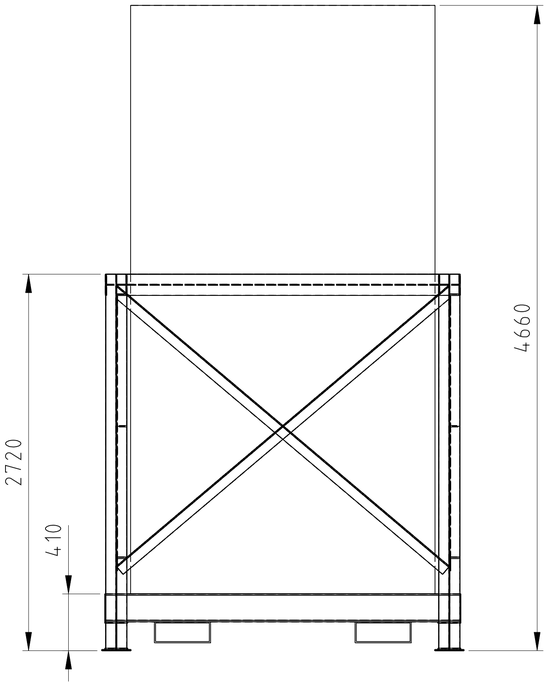


PLAN



ISOMETRIC VIEW



FRONT

MASS OF STRUCTURE = 1800kg
DESIGN LOAD = 29760kg
TOTAL MASS FOR HANDLING = 31560kg
CAPACTIY = ONE RESIN LINER SHELL "SHIELD 1" FROM QUADRICELL

FOR DESIGN CRITERIA
SEE H333000-WP401-10-220-0001

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner

Area Lead
Digitally signed by M R Dawborn
Reason: On behalf of Glen Davidge
Date: 2009.10.28 10:48:35 -04'00'

Engineering Mangager
Sherwin Aarons
2009.10.28 10:13:14 -04'00'

Project Manager
Digitally signed by M R Dawborn
Date: 2009.10.28 10:48:42 -04'00'

Accepted by Owner
R.J. Heystee
2009.10.30 16:28:18 -04'00'

NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

NO.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD	SAA	2009-10-22

ISSUE AUTHORIZATION

DESIGNED BY D. BHATTAL DATE 2009-09-23	DRAWN BY K. BUSHEY DATE 2009-09-23
CHECKED BY DATE	DISCIP. ENGR. DATE
PROJ. MGR. M. DAWBORN DATE	PROJ. ENGR. DATE

HATCH

SCALE NTS OR AS NOTED

NWMO DEEP GEOLOGIC REPOSITORY PROJECT

GENERAL ARRANGEMENT
SACRIFICIAL PALLET
RESIN LINER SHELLS FROM QUADRICELLS

DRAWING NO. H333000-WP401-35-042-0002 | SHT. | REV. 00

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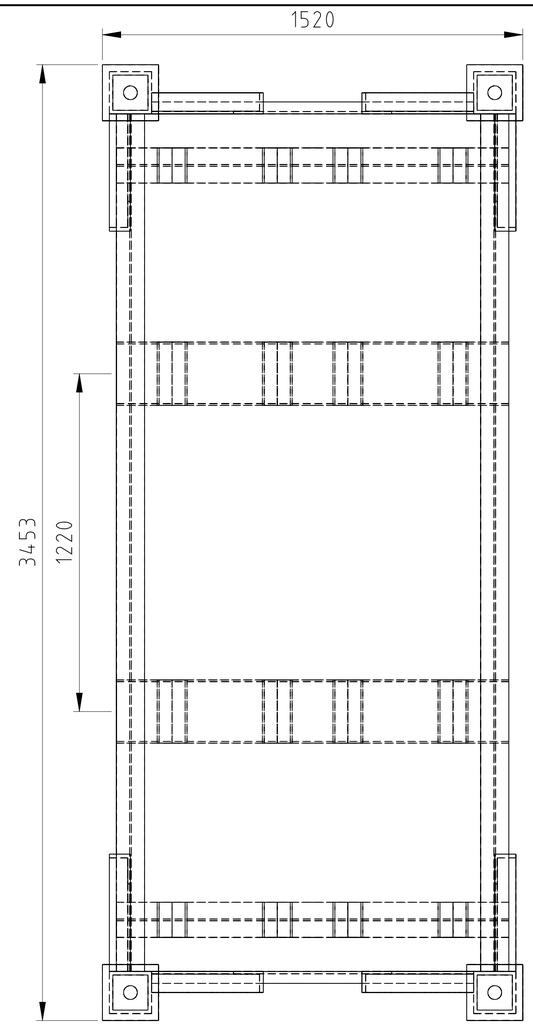
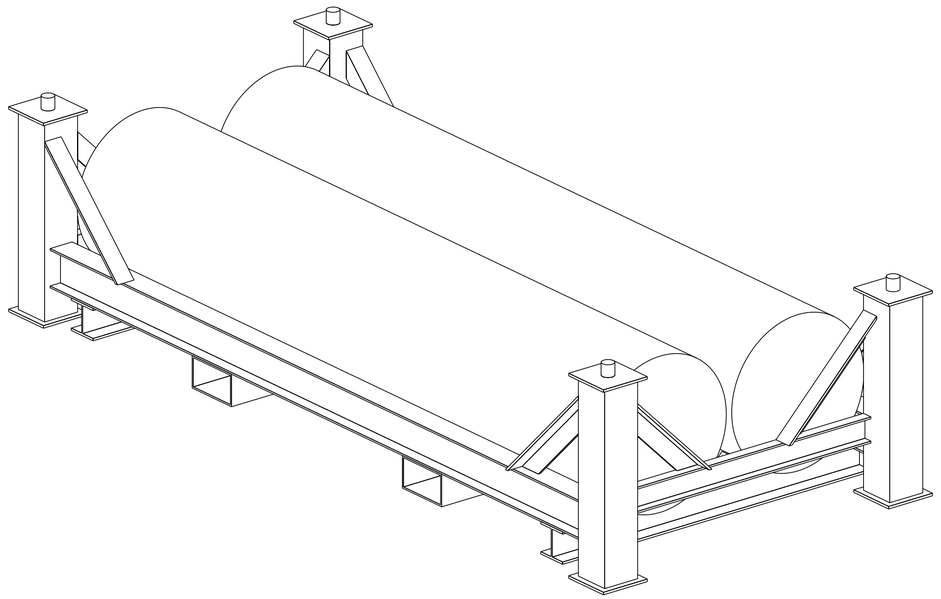
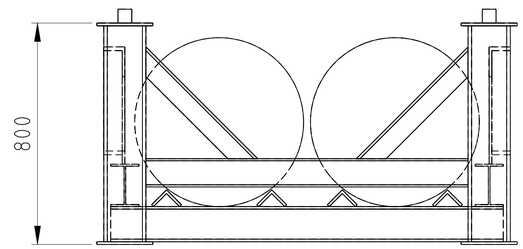


PLAN



ISOMETRIC VIEW



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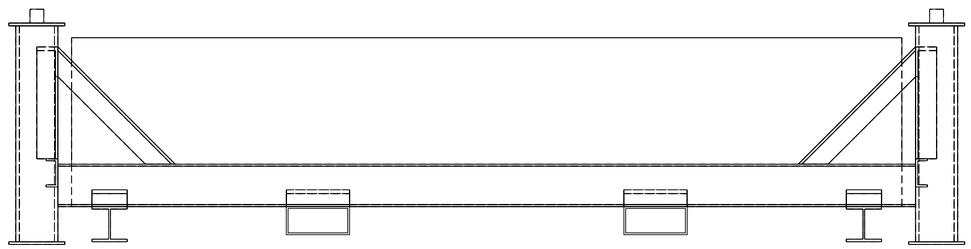

RIGHT

MASS OF STRUCTURE = 565kg
DESIGN LOAD = 4400kg
TOTAL MASS FOR HANDLING = 4965kg
CAPACITY: TWO TILE HOLE LINERS

STACKING: 5-HIGH MAX

FOR DESIGN CRITERIA
SEE H333000-WP401-10-220-0001

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner

Area Lead
Digitally signed by M R Dawborn
Reason: On behalf of Glen Davidge
Date: 2009.10.28 10:48:57 -04'00'

Engineering Mangager
Sherwin Aarons
2009.10.28 10:13:34 -04'00'

Project Manager
Digitally signed by M R Dawborn
Date: 2009.10.28 10:49:03 -04'00'

Accepted by Owner
R.J. Heystee
2009.10.30 16:29:09 -04'00'

NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

NO.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD	SAA 2009-10-22

ISSUE AUTHORIZATION

DESIGNED BY D. BHATTAL DATE 2009-09-25	DRAWN BY K. BUSHEY DATE 2009-09-25
CHECKED BY DATE	DISCIP. ENGR. DATE
PROJ. MGR. DATE	PROJ. ENGR. DATE

HATCH

NWMO DEEP GEOLOGIC REPOSITORY PROJECT

GENERAL ARRANGEMENT
SACRIFICIAL RACK
TILE HOLE LINERS

SCALE NTS OR AS NOTED

DRAWING NO. H333000-WP401-35-042-0003

SHT.

REV. 00

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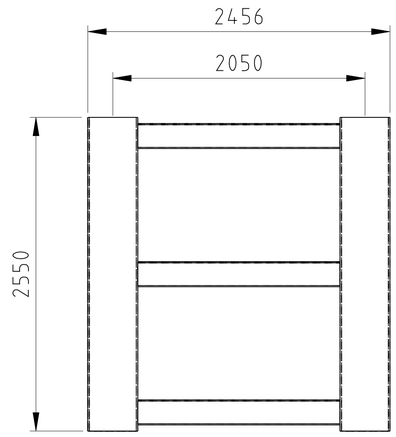
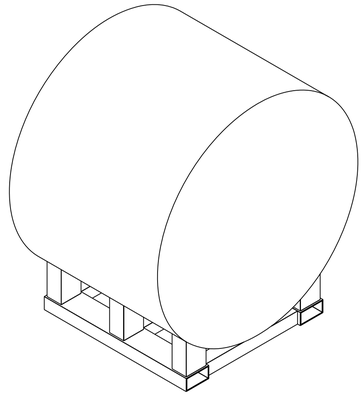
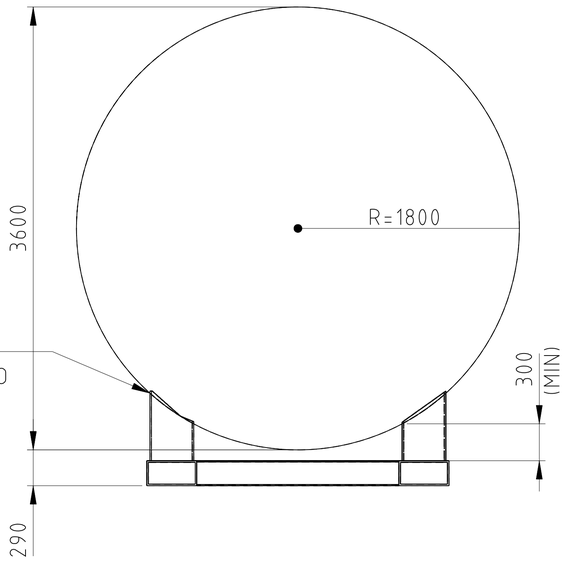


PLAN



ISOMETRIC VIEW



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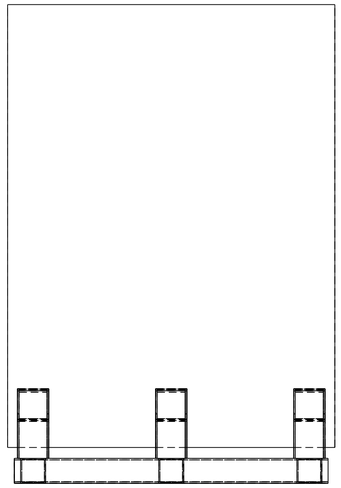

RIGHT

MASS OF STRUCTURE = 970kg
DESIGN LOAD = 35000kg
TOTAL MASS FOR HANDLING = 35970kg
CAPACITY = ONE BRUCE B STEAM GENERATOR SEGMENT

FOR DESIGN CRITERIA
SEE H333000-WP401-10-220-0001

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner
Daryl Wilson

Area Lead
Digitally signed by M R Dawborn
Reason: On behalf of Glen Davidge
Date: 2009.10.28 10:47:46 -04'00'

Engineering Mangager
Sherwin Aarons
2009.10.28 10:12:16 -04'00'

Project Manager
Digitally signed by M R Dawborn
Date: 2009.10.28 10:47:52 -04'00'

Accepted by Owner
R.J. Heystee
2009.10.30 16:26:29 -04'00'

NOT FOR CONSTRUCTION

NO.	DESCRIPTION	CHK'D	APP'D	DATE
00	APPROVED FOR USE	GRD	SAA	2009-10-22

REVISIONS | ISSUE AUTHORIZATION

DESIGNED BY D. BHATTAL DATE 2009-09-24	DRAWN BY K. BUSHEY DATE 2009-09-24
CHECKED BY DATE	DISCIP. ENGR. DATE
PROJ. MGR. DATE	PROJ. ENGR. DATE

HATCH

NWMO DEEP GEOLOGIC REPOSITORY PROJECT

GANERAL ARRANGEMENT
SUPPORT FRAME
BRUCE B STEAM GENERATOR SEGMENT

SCALE NTS OR AS NOTED

DRAWING NO. H333000-WP401-35-042-0004 | SHT. | REV. 00

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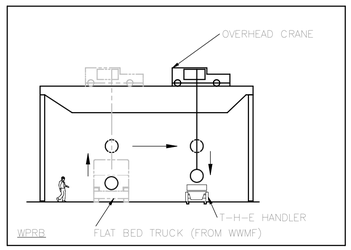
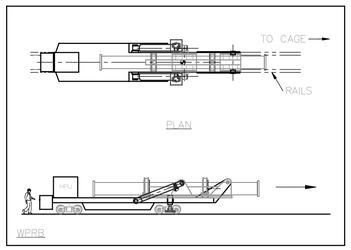
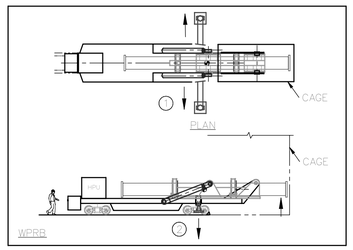


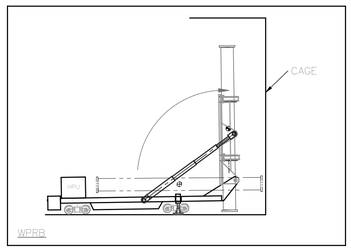
1) OVERHEAD CRANE UNLOADS T-H-E TRANSFER BELL FROM FLAT-BED TRUCK AND LOADS T-H-E HANDLER INSIDE THE WPRB.



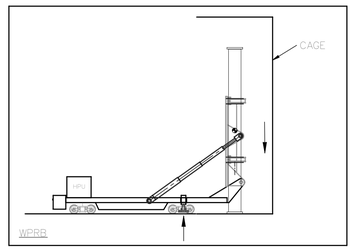
2) THE TRANSFER BELL IS SECURED TO THE T-H-E HANDLER. THE T-H-E HANDLER DRIVES TOWARD CAGE.



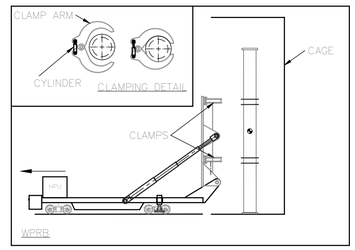
3) WITH END OF TRANSFER BELL INSIDE CAGE, T-H-E HANDLER EXTENDS OUTRIGGER STABILIZERS OUT, THEN DOWN.



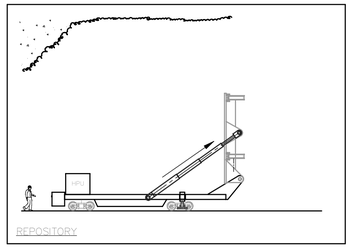
4) TRANSFER BELL IS ROTATED INTO VERTICAL POSITION.



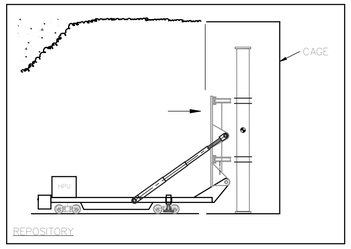
5) T-H-E HANDLER LOWERS TRANSFER BELL ONTO CAGE FLOOR. TRANSFER BELL IS SECURED TO CAGE. (CAGE SECURING HARDWARE NOT SHOWN.)



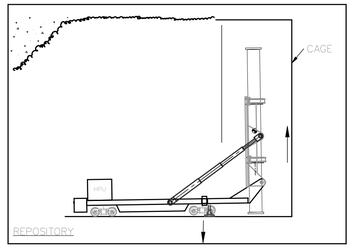
6) T-H-E HANDLER RELEASES CLAMPS, AND WITHDRAWS FROM CAGE. CAGE DESCENDS TO REPOSITORY LEVEL.



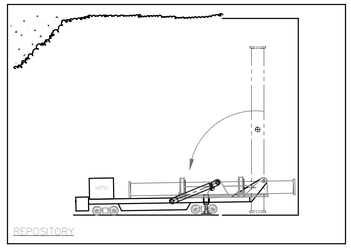
7) T-H-E HANDLER AT REPOSITORY LEVEL EXTENDS MAIN HOISTING CYLINDERS.



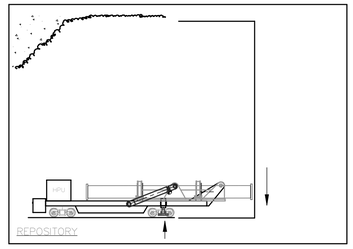
8) CAGE ARRIVES AT REPOSITORY LEVEL. T-H-E HANDLER APPROACHES CAGE TO LOCATE CLAMPS AROUND TRANSFER BELL COLLARS.



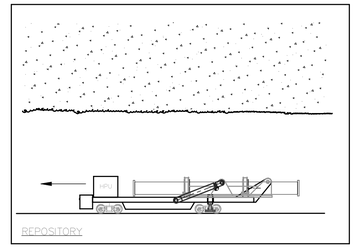
9) T-H-E HANDLER LIFTS TRANSFER BELL WITH OUTRIGGER STABILIZERS



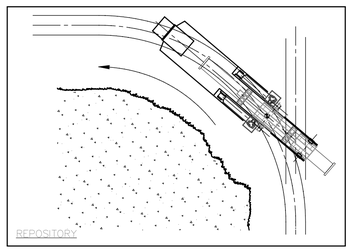
10) T-H-E HANDLER ROTATES TRANSFER BELL INTO HORIZONTAL POSITION.



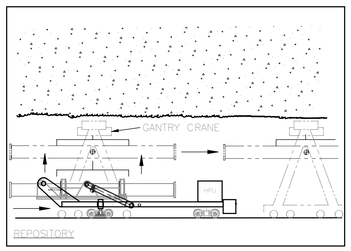
11) T-H-E HANDLER RETRACTS OUTRIGGER STABILIZERS, AND DRIVES AWAY FROM CAGE.



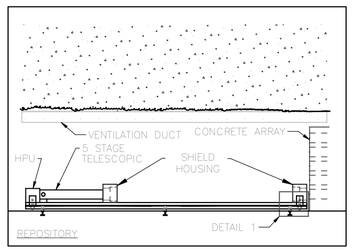
12) T-H-E HANDLER TRANSPORTS TRANSFER BELL (IN HORIZONTAL POSITION) ALONG RAILS TOWARD EMPLACEMENT ROOM.



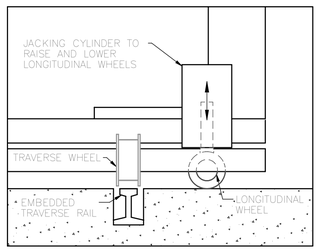
13) T-H-E HANDLER ENTERS EMPLACEMENT ROOM BY FOLLOWING CURVATURE OF RAIL.



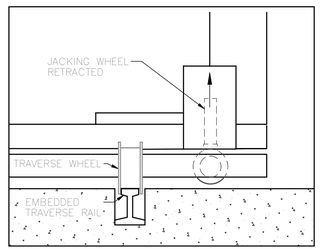
14) GANTRY CRANE REMOVES T-H-E TRANSFER BELL FROM T-H-E HANDLER.



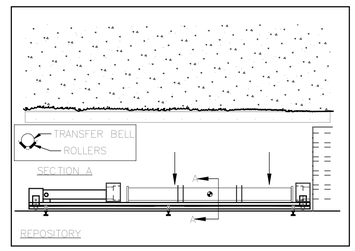
15) AT THE CONCRETE ARRAY LOCATION, HEM ROLLS TO CENTRE OF TRAVERSE RAILS TO PREPARE FOR TRANSFER BELL LOADING.



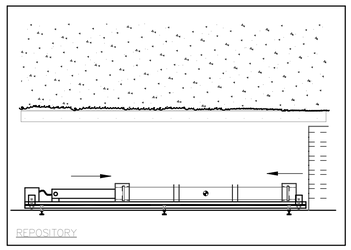
DETAIL 1-A



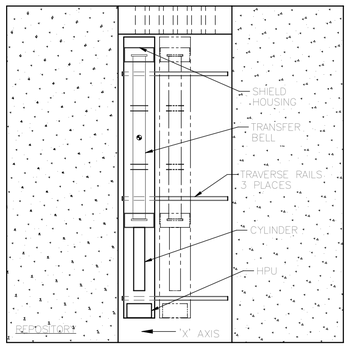
DETAIL 1-B



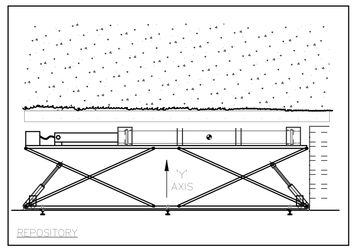
16) GANTRY CRANE (NOT SHOWN) LOWERS TRANSFER BELL ONTO HEM. TRANSFER BELL SUPPORTED ON ROLLERS.



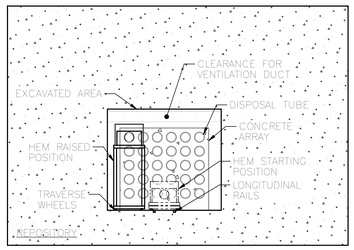
17) SHIELD HOUSINGS ON BOTH ENDS PULLED OVER TRANSFER BELL BY HYDRAULIC CYLINDERS.



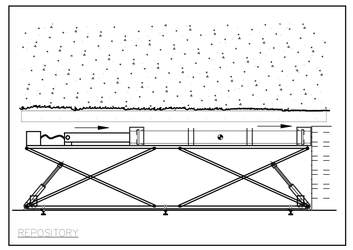
18) HEM MOVES ALONG TRAVERSE RAILS TO ITS INTENDED 'X' POSITION.



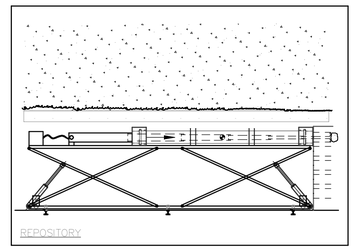
19) HEM IS SECURED TO CONCRETE FLOOR USING PRE-INSTALLED EMBEDDED CLIPS. HEM RISES TO ALIGN TRANSFER BELL WITH CONCRETE DISPOSAL TUBE 'Y' POSITION.



20) FRONT VIEW OF CONCRETE ARRAY AS HEM POSITIONS ITSELF TO EMPLACE T-H-E LINER.



21) HYDRAULIC CYLINDERS MOVE SHIELD HOUSINGS AND TELESCOPIC CYLINDER UNTIL FLUSH WITH FACE OF CONCRETE ARRAY. SHIELD HOUSING OPENS END CAPS.



22) 5-STAGE HYDRAULIC CYLINDER EXTENDS, PUSHING T-H-E LINER THROUGH TRANSFER BELL AND INTO CONCRETE ARRAY. DISPOSAL TUBE IS CAPPED WITH CONCRETE PLUG.

NOTES:

1. THIS DRAWING IS CONCEPT ONLY. NOT TO BE USED FOR FABRICATION.
2. THIS DRAWING MUST BE READ WITH IN CONJUNCTION FUNCTIONAL DESCRIPTIONS H333000-WP401-50-109-0001 AND H333000-WP401-50-109-0002.

CONCEPT ONLY
NOT FOR FABRICATION

This Illustration for Information Purposes Only

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner

Area Lead — G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.09.16 14:22:14 -04'00'

Engineering Mangager — Sherwin Aarons 2009.09.16 18:16:03 -04'00'

Project Manager — Digitally signed by M R Dawborn Date: 2009.09.17 11:13:54 -04'00'

Accepted by Owner — R.J. Heystee 2009.09.24 19:29:25 -04'00'

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

REV.	ISSUE FOR	GRD. AUTH. BY	SAA 2009-09-15 DATE
00	APPROVED FOR USE		
ISSUE AUTHORIZATION			

HATCH™

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

T-H-E HANDLING CONCEPT STORY BOARD
GENERAL ARRANGEMENT

DESIGNED BY	DRAWN BY
G. HOLOHAN/I. AHMAD	G. HOLOHAN/I. AHMAD
DATE 2009-09-15	DATE 2009-09-15
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M. DAWBORN	
DATE 2009-09-15	

SCALE N.T.S. OR AS NOTED

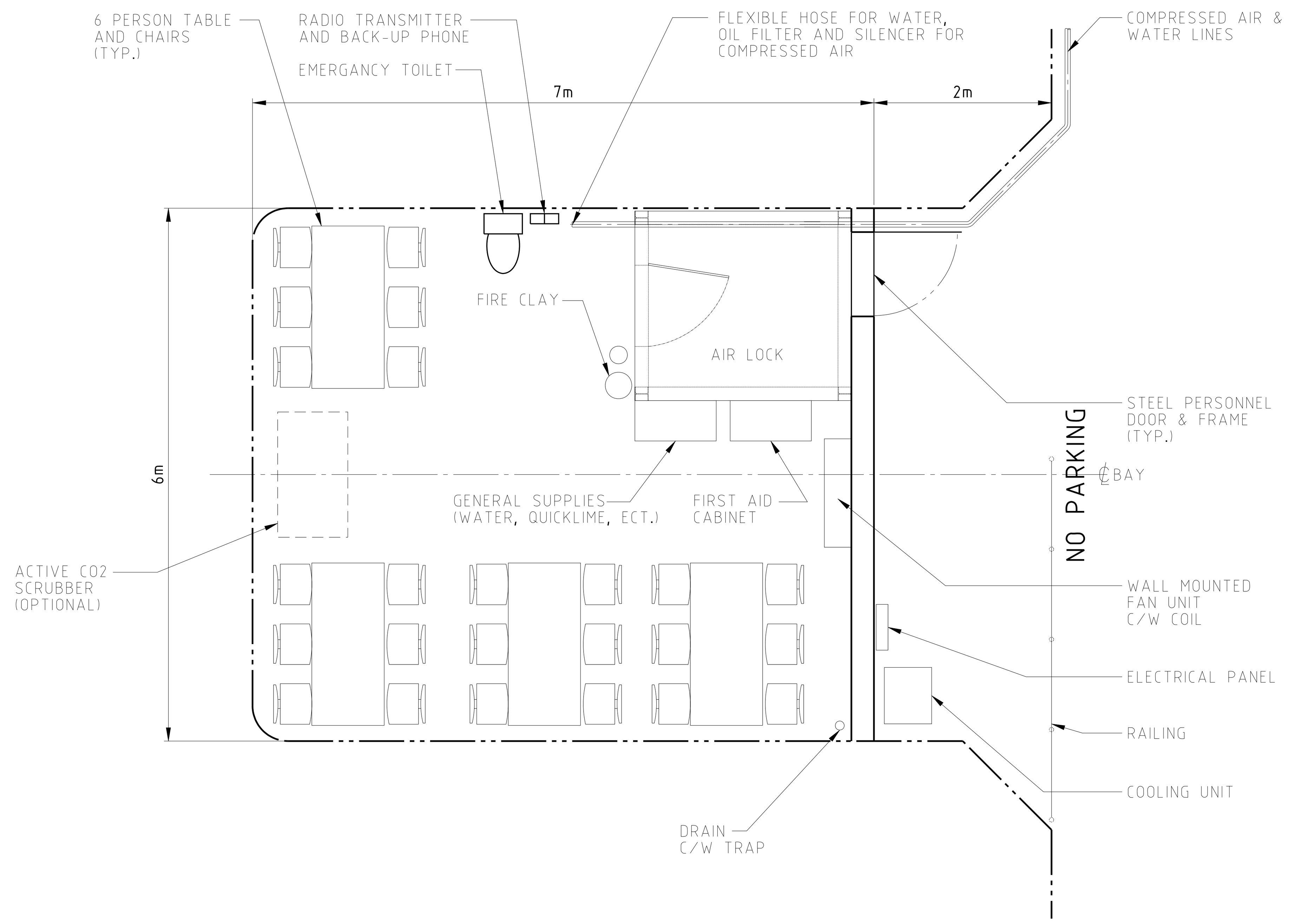
DWG. NO. H333000-WP401-50-042-0001

REV. 00

DWG. NO. H333000-WP402-05-042-0001

NOTES:

1. FOR REFUGE STATION FUNCTIONAL SPECIFICATION SEE H333000-WP402-20-109-0001.
2. THIS ARRANGEMENT APPLIES TO BOTH REFUGE STATIONS.
3. CAPACITY: 25 PERSONS



REFUGE STATION

(TYP.)

PRELIMINARY

NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner
Digitally signed by Al Boissonneault
DN: cn=Al Boissonneault, c=CA, o=Hatch Sudbury, ou=MMP, email=aboissonneault@hatch.ca
Reason: I am approving this document
Location: Sudbury, Ontario
Date: 2009.11.26 15:20:33 -05'00'

Area Lead
Digitally signed by G.R. Davidge
Date: 2009.11.26 17:18:58 -05'00'

Engineering Mangager
Sherwin Aarons
2009.11.27 11:15:31 -05'00'

Project Manager
Digitally signed by M R Dawborn
Date: 2009.11.30 14:29:09 -05'00'

Accepted by Owner
R.J. Heystee
2009.12.03 16:18:49 -05'00'

REV.	ISSUE FOR	AUTH. BY		DATE
00	APPROVED FOR USE	AB	SAA	2009-11-25
ISSUE AUTHORIZATION				

HATCH

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

DESIGNED BY B. PERRY DATE 09.10.09
DRAWN BY K. BUSHEY DATE 09.10.09
CHECKED BY / DATE
DISCIP. ENGR. / DATE
PROJ. DES. COORD. / DATE
PROJ. ENGR. / DATE
PROJ. MGR. M.R. DAWBORN / DATE

PRELIMINARY DESIGN

UNDERGROUND PERMANENT
REFUGE STATIONS
GENERAL ARRANGEMENT

SCALE 1:50 OR AS NOTED

DWG. NO. H333000-WP402-05-042-0001

REV. 00

P:\NUCLEAR_333000\CAD\M\DGN\WP402\Approved for Use\H333000-WP402-05-042-0001.dgn
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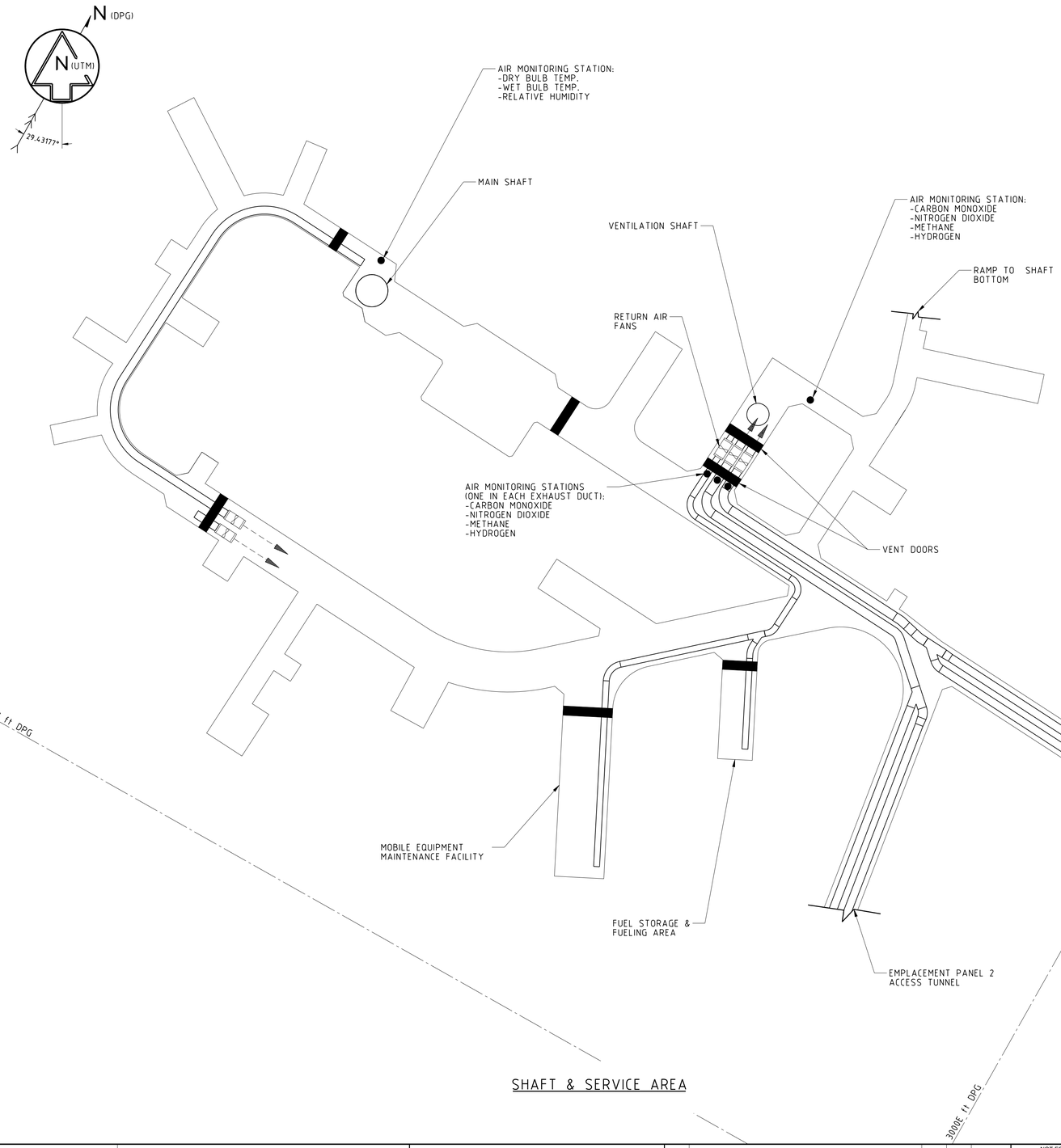
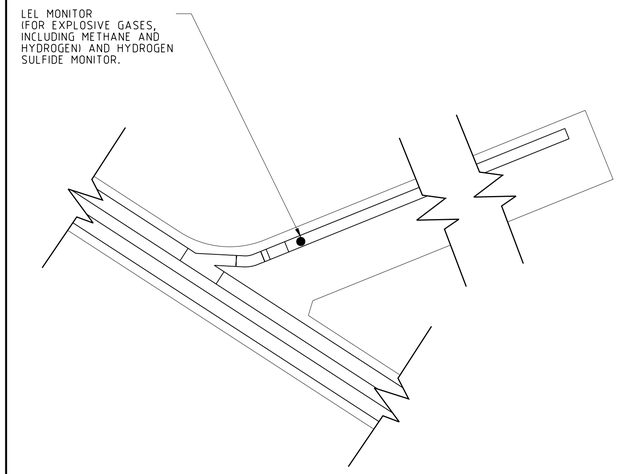
bus53169

DWG. NO. H333000-WP402-75-042-0001



SHAFT & SERVICE AREA



TYPICAL EMPLACEMENT ROOM DETAIL

(NTS)

NOTES:

1. THE INTAKE AIR PLENUM ON SURFACE WILL BE MONITORED FOR CARBON MONOXIDE, WET BULB TEMPERATURE AND DRY BULB TEMPERATURE.
2. ADDITIONAL CARBON MONOXIDE DETECTORS WILL BE INSTALLED AS PART OF THE FIRE DETECTION SYSTEM, INCLUDING IN THE EMPLACEMENT ROOM EXHAUST DUCTS AND THROUGHOUT THE SERVICES AREA.
3. MONITORING FOR RADIOACTIVITY (e.g. RADON, TRITIUM, AND C-14) WILL LIKELY BE REQUIRED.

PRELIMINARY
NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner
Area Lead — G.R. Davidge — Digitally signed by G.R. Davidge Date: 2010.01.12 08:58:37 -05'00'
Engineering Manager — Sherwin Aarons 2010.01.12 11:56:46 -05'00'
Project Manager — Sherwin Aarons 2010.01.12 11:56:57 -05'00'
Accepted by Owner — R.J. Heystee 2010.01.12 17:33:04 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	AB	SA 10-01-11
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY	DRAWN BY
K. HORTIN	S. WELLS
DATE 09-11-26	DATE 09-11-26
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M. DAWBORN	
DATE 2010-01-11	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

OPERATIONAL SAFETY SYSTEMS

VENTILATION SYSTEM – UNDERGROUND AIR QUALITY MONITORING SYSTEM GENERAL ARRANGEMENT

SCALE	DWG. NO.	REV.
1:500 OR AS NOTED	H333000-WP402-75-042-0001	00

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1/11/2010 11:55:57 AM
well41443

DWG. NO. H333000-WP403-10-042-0001

2000E 11 DPG

3000N 11 DPG

3000E 11 DPG

2000N 11 DPG

PROPANE TANK FILLING STATION

HEATER HOUSE

POSSIBLE FUTURE: BULK AIR COOLER CONDENSER COOLING TOWERS REFRIGERATION PLANT

EMERGENCY DIESEL GENERATOR

ELECTRICAL SUB-STATION

STORMCEPTOR No.1

PROPANE STORAGE

MAIN SHAFT HEADFRAME

AIR COMPRESSOR PLANT

ELECT. ROOM

EMERGENCY ACCESS

VENTILATION SHAFT HEADFRAME

COLLAR HOUSE

WASTE PACKAGE RECEIVING BUILDING

AMENITIES BUILDING

OFFICES & MAIN CONTROL ROOM

PARKING

HOIST HOUSE

EXHAUST FANS

EXISTING ROAD

FENCE LINE

DGR PROJECT SITE BOUNDARY

DGR SURFACE FACILITIES

WASTE ROCK MANAGEMENT AREA
EL. 219.00

N (DPG)

N (UTM)

29.43177°

EMERGENCY ACCESS

WATER SAMPLING STATION

STORMCEPTOR No.2

CULVERTS SEE DWG. H333000-WP403-10-042-0003

EXISTING DITCH AND CULVERT TO REMAIN

PROPOSED FIBRE OPTIC CABLE JUNCTION BOX

ACCESS TO DGR FACILITY FROM WWMF

EXISTING WESTERN WASTE MANAGEMENT FACILITY (WWMF)

4000E 11 DPG

0 20 40

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
01	WAS OFFICES & CONTROL ROOM	G.K.	S.A.	10-04-23
REVISIONS				

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner — Sherwin Aarons 2010.04.26 13:56:38 -04'00'

Area Lead

Engineering Manager — Sherwin Aarons 2010.04.26 13:56:46 -04'00'

Project Manager — Digitally signed by Martyn Davison Date: 2010.04.26 10:53:51 -04'00'

Accepted by Owner — R.J. Heystee 2010.04.27 07:41:10 -04'00'

REV.	ISSUE FOR	AUTH. BY	DATE
01	APPROVED FOR USE	G.K.	S.A. 10-04-23
00	APPROVED FOR USE	G.K.	S.A. 10-01-11
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY	DRAWN BY
M. FARRELL DATE 2009-10-29	L. SHIELDS DATE 2009-10-29
CHECKED BY	DISCIP. ENGR.
M. FARRELL DATE 2009-12-16	G. KRAMER DATE 2009-12-16
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. M. DAWBORN DATE 2009-11-25	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT SERVICE FACILITY AREA (SSFA)

OPERATIONS LAYOUT
GENERAL ARRANGEMENT

SCALE 1:1000 OR AS NOTED

DWG. NO. H333000-WP403-10-042-0001

REV. 01

P:\NUCLEAR\333000\CAD\G\H333000-WP403-10-042-0001.dgn
4/26/2010 12:26:08 PM
SHIE9478

DWG. NO. H333000-WP403-10-042-0002

NOTES:

- BUILDING - PRESENT DURING SHAFT SINKING AND/OR LATERAL DEVELOPMENT *
- BUILDING - PRESENT DURING OPERATIONS ONLY

* FOR ALL BUILDINGS PRESENT DURING OPERATIONS REFER TO DRAWING H/333000-WP403-10-042-0001

CONSTRUCTION FENCING:
- SSFA TO BE ENCLOSED BY CHAIN LINK FENCE;
- WRMA AND CONSTRUCTION AREA TO BE ENCLOSED BY SNOW FENCE

FENCE LINE OMITTED FROM DRAWING FOR CLARITY

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
01	FACILITY NAME CHANGES	G.K.	S.A.	10-04-23
REVISIONS				

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner — Sherwin Aarons 2010.04.27 17:00:42 -04'00'

Area Lead — Digitally signed by Gas J.E. Kramer DN: cn=Gas J.E. Kramer, o=Nuclear Waste Management Organization, ou=Deep Geologic Repository Project, email=gkramer@hatch.ca, c=CA Date: 2010.04.27 17:00:47 -04'00'

Engineering Manager — Sherwin Aarons 2010.04.27 17:00:47 -04'00'

Project Manager — Digitally signed by M R Dawborn Date: 2010.04.27 22:46:53 -04'00'

Accepted by Owner — R.J. Heystee 2010.04.28 11:36:01 -04'00'

REV.	ISSUE FOR	AUTH. BY	DATE
01	APPROVED FOR USE	G.K.	S.A. 10-04-23
00	APPROVED FOR USE	G.K.	S.A. 10-01-11
ISSUE AUTHORIZATION			

HATCH™

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT SERVICE FACILITY AREA (SSFA)

CONSTRUCTION LAYOUT
GENERAL ARRANGEMENT

DESIGNED BY	DRAWN BY
M. FARRELL	L. SHIELDS
DATE 2009-11-16	DATE 2009-11-16
CHECKED BY	DISCIP. ENGR.
M. FARRELL	G. KRAMER
DATE 2009-12-16	DATE 2009-12-16
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M. DAWBORN	
DATE 2009-11-25	

SCALE 1:2000 OR AS NOTED

DWG. NO. H333000-WP403-10-042-0002

REV. 01

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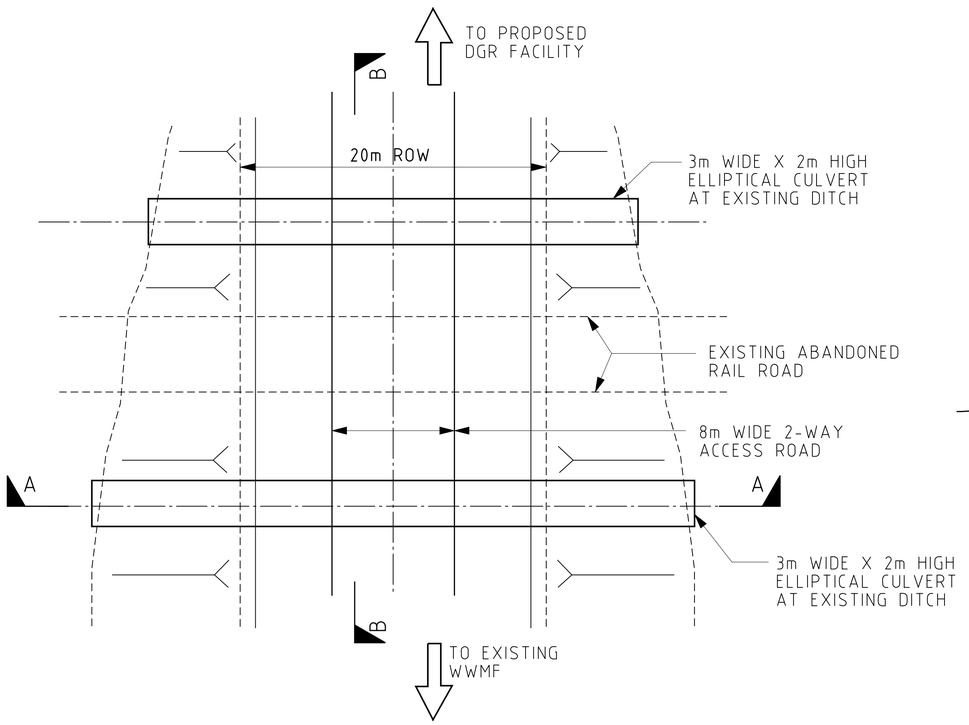
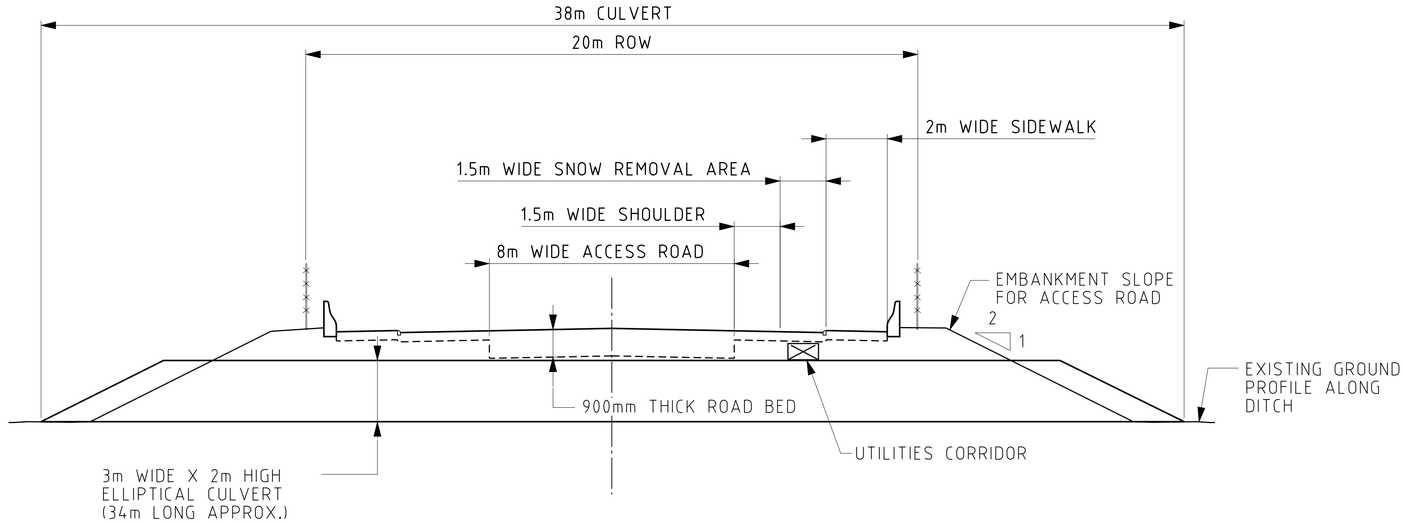
SHIELDK478

DWG. NO. H333000-WP403-10-042-0003



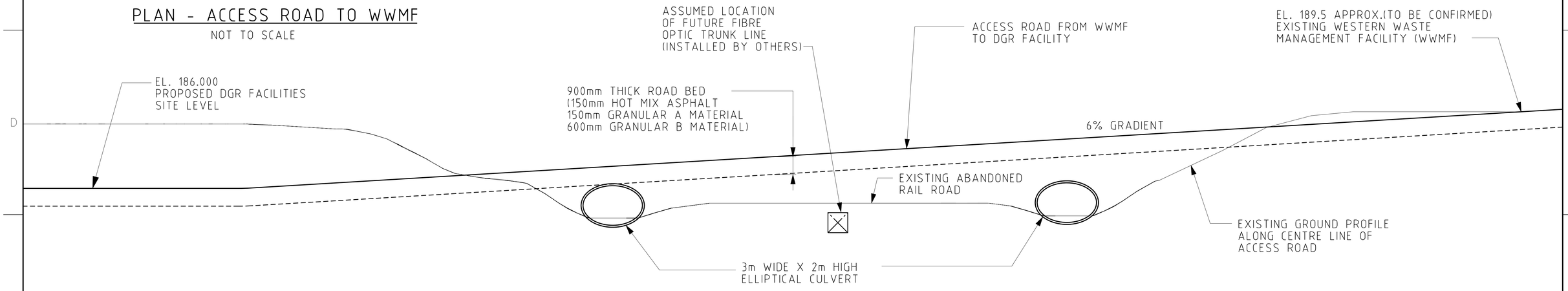
PLAN - ACCESS ROAD TO WWMF

NOT TO SCALE



CROSS SECTION OF ACCESS ROAD TO FACILITY (SECTION A-A)

SCALE 1:100



LONGITUDINAL SECTION ALONG CENTRE LINE OF ACCESS ROAD TO FACILITY (SECTION B-B)

SCALE 1:100

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner
Area Lead
Engineering Manager — Sherwin Aarons 2010.01.12 09:26:39 -05'00'
Project Manager — Sherwin Aarons 2010.01.12 09:26:48 -05'00'
Accepted by Owner — R.J. Heystee 2010.01.18 19:05:54 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	G.K.	S.A. 10-01-1
ISSUE AUTHORIZATION			

HATCH

DESIGNED BY	DRAWN BY
C. CHAN DATE 2009-11-27	C. CHAN DATE 2009-11-27
CHECKED BY	DISCIP. ENGR.
M. FARRELL DATE 2009-12-16	G. KRAMER DATE 2009-12-16
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. M. DAWBORN DATE 2009-11-27	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT SERVICE FACILITY AREA (SSFA)

SURFACE FACILITIES – CROSSING OF RAILWAY & DITCHES TO WWMF

SCALE: AS NOTED OR AS NOTED

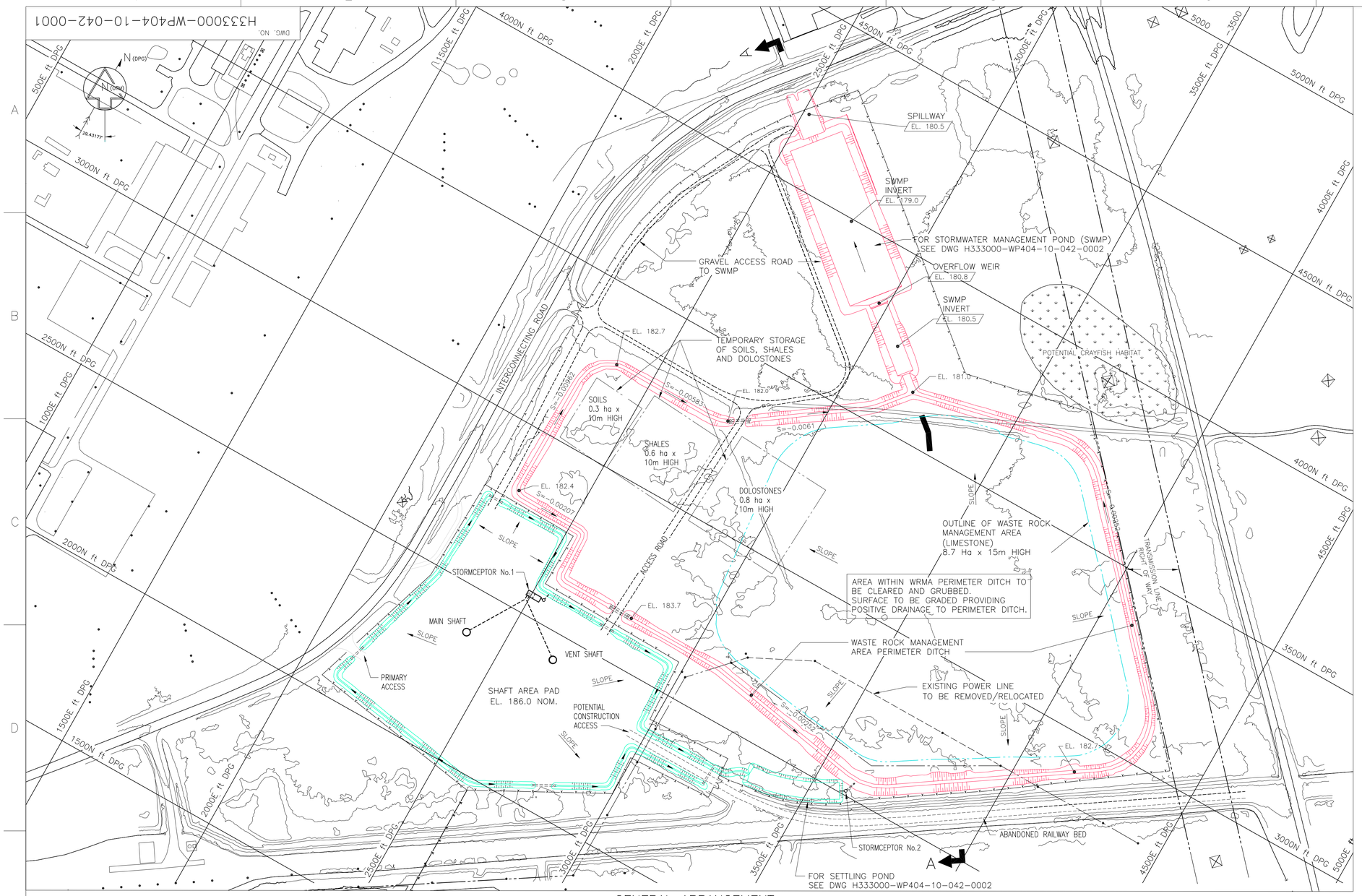
DWG. NO. H333000-WP403-10-042-0003

REV. 00

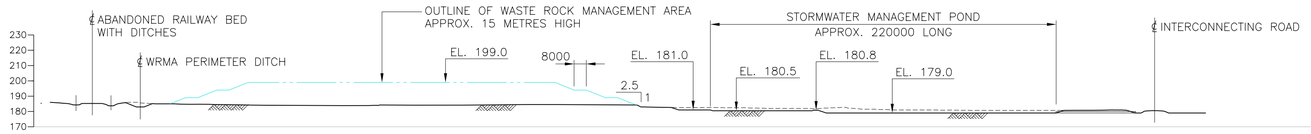
P:\NUCLEAR\333000\CAD\G\H333000-WP403-10-042-0003.dgn
11/2/2010 10:33:47 AM
SHIE9478

DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES
COORDINATES SHOWN IN FEET

DWG. NO. H333000-WP404-10-042-0001



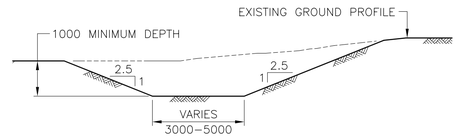
GENERAL ARRANGEMENT
1:2000



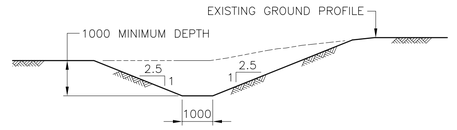
SECTION A–A
1:2000

NOTES:

1. HORIZONTAL DATUM: COORDINATE SYSTEM SHOWN IS BASED ON 1959 DOUGLAS POINT GRID (DPG). GRID SHOWN IN FEET AND CAN BE CONVERTED TO METRES BY MULTIPLYING BY 0.3048.
   COORDINATES CAN BE TRANSFORMED FROM DPG TO UTM NAD83 ZONE 17 (OR REVERSE) USING THE FOLLOWING EQUATIONS:
   $EASTING_{UTM} = 452408.341 + (0.8705935 \times EASTING_{DPG}) + (0.4911905 \times NORTHING_{DPG})$
   $NORTHING_{UTM} = 4907963.328 + (0.8705935 \times NORTHING_{DPG}) - (0.4911905 \times EASTING_{DPG})$
   DPG COORDINATES MUST BE CONVERTED TO METRES BEFORE USING THIS TRANSFORMATION.
   EQUATIONS PROVIDED BY 4DM INC. IN "DGR PROJECT COORDINATE TRANSFORMATION FROM DPG TO UTM WPD-SC34 WORK REQUEST 3", FEBRUARY 5, 2008.
2. VERTICAL DATUM: STATION 0011972U188
   ELEVATION 183.330 (CGVD28).
   LOCATION: BRUCE NUCLEAR POWER DEVELOPMENT (AUXILIARY STEAM PLANT) CONCRETE CHIMNEY, TABLET IN EAST FACE OF CHIMNEY, 6.7m CLOCKWISE OF A STEEL DOOR, 4.5m COUNTER-CLOCKWISE OF A STEEL LADDER AND 30cm ABOVE CONCRETE BASE.
3. CONTOURS PRODUCED BY HATCH LTD. FROM A DIGITAL ELEVATION MODEL (DEM). THE DEM WAS PROVIDED AND PREPARED BY 4DM INC. BASED ON A LIDAR SURVEY FLOWN BY TERRAPOINT CANADA, JULY 19, 2007.



WRMA PERIMETER DITCH TYPICAL SECTION
1:100



DGR SURFACE FACILITIES PERIMETER DITCH TYPICAL SECTION
1:100

1:100 0 2 4 6 8 10 METRES
1:2000 0 40 80 120 160 200 METRES

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner — Digitally signed by Warren Hoyle DN: cn=Warren Hoyle, o=CA, ou=each Reason: I am approving this document Date: 2010.01.06 13:25:40 -05'00'

Area Lead — Digitally signed by Gary J.E. Kramer DN: cn=Gary J.E. Kramer, o=AMEC, ou=Mississauga, email=gary.kramer@hatchmail.com, c=CA Date: 2010.01.12 09:43:34 -05'00'

Engineering Mangager — Sherwin Aarons 2010.01.12 10:26:47 -05'00'

Project Manager — Sherwin Aarons 2010.01.12 10:26:54 -05'00'

Accepted by Owner — R.J. Heystee 2010.01.16 10:36:32 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GJEK SAA	2010-01-05
ISSUE AUTHORIZATION			

HATCH™

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

WASTE ROCK MANAGEMENT AREA

SITE GRADING AND DRAINAGE

DESIGNED BY	DRAWN BY
R. ZHOU	D. PARKES
DATE	DATE
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M.R. DAWBORN	
DATE 2010-01-05	

SCALE: OR AS NOTED

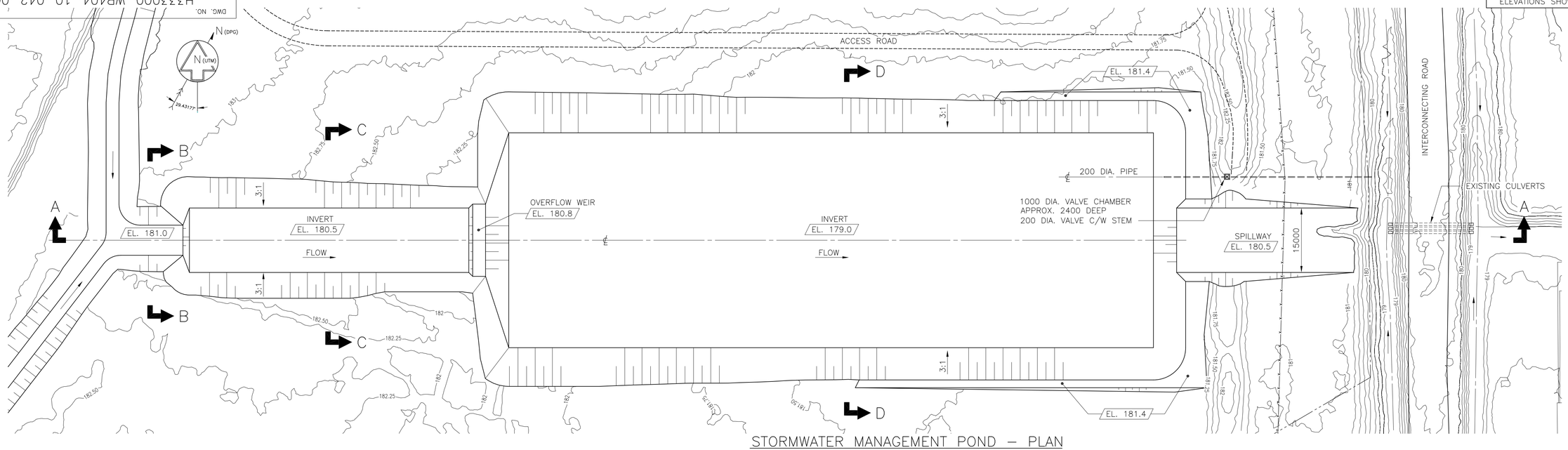
DWG. NO. H333000-WP404-10-042-0001

REV. 00

Jan 08 , 2010 , 11:25am Login name: loco50801 Layout: Layout1
Drawing Name: P:\NUCLEAR\333000\CAD\C\WP\H333000-WP404-10-042-0001.dwg

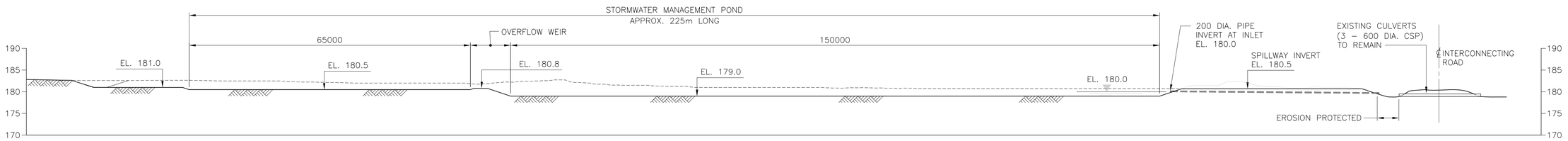
DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES

DWG. NO. H333000-WP404-10-042-0002



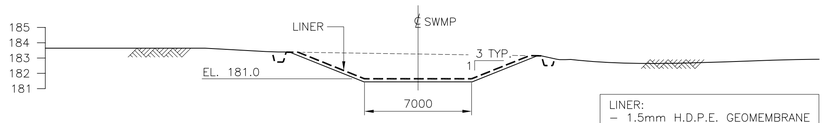
STORMWATER MANAGEMENT POND – PLAN

SEE DWG H333000-WP404-10-042-0001
1:500



SECTION A–A

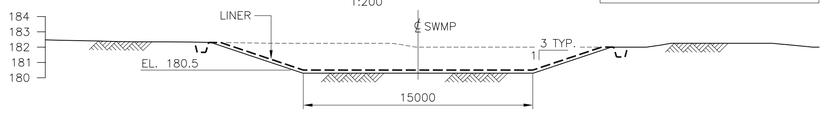
1:500



SECTION B–B

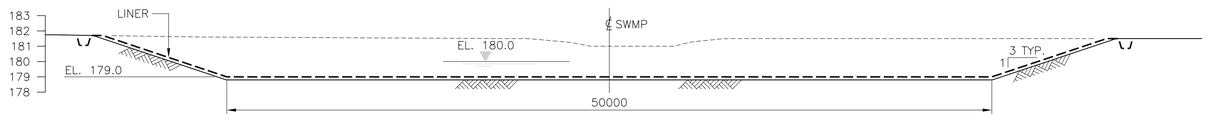
1:200

LINER:
- 1.5mm H.D.P.E. GEOMEMBRANE
- 200 GRANULAR "A"
- GEOFABRIC



SECTION C–C

1:200



SECTION D–D

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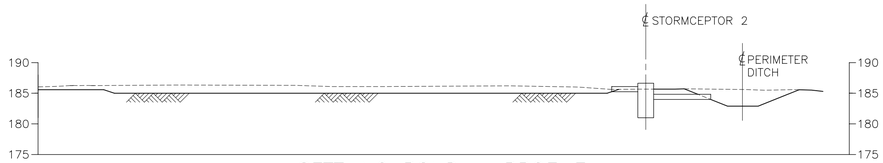
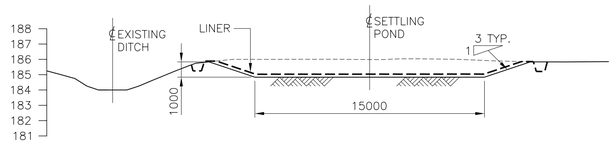


SETTLING POND – PROFILE

SEE DWG H333000-WP404-10-042-0001
1:500



SETTLING POND – SECTION

SEE DWG H333000-WP404-10-042-0001
1:200

1:200 0 4 8 12 16 20 METRES
1:500 0 10 20 30 40 50 METRES

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner — Digitally signed by Warren Hoyle DN: cn=Warren Hoyle, o=OA, ou=Hatch Ltd., email=whoyle@hatch.ca Date: 2010.01.08 13:31:21 -05'00'

Area Lead — Digitally signed by Gary J.E. Kramer DN: cn=Gary J.E. Kramer, o=WMI, ou=Hatch Ltd., email=gary.kramer@hatchmail.com, c=CA Date: 2010.01.12 09:47:23 -05'00'

Engineering Manager — Sherwin Aarons 2010.01.12 10:23:39 -05'00'

Project Manager — Sherwin Aarons 2010.01.12 10:23:47 -05'00'

Accepted by Owner — R.J. Heystee 2010.01.16 10:40:30 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GJEK SAA	2010-01-05

ISSUE AUTHORIZATION

HATCH™

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

WASTE ROCK MANAGEMENT AREA

STORMWATER MANAGEMENT POND
AND SETTLING POND

DESIGNED BY	DRAWN BY
R. ZHOU	D. PARKES
DATE	DATE
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR. M.R. DAWBORN	
DATE 2010-01-05	

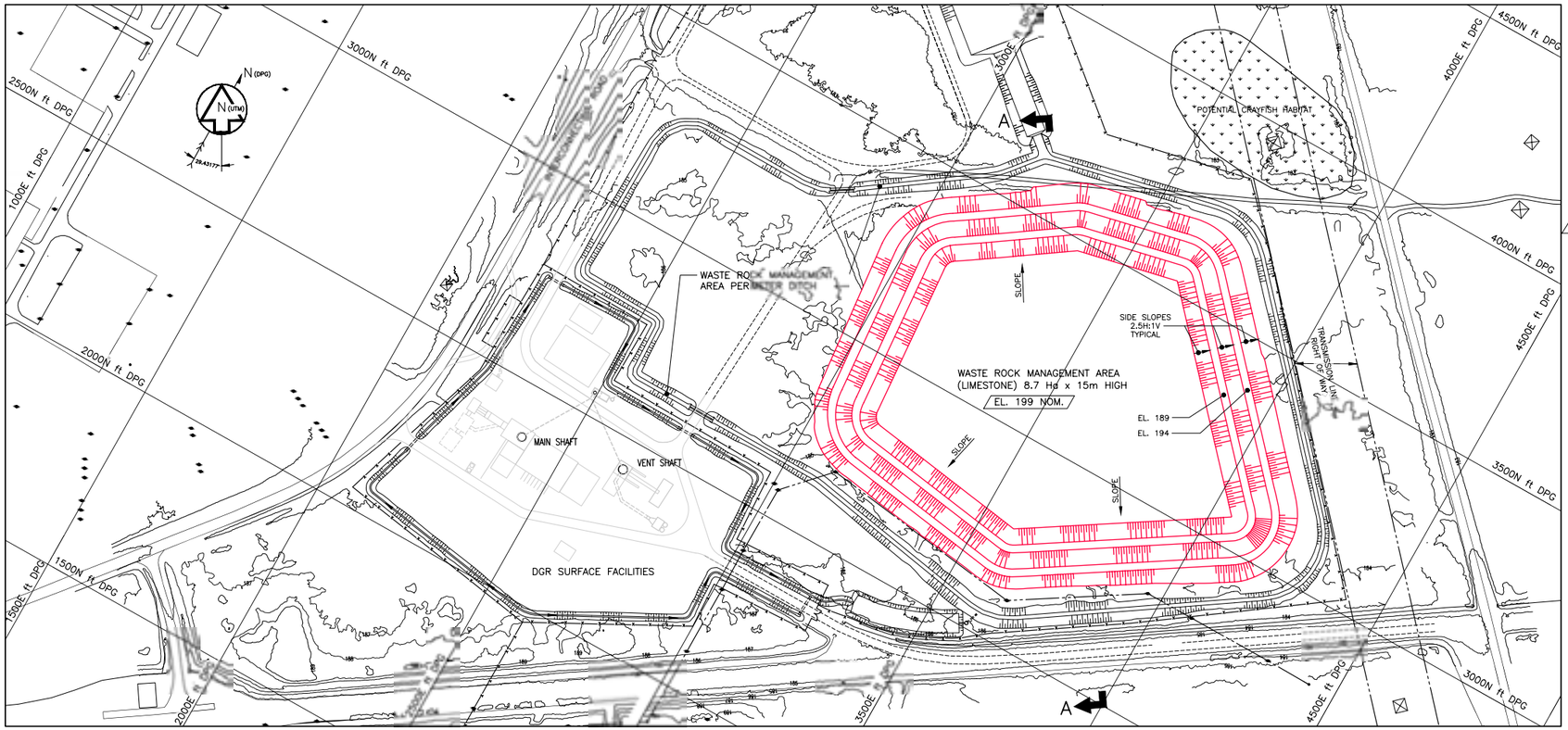
SCALE: OR AS NOTED

DWG. NO. H333000-WP404-10-042-0002

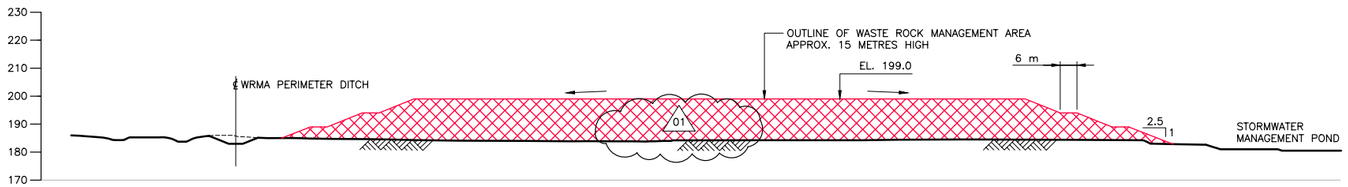
REV. 00

Jan 08, 2010, 11:25am Login name: Loc50801 Layout: Layout1
Drawing Name: P:\NUCLEAR\333000\CAD\C\WP\H333000-WP404-10-042-0002.dwg

DWG. NO. H333000-WP404-10-042-0003



GENERAL ARRANGEMENT
1:2000



SECTION A–A
1:2000

1:1000 0 20 40 60 80 100 METRES
1:2000 0 40 80 120 160 200 METRES

NOTE:

1. HORIZONTAL DATUM: COORDINATE SYSTEM SHOWN IS BASED ON 1959 DOUGLAS POINT GRID (DPG). GRID SHOWN IN FEET AND CAN BE CONVERTED TO METRES BY MULITILYING BY 0.3048.
2. VERTICAL DATUM: STATION 0011972U188 ELEVATION 183.330 (CGVD28). LOCATION: BRUCE NUCLEAR POWER DEVELOPMENT (AUXILIARY STEAM PLANT) CONCRETE CHIMNEY, TABLET IN EAST FACE OF CHIMNEY, 6.7m CLOCKWISE OF A STEEL DOOR, 4.5m COUNTER-CLOCKWISE OF A STEEL LADDER AND 30cm ABOVE CONCRETE BASE.
3. CONTOURS PRODUCED BY HATCH LTD. FROM A DIGITAL ELEVATION MODEL (DEM). THE DEM WAS PROVIDED AND PREPARED BY 4DM INC. BASED ON A LIDAR SURVEY FLOWN BY TERRAPOINT CANADA, JULY 19, 2007.
4. (01) FOR WASTE ROCK VOLUMES AND BULKING FACTOR SEE WP4-4 FUNCTIONAL DESCRIPTION (REFERENCE NUMBER H333000-WP404-10-109-0001).

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
01	VOLUME LABEL REMOVED, NOTE 4 ADDED	GJEK	SAA	2010-05-10
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Area Lead
Engineering Manager
Project Manager
Accepted by Owner
R.J. Heystee 2010.05.11 14:50:50 -04'00'

REV.	ISSUE FOR	AUTH. BY	DATE
01	APPROVED FOR USE	GJEK	SAA	2010-05-10
00	APPROVED FOR USE	GJEK	SAA	2010-01-05
ISSUE AUTHORIZATION			

HATCH

DESIGNED BY R. ZHOU	DRAWN BY D. PARKES
DATE	DATE
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR. M.R. DAWBORN	
DATE 2010-01-05	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

WASTE ROCK MANAGEMENT AREA

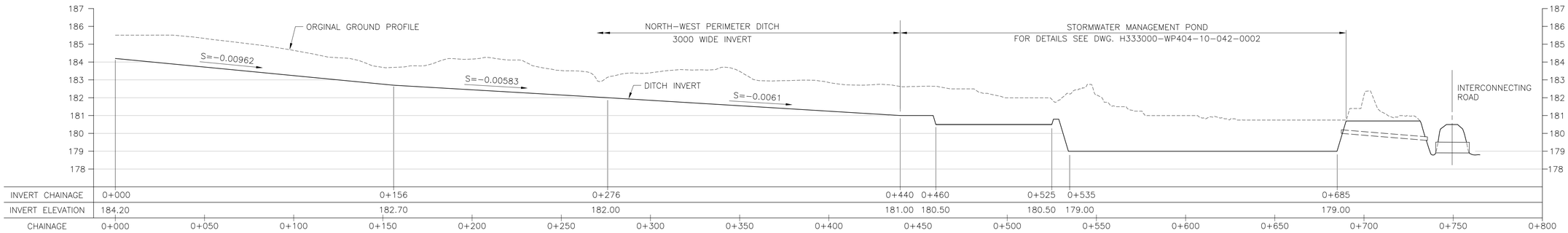
BASE CASE

SCALE	DWG. NO.	REV.
OR AS NOTED	H333000-WP404-10-042-0003	01

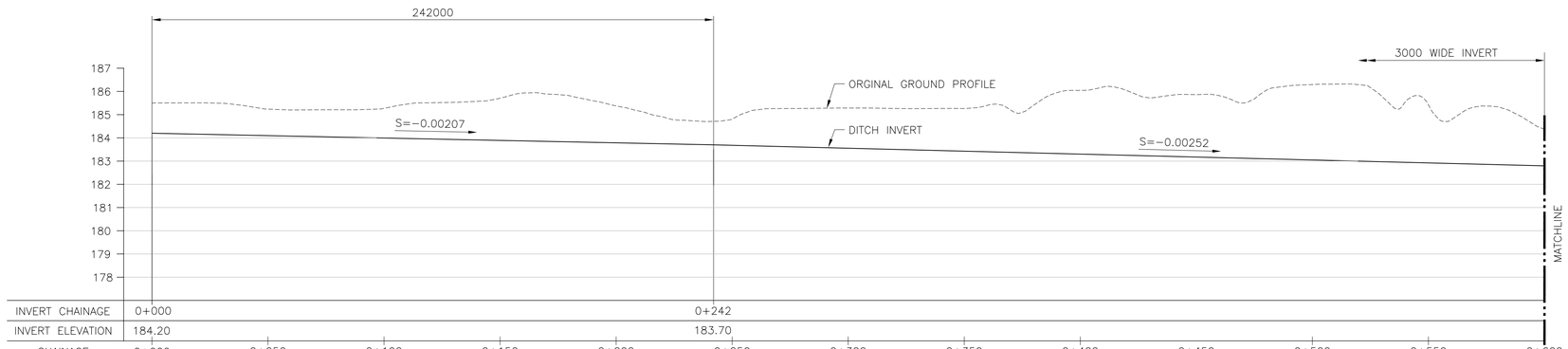
May 10, 2010, 3:45pm Login name: Park110733 Layout: Layout1
Drawing Name: P:\NUCLEAR\333000\CAD\C\NF\H333000-WP404-10-042-0003.dwg

DWG. NO. H333000-WP404-10-042-0005

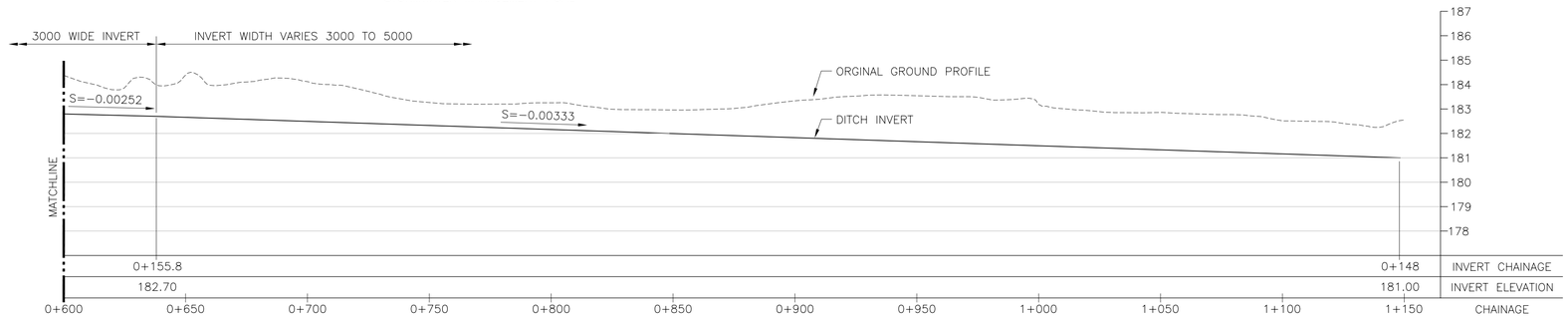
DIMENSIONS SHOWN IN MILLIMETRES
ELEVATIONS SHOWN IN METRES



PROFILE ALONG NORTH-WEST PERIMETER DITCH AND STORMWATER MANAGEMENT POND
1:1250



PROFILE ALONG SOUTH-EAST PERIMETER DITCH
1:1250



PROFILE ALONG SOUTH-EAST PERIMETER DITCH (CONT.)
1:1250

VERTICAL 1:125 0 2.5 5 7.5 10 125 METRES
HORIZONTAL 1:1250 0 25 50 75 100 125 METRES

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner — Digitally signed by Warren Hoyle DN: cn=Warren Hoyle, o=Hatch, ou=H&T Originator, email=whoyle@hatch.ca, c=CA Date: 2010.01.08 13:28:14 -05'00'

Area Lead — Digitally signed by Gary J.E. Kramer DN: cn=Gary J.E. Kramer, o=NWMO, ou=Engineering, email=gary.kramer@sympatico.ca, c=CA Date: 2010.01.12 09:46:34 -05'00'

Engineering Mangager — Sherwin Aarons 2010.01.12 10:25:31 -05'00'

Project Manager — Sherwin Aarons 2010.01.12 10:25:39 -05'00'

Accepted by Owner — R.J. Heystee 2010.01.16 10:50:54 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GJEK SAA	2010-01-05

ISSUE AUTHORIZATION

HATCH™

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

WASTE ROCK MANAGEMENT AREA

NORTH-WEST AND SOUTH EAST PERIMETER DITCH – PROFILES

DESIGNED BY	DRAWN BY
R. ZHOU	D. PARKES
DATE	DATE
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR. M.R. DAWBORN	
DATE 2010-01-05	

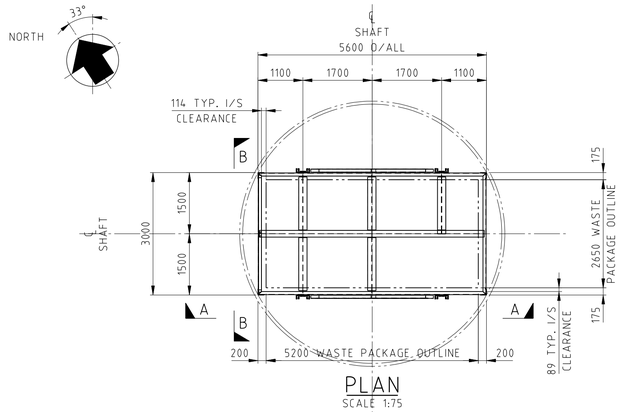
SCALE OR AS NOTED

DWG. NO. H333000-WP404-10-042-0005

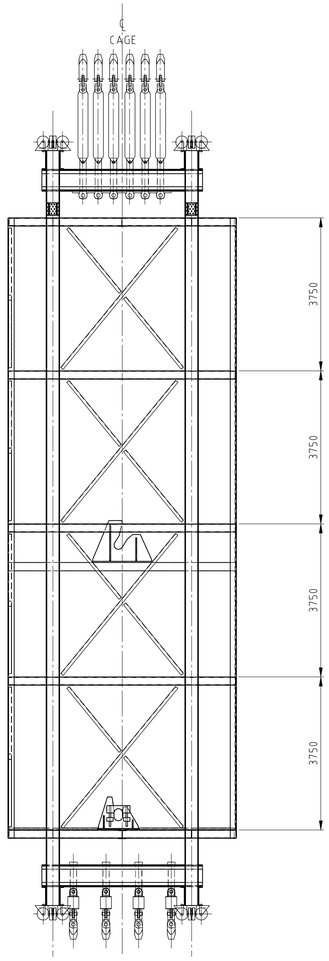
REV. 00

Jan 08 2010, 11:26am Login name: Laco50801 Layout: Layout1
Drawing Name: P:\NUCLEAR\333000\CAD\C\WF\H333000-WP404-10-042-0005.dwg

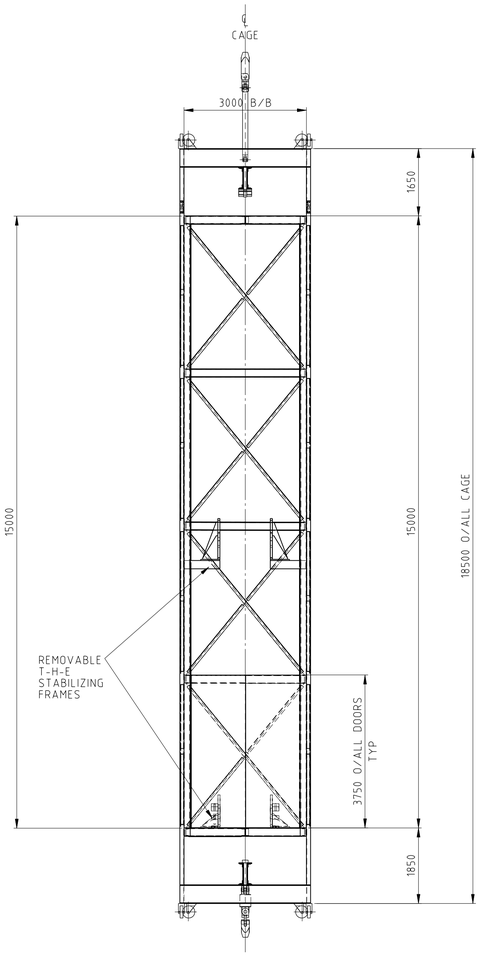
DWG. NO. H333000-WP405-20-042-0003-02



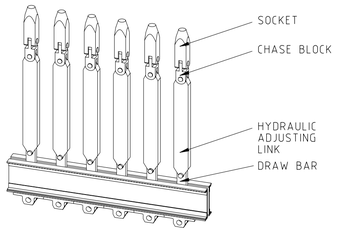
PLAN
SCALE 1:75



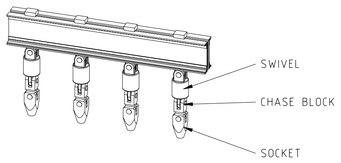
ELEVATION A-A
SCALE 1:75



ELEVATION B-B
SCALE 1:75

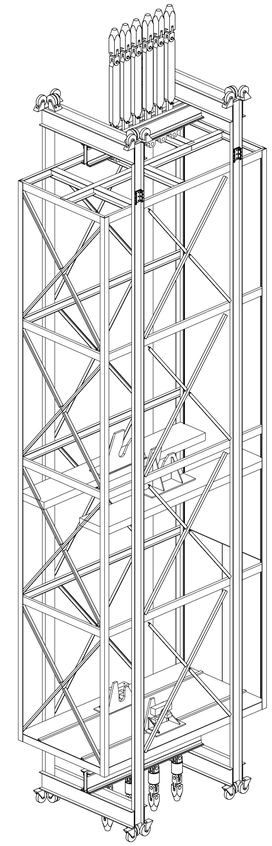


ISOMETRIC VIEW OF HEAD ROPE ATTACHMENT



ISOMETRIC VIEW OF TAIL ROPE ATTACHMENT

PRELIMINARY



ISOMETRIC VIEW OF CAGE CONVEYANCE

ITEMS	ESTIMATED MASS
1. MAXIMUM PAYLOAD INCL. T-H-E STABILIZING FRAMES	44 000 KG
2. PRIMARY STEEL MEMBERS	22 658 KG
3. ROPE ATTACHMENTS	9 328 KG
4. ALLOWANCE FOR SUNDRIES	5 000 KG
5. TOTAL	80 986 KG

GENERAL NOTE:-

1. ALL STRUCTURAL STEELWORK TO BE IN ACCORDANCE WITH CAN/CSA-S16-01
2. ALL STRUCTURAL STEEL TO BE 350W UNLESS OTHERWISE NOTED
3. DRAWING TO BE USED FOR PRELIMINARY DESIGN ONLY, NOT TO BE USED FOR CONSTRUCTION
4. SIZE OF CONVEYANCE BASED ON SHAFT SIZE FROM CONCEPTUAL DESIGN REPORT
5. FOR MORE DETAIL REGARDING ROPE ATTACHMENTS SEE H333000-WP405-35-122-0001

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner: Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=ZA, ou=Hatch MMP, ou=Work Package Owner Reason: I am approving this document Date: 2009.11.12 07:36:56 +02'00'

Area Lead: G.R.Davidge — Digitally signed by G.R. Davidge Date: 2009.11.13 14:13:13 -05'00'

Engineering Mangager: Sherwin Aarons 2009.11.13 15:25:16 -05'00'

Project Manager: M R Dawborn — cn=M R Dawborn, o=ZA, o=Hatch MMP, ou=Project Manager 2009.11.13 15:57:10 -05'00'

Accepted by Owner — Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA Date: 2009.11.17 15:37:53 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD	SAA 09/11/11
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY	DRAWN BY
L CLARK DATE 26/08/09	MC BOTHMA DATE 26/08/09
CHECKED BY DATE	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. M.R.DAWBORN DATE 2009-11-11	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT HOISTING SYSTEMS

MAIN SHAFT – PERMANENT CONDITION
SINGLE DECK MAIN CAGE – KOEPE HOIST
OPTION 2 – GENERAL ARRANGEMENT

SCALE 1:75 OR AS NOTED

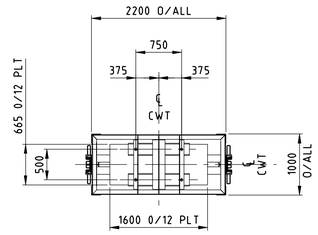
DWG. NO. H333000-WP405-20-042-0003-02

REV. 00

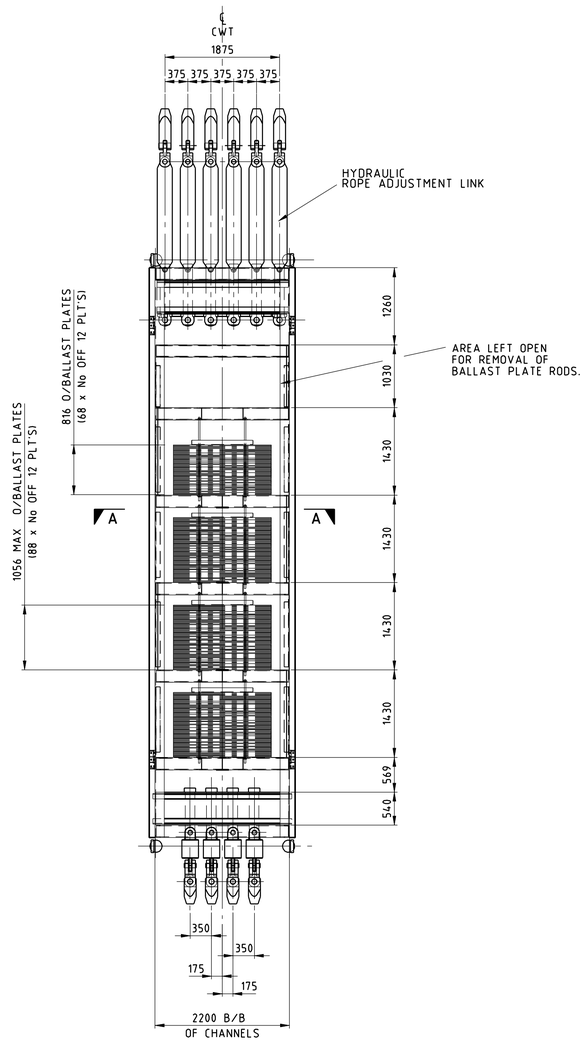
P:\NUCLEAR\333000\CAD\MicroStation\H333000-WP405-20-042-0003-02 - Permanent main shaft keepe cage GA.dgn
2009/11/17 12:13:20 PM
dbulk4501

1 2 3 4 5 6 7 8

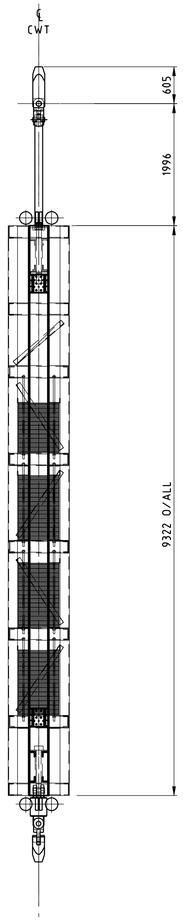
DWG. NO. H333000-WP405-20-042-0004



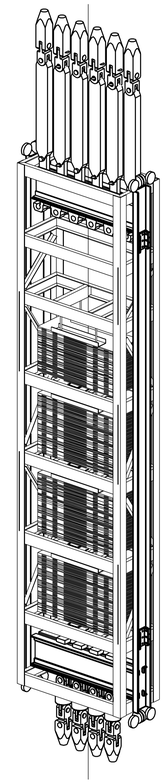
SECTION A-A
SCALE 1:50



FRONT ELEVATION
SCALE 1:50



SIDE ELEVATION
SCALE 1:50



ISOMETRIC VIEW OF COUNTERWEIGHT CONVEYANCE

ITEMS	ESTIMATED MASS
1. MAXIMUM PAYLOAD	33 273 KG
2. PRIMARY STEEL MEMBERS	16 355 KG
3. ROPE ATTACHMENTS	9 328 KG
4. TOTAL	58 956 KG

PRELIMINARY

BALLAST PLATES
1 x 12 THK PLATE = 100.3 kg 100.3 x 332 = 33 273 kg

GENERAL NOTE:-

1. ALL STRUCTURAL STEELWORK TO BE IN ACCORDANCE WITH CAN/CSA-S16-01
2. ALL STRUCTURAL STEEL TO BE CSA G40.21 350WT UNLESS OTHERWISE NOTED
3. DRAWING TO BE USED FOR PRELIMINARY DESIGN ONLY, NOT TO BE USED FOR CONSTRUCTION
4. SIZE OF CONVEYANCE BASED ON SHAFT SIZE FROM CONCEPTUAL DESIGN REPORT
5. FOR MORE DETAIL ON RPOE ATTACHMENTS SEE H333000-WP405-042-35-122-0001

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
01	REVISED COUNTERWEIGHT MASS	SJK	GRD	10/01/14
REVISIONS				

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner: Stephen Keen

Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge, Date: 2010.01.14 14:16:33 -05'00'

Engineering Manager: Sherwin Aarons, 2010.01.14 16:09:18 -05'00'

Project Manager: Sherwin Aarons, 2010.01.14 16:09:24 -05'00'

Accepted by Owner: Digitally signed by Derek Wilson, DN: cn=Derek Wilson, o=AECL, ou=, email=dwilson@aecl.ca, c=CA, Date: 2010.01.15 08:25:43 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
01	APPROVED FOR USE	GRD	SAA 10/01/14
00	APPROVED FOR USE	GRD	SAA 09/12/10
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY / DATE	DRAWN BY MC BOTHMA DATE 14/10/09
CHECKED BY S. KEEN DATE 14/10/09	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. M. DAWBORN DATE 14/10/09	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

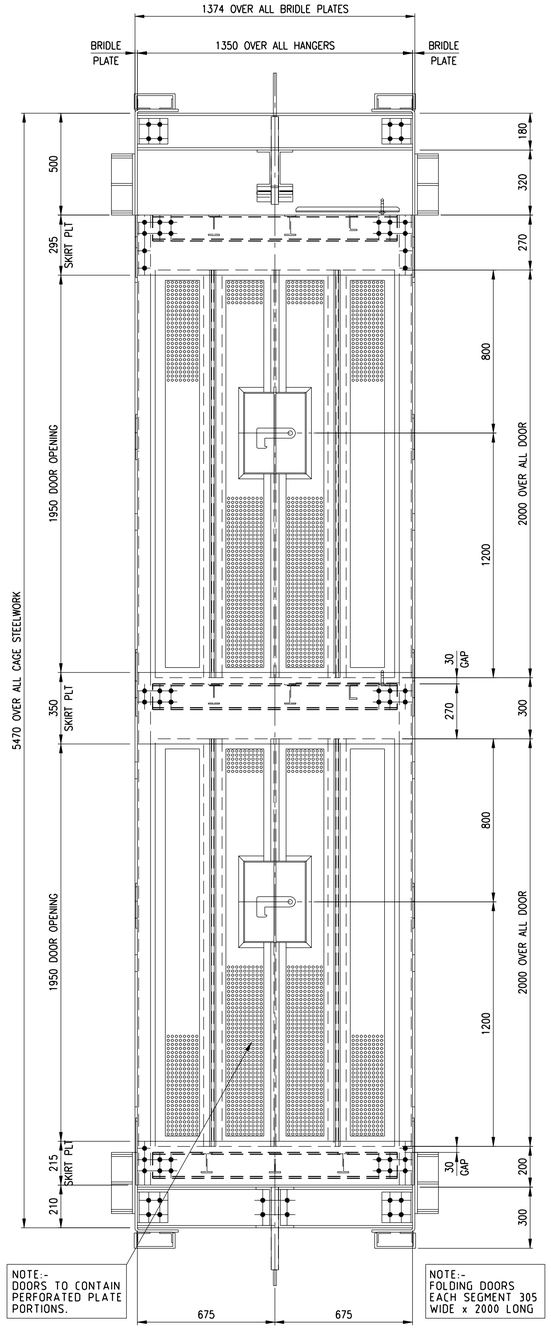
SHAFT HOISTING SYSTEMS

MAIN SHAFT – PERMANENT CONDITION
MAIN SHAFT KOEPE COUNTERWEIGHT
GENERAL ARRANGEMENT

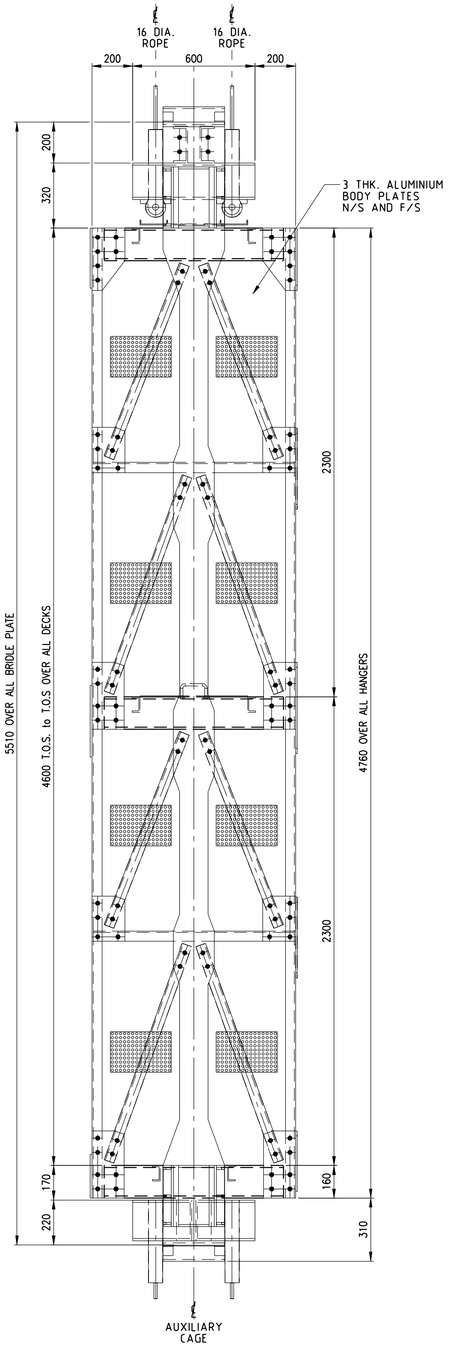
SCALE 1:50 OR AS NOTED | DWG. NO. H333000-WP405-20-042-0004 | REV. 01

P:\NUCLEAR\333000\CAD\MA\DGN\H333000-WP405-20-042-0004 - [Permanent Main Shaft Koepe Counterweight Design]
1/14/2010 9:38:38 AM
don57041

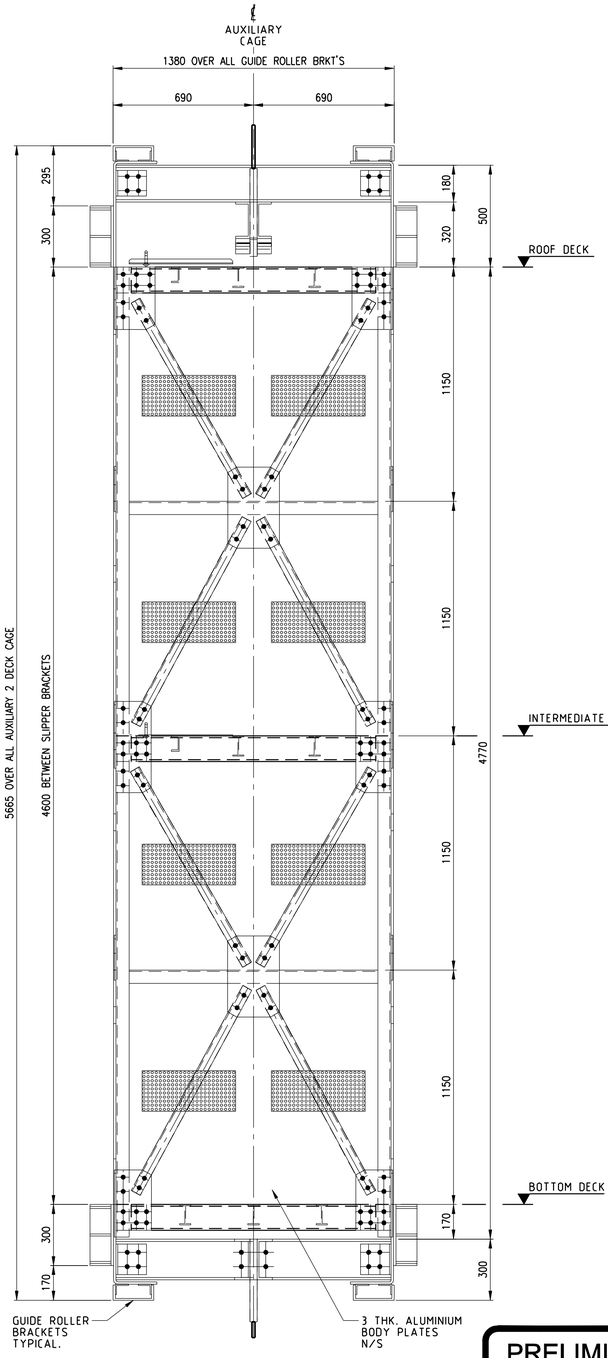
DWG. NO. H333000-WP405-20-042-0005



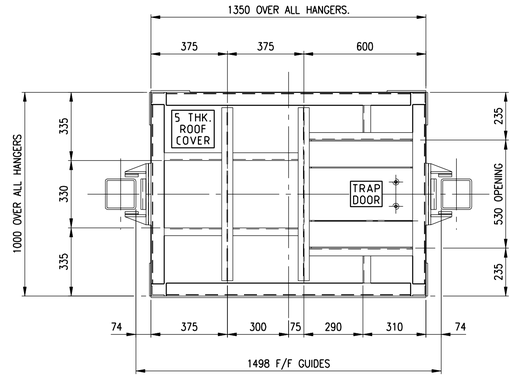
SIDE ELEVATION
SCALE 1:15



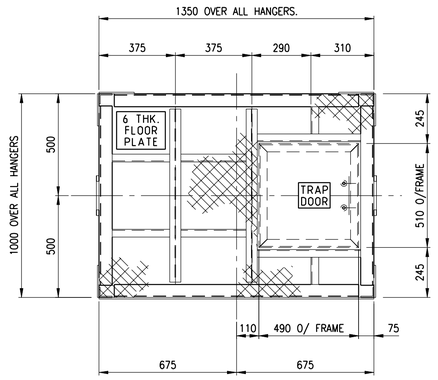
ELEVATION ON AUXILIARY CAGE
SCALE 1:15



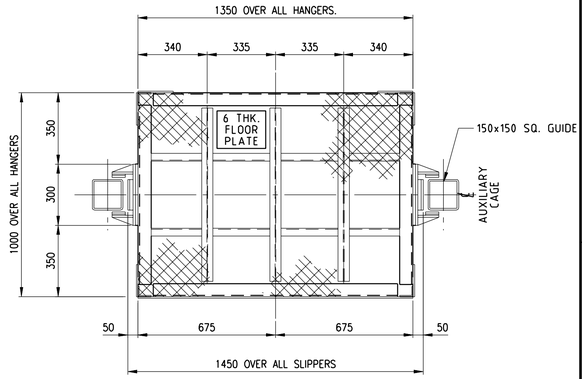
SIDE ELEVATION
SCALE 1:15



PLAN ON ROOF DECK
SCALE 1:15



PLAN ON INTERMEDIATE DECK
SCALE 1:15



PLAN ON BOTTOM DECK
SCALE 1:15

PRELIMINARY

NOTE:- CAGE FLOOR AREA = 1.3m² PER DECK.

ITEM No.	DESCRIPTION	ESTIMATED MASS
1.	MATERIAL TRANSPORT	1 270 Kg
2.	PERSONNEL TRANSPORT	1 080 Kg - 6 PEOPLE @ 90 Kg PER DECK
3.	PRIMARY STEEL MEMBERS	1 650 Kg
4.	ROPE ATTACHMENTS	250 Kg
5.	ALLOWANCE FOR SUNDRIES	250 Kg
6.	TOTAL ESTIMATED MAXIMUM MASS	3 420 Kg.

GENERAL NOTES.

1. ALL STRUCTURAL STEELWORK TO BE IN ACCORDANCE WITH CAN/CSA-S16-01.
2. ALL STRUCTURAL STEEL TO BE 350WA UNLESS OTHERWISE NOTED.
3. THIS DRAWING TO BE USED FOR PRELIMINARY DESIGN ONLY, NOT TO BE USED FOR CONSTRUCTION

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner: Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=SA, ou=Hatch Africa, email=skeen@hatch.co.za, c=ZA Reason: I have reviewed this document Date: 2009.12.10 16:09:51 +02'00'
Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.12.10 13:13:46 -05'00'
Engineering Mangager: Sherwin Aarons 2009.12.10 15:21:05 -05'00'
Project Manager: M R Dawborn — Digitally signed by M R Dawborn Date: 2009.12.10 15:39:11 -05'00'
Accepted by Owner: Derek Wilson — Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou=Director, email=dwilson@nwmo.ca, c=CA Date: 2009.12.15 16:25:02 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	SAA	GRD 09/12/10

ISSUE AUTHORIZATION

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

HATCH™

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT HOISTING SYSTEMS

MAIN SHAFT – PERMANENT CONDITION
AUXILIARY 2 DECK CAGE
GENERAL ARRANGEMNT

DESIGNED BY		DRAWN BY	M.G.
DATE		DATE	2009/11/06
CHECKED BY	S. KEEN	DISCIP. ENGR.	
DATE	2009/12/06	DATE	
PROJ. DES. COORD.		PROJ. ENGR.	
DATE		DATE	
PROJ. MGR.	M. DAWBORN		
DATE	2009/11/06		

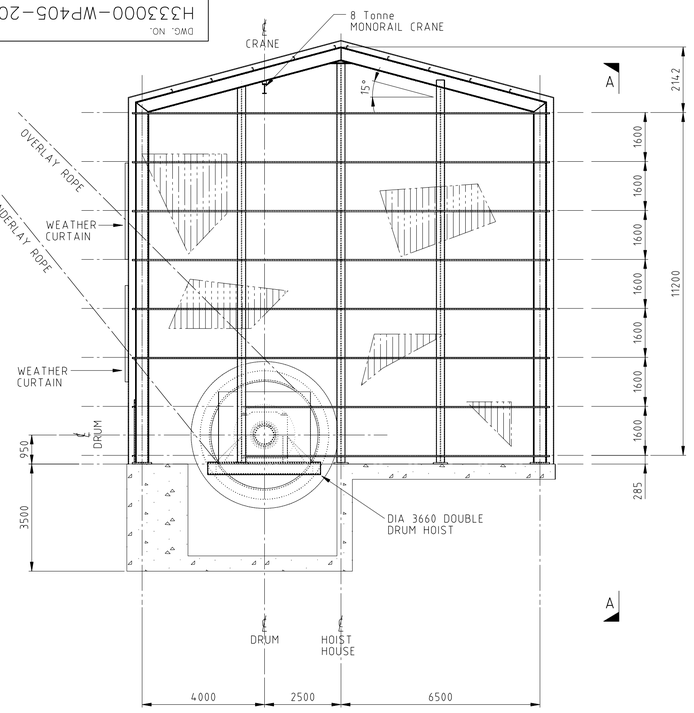
SCALE 1:15 OR AS NOTED

DWG. NO. H333000-WP405-20-042-0005

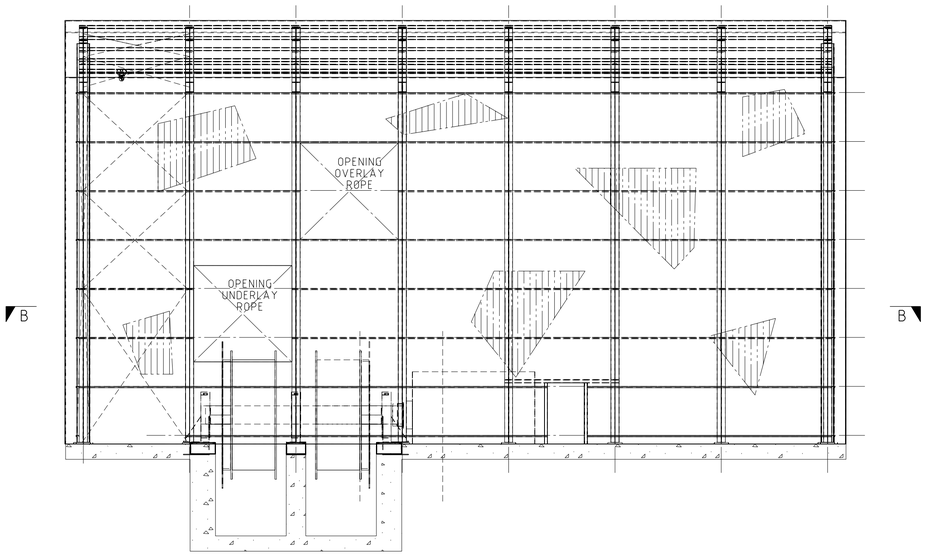
REV. 00

P:\NUCLEAR\333000\CAD\MA\DGN\H333000-WP405-20-042-0005 - rPermanent main shaft auxiliary cage.dgn
12/10/2009 12:26:22 PM
dan57041

DWG. NO. H333000-WP405-20-042-0010

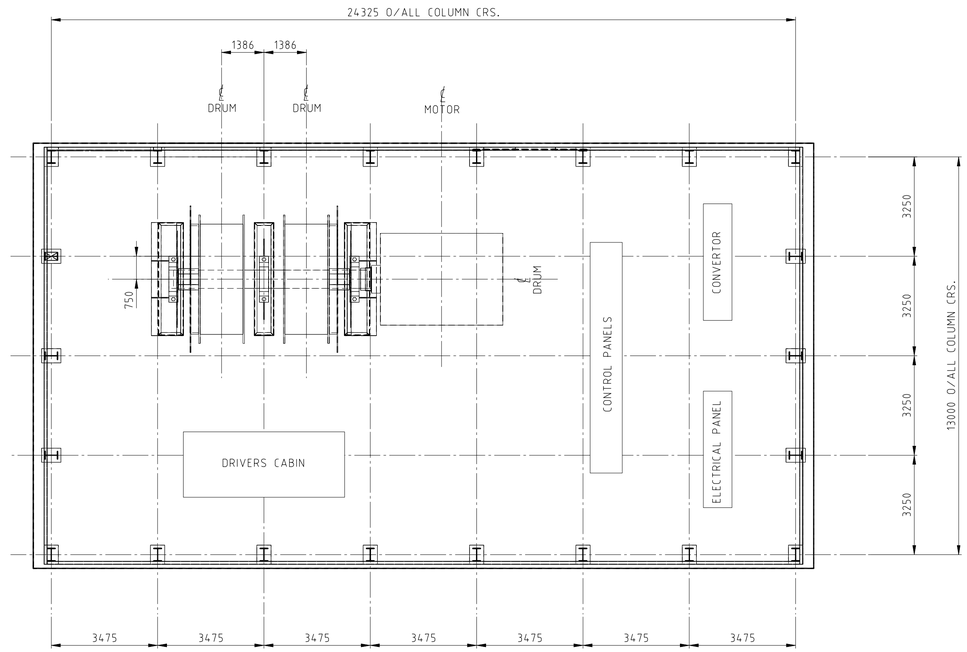


FRONT VIEW
SCALE 1:100



ELEVATION A-A
SCALE 1:100

ISOMETRIC VIEW



PLAN ON B-B
SCALE 1:100

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Stephen Keen
Digitally signed by Stephen Keen
DN: cn=Stephen Keen, o=JDL Armtech Africa, email=skeen@mech.co.za
Reason: I am approving this document
Date: 2009.12.10 17:39:41 +03'00'
Area Lead
G.R.Davidge
Digitally signed by G.R. Davidge
Date: 2009.12.10 14:10:38 -05'00'
Engineering Manager
Sherwin Aarons
2009.12.10 15:22:04 -05'00'
Project Manager
Digitally signed by M R Dawborn
Date: 2009.12.10 15:39:38 -05'00'
Accepted by Owner
Digitally signed by Derek Wilson
DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA
Date: 2009.12.15 15:28:26 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	SAA GRD	09/12/10
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY	DRAWN BY
S Lo DRAGO	JP DANIELS
DATE 11/11/09	DATE 11/11/09
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
DATE	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT HOISTING SYSTEM

MAIN SHAFT
HOIST HOUSE – SINKING CONDITION
LAYOUT

SCALE	DWG. NO.	REV.
1:100 OR AS NOTED	H333000-WP405-20-042-0010	00

P:\NUCLEAR\333000\CADD\MKDGN\H333000-WP405-20-042-0010 - Main Shaft Sinking and Permanent Condition Bucket Hoist.dgn
2009/12/10 02:35:18 PM
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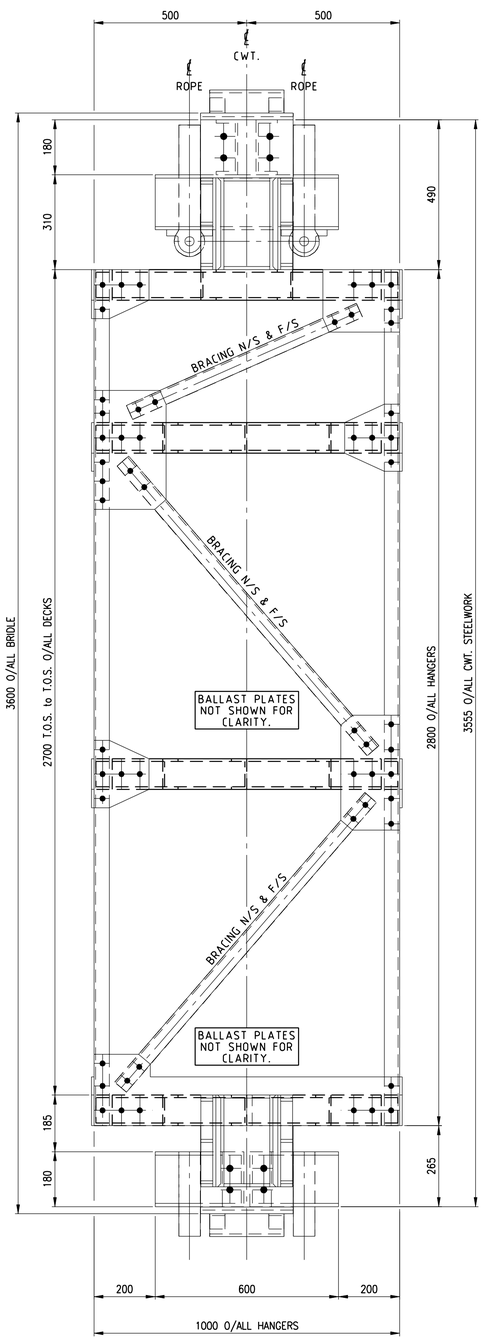
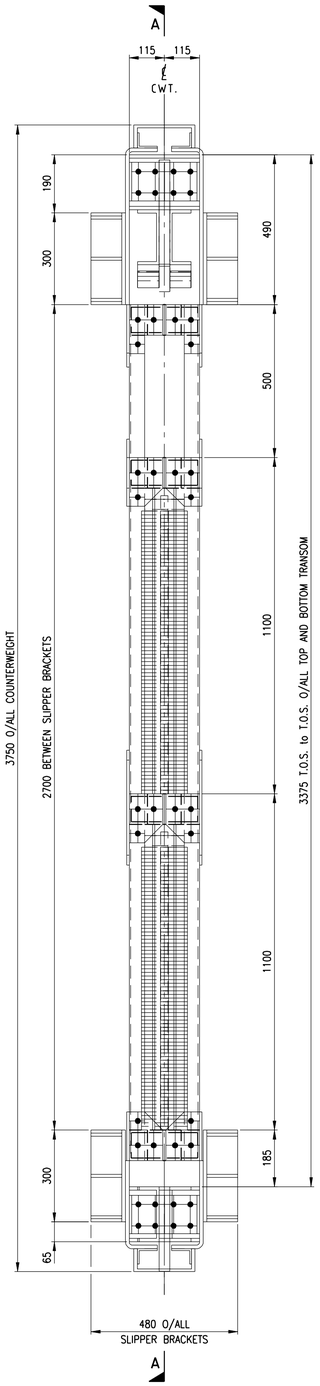
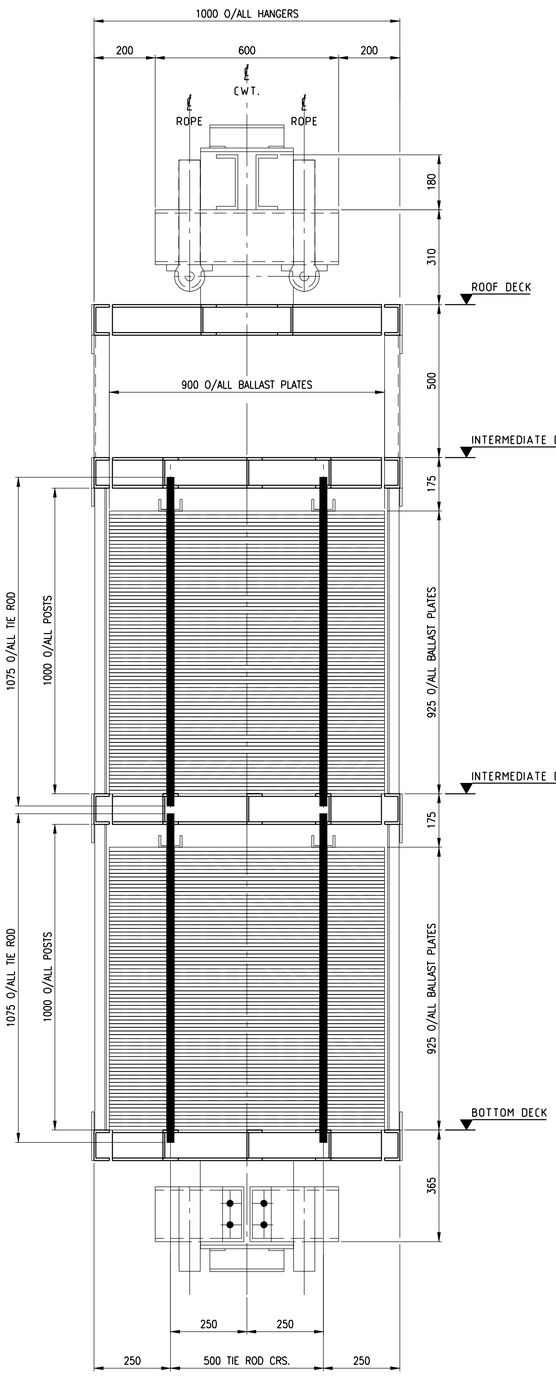
DWG. NO. H333000-WP405-35-042-0001



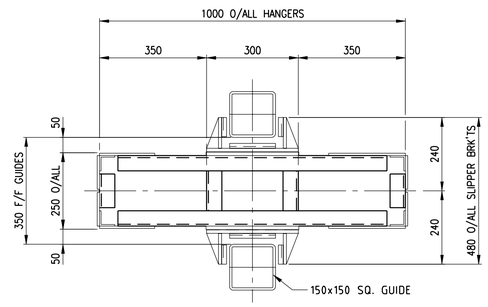
SIDE ELEVATION
SCALE 1:10



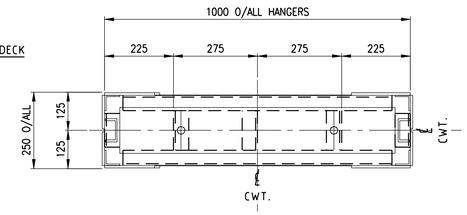
ELEVATION ON COUNTERWEIGHT
SCALE 1:10



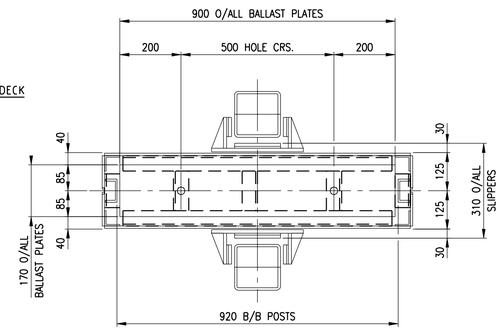
SECTION A-A
SCALE 1:10



PLAN ON ROOF DECK
SCALE 1:10



PLAN ON INTERMEDIATE DECKS
SCALE 1:10

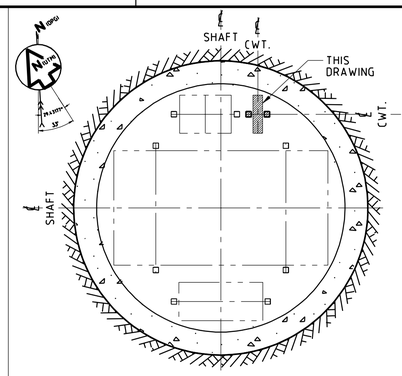


PLAN ON BOTTOM DECK
SCALE 1:10

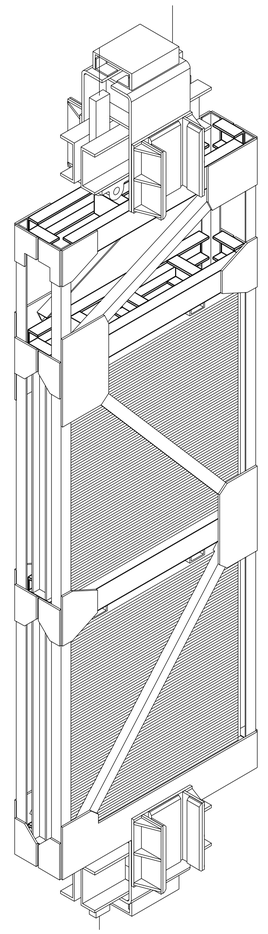
PRELIMINARY

BALLAST PLATES:-
154 PLATES - 77 PLATES PER DECK
14.4Kg PER PLATE

ITEM No.	DESCRIPTION	ESTIMATED MASS
1.	BALLAST PLATES	2 200 Kg. SPLIT BETWEEN 2 - DECKS
2.	PRIMARY STEEL MEMBERS	320 Kg
3.	ROPE ATTACHMENTS	250 Kg.
4.	ALLOWANCE FOR SUNDRIES	30 Kg.
5.	TOTAL ESTIMATED MAXIMUM MASS	2 800 Kg.



KEY PLAN



ISOMETRIC VIEW - COUNTERWEIGHT

GENERAL NOTES:-

1. ALL STRUCTURAL STEELWORK TO BE IN ACCORDANCE WITH CAN/CSA-S16-01.
2. ALL STRUCTURAL STEEL TO BE 350WA UNLESS OTHERWISE NOTED.
3. THIS DRAWING TO BE USED FOR PRELIMINARY DESIGN ONLY, NOT TO BE USED FOR CONSTRUCTION.

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner
Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=JV, ou=Hatch Africa, email=skeen@hatch.co.za, c=ZA Reason: I have reviewed this document Date: 2009.12.10 09:51:41 +02'00'
Area Lead
G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.12.10 13:03:13 -05'00'
Engineering Mangager
Sherwin Aarons 2009.12.10 15:25:06 -05'00'
Project Manager
Digitally signed by M R Dawborn Date: 2009.12.10 15:41:13 -05'00'
Accepted by Owner
Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA Date: 2009.12.10 15:22:03 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	SAA	GRD 09/12/10

ISSUE AUTHORIZATION

HATCH

DESIGNED BY	DRAWN BY M.G.
DATE	DATE 2009/11/12
CHECKED BY S. KEEN	DISCIP. ENGR.
DATE 2009/11/12	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR. M. DAWBORN	
DATE 2009/11/12	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

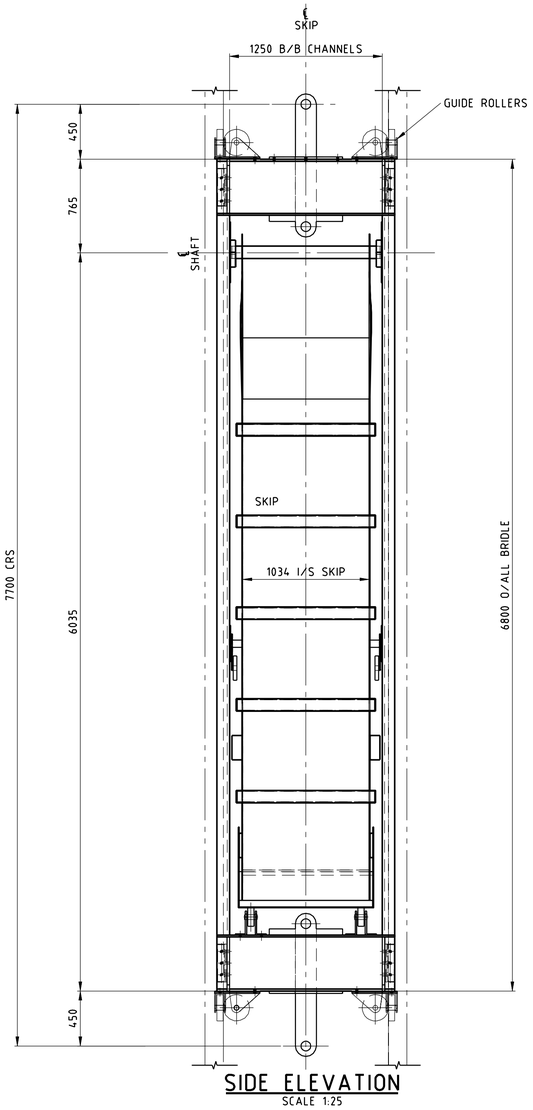
SHAFT HOISTING SYSTEMS

MAIN SHAFT – PERMANENT CONDITION
AUXILIARY – COUNTERWEIGHT
GENERAL ARRANGEMENT

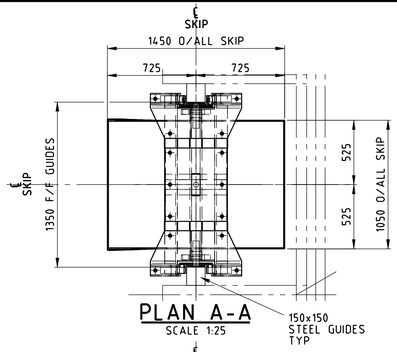
SCALE	DWG. NO.	REV.
1:10 OR AS NOTED	H333000-WP405-35-042-0001	00

P:\NUCLEAR\333000\CAD\MA\DGN\H333000-WP405-35-042-0001 - TAuxiliary Cage Counterweight.dgn
12/10/2009 12:29:17 PM
dan57041

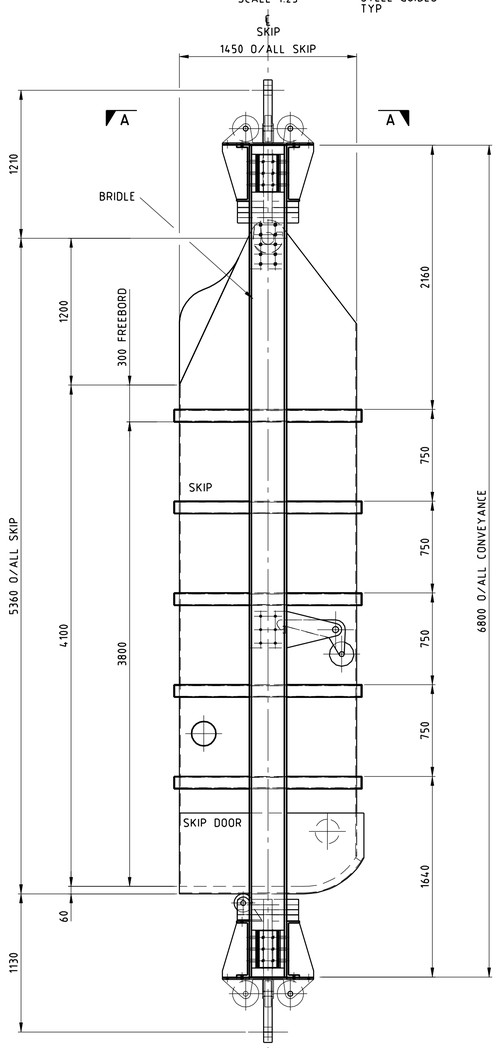
DWG. NO. H333000-WP405-20-042-0014



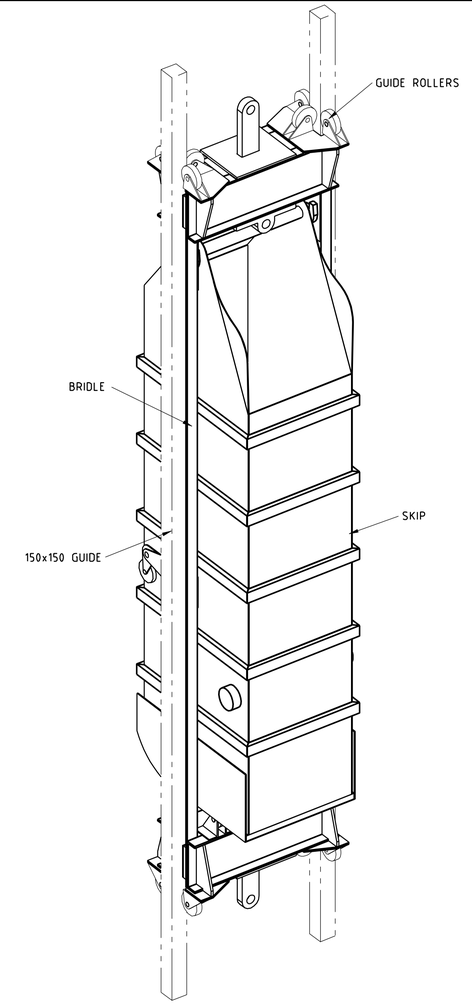
SIDE ELEVATION
SCALE 1:25



PLAN A-A
SCALE 1:25



ELEVATION ON 9.3 Tonne SKIP
SCALE 1:25



ISOMETRIC VIEW

ITEMS	ESTIMATED MASS
1. MAXIMUM SKIP PAYLOAD	9 300 KG
2. PRIMARY STEEL MEMBERS	1 550 KG
3. ROPE ATTACHMENTS	230 KG
4. ALLOWANCE FOR SUNDRIES	491 KG
5. SKIP	4650 KG
TOTAL ESTIMATED MAXIUM MASS	16 221 KG

GENERAL NOTE:-
1. ALL STRUCTURAL STEELWORK TO BE IN ACCORDANCE WITH CAN/CSA-S16-01.
2. ALL STRUCTURAL STEEL TO BE CSA G40.21 350WT UNLESS OTHERWISE NOTED.
3. DRAWING TO BE USED FOR PRELIMINARY DESIGN ONLY, NOT TO BE USED FOR CONSTRUCTION.
4. SIZE OF CONVEYANCE BASED ON SHAFT SIZE FROM CONCEPTUAL DESIGN REPORT.
5. ROLLOMATIC BOTTOM DISCHARGE TYPE SKIP ASSUMED.
6. A 2 Tonne ALLOWANCE HAS BEEN MADE FOR EITHER SLINGING OF AN INSPECTION PLATFORM UNDER THE SKIP OR PLACING AN INSPECTION PLATFORM ON TOP OF THE SKIP

PRELIMINARY

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner: Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=JDS, o=Hatch Africa, ou=Mining, email=skeen@hatch.ca Reason: I have reviewed this document Date: 2009.12.04 07:28:32 +02'00'
Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.12.04 14:59:58 -05'00'
Engineering Mangager: Sherwin Aarons 2009.12.04 15:17:33 -05'00'
Project Manager: M R Dawborn — Digitally signed by M R Dawborn Date: 2009.12.04 15:27:21 -05'00'
Accepted by Owner: Derek Wilson — Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA Date: 2009.12.14 09:54:16 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD | SAA	03/12/09
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY / DATE	DRAWN BY M.C. BOTHMA DATE 14/10/09
CHECKED BY S. KEEN DATE 14/10/09	DISCIP. ENGR. / DATE
PROJ. DES. COORD. / DATE	PROJ. ENGR. / DATE
PROJ. MGR. M. DAWBORN DATE 10/10/09	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT HOISTING SYSTEMS

VENTILATION SHAFT–PERMANENT CONDITION
9.3 Tonne SKIP
GENERAL ARRANGEMENT

SCALE 1:25 OR AS NOTED
DWG. NO. H333000-WP405-20-042-0014
REV. 00

P:\NUCLEAR\333000\CAD\MA\DGN\H333000-WP405-20-042-0014 - Permanent Condition 9.3 Tonne Skip Arrangement.dgn
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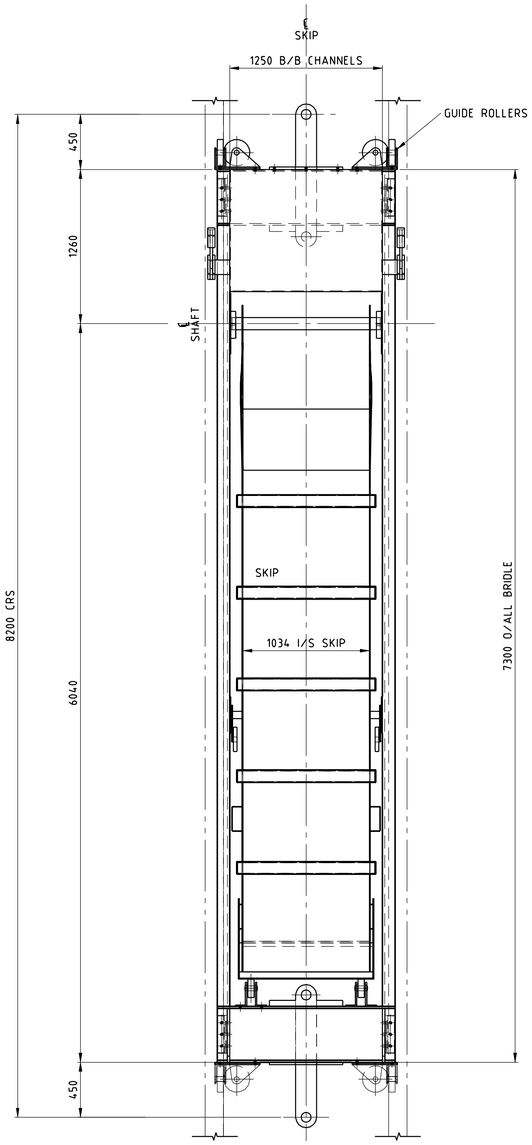
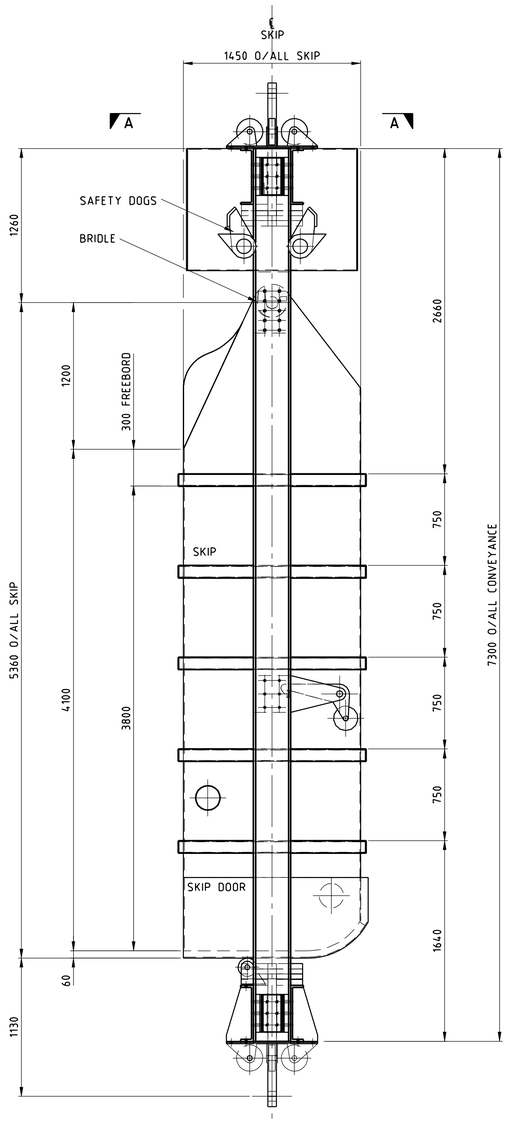
don57041

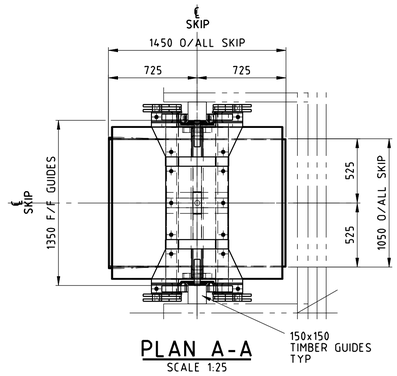
DWG. NO. H333000-WP405-20-042-0015



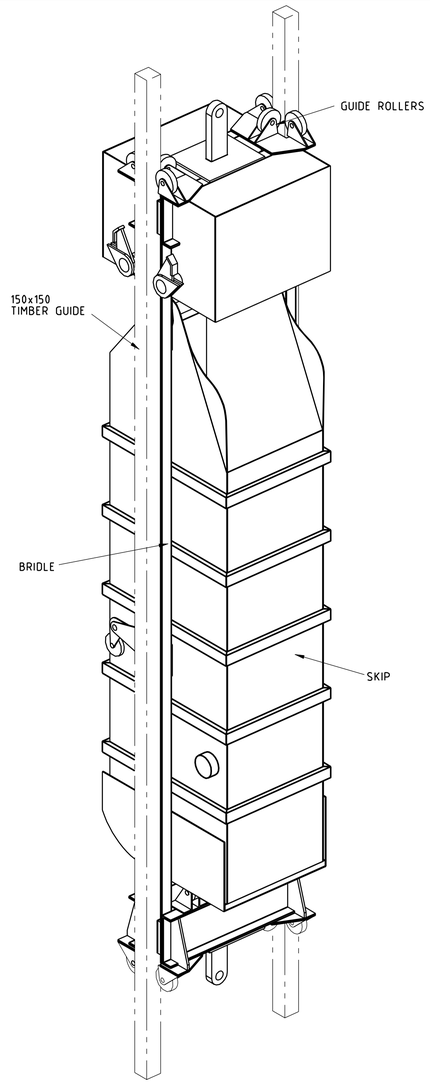
SIDE ELEVATION
SCALE 1:25



ELEVATION ON REMOVABLE SKIP
SCALE 1:25



PLAN A-A
SCALE 1:25



ISOMETRIC VIEW

ITEMS	ESTIMATED MASS
1. MAXIMUM SKIP PAYLOAD	9 300 KG
2. PRIMARY STEEL MEMBERS	2 015 KG
3. ROPE ATTACHMENTS	230 KG
4. ALLOWANCE FOR SUNDRIES	491 KG
5. SKIP	4650 KG
TOTAL ESTIMATED MAXIUM MASS	16 686 KG

PRELIMINARY

GENERAL NOTE:-
1. ALL STRUCTURAL STEELWORK TO BE IN ACCORDANCE WITH CAN/CSA-S16-01.
2. ALL STRUCTURAL STEEL TO BE CSA G40.21 350WT UNLESS OTHERWISE NOTED.
3. DRAWING TO BE USED FOR PRELIMINARY DESIGN ONLY, NOT TO BE USED FOR CONSTRUCTION.
4. SIZE OF CONVEYANCE BASED ON SHAFT SIZE FROM CONCEPTUAL DESIGN REPORT.
5. ROLLOMATIC BOTTOM DISCHARGE TYPE SKIP ASSUMED.
6. A 2 Tonne ALLOWANCE HAS BEEN MADE FOR EITHER SLINGING OF AN INSPECTION PLATFORM UNDER THE SKIP OR PLACING AN INSPECTION PLATFORM ON TOP OF THE SKIP

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner: Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=SA, ou=Waste Area, email=skeen@nwmo.ca, c=CA Reason: I have reviewed this document Date: 2009.12.04 07:40:06 -05'00'

Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.12.04 14:56:13 -05'00'

Engineering Mangager: Sherwin Aarons 2009.12.04 16:01:30 -05'00'

Project Manager: Digitally signed by M R Dawborn Date: 2009.12.04 15:27:41 -05'00'

Accepted by Owner: Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA Date: 2009.12.11 10:57:18 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD	SAA 03/12/09
ISSUE AUTHORIZATION			

HATCH™

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT HOISTING SYSTEMS

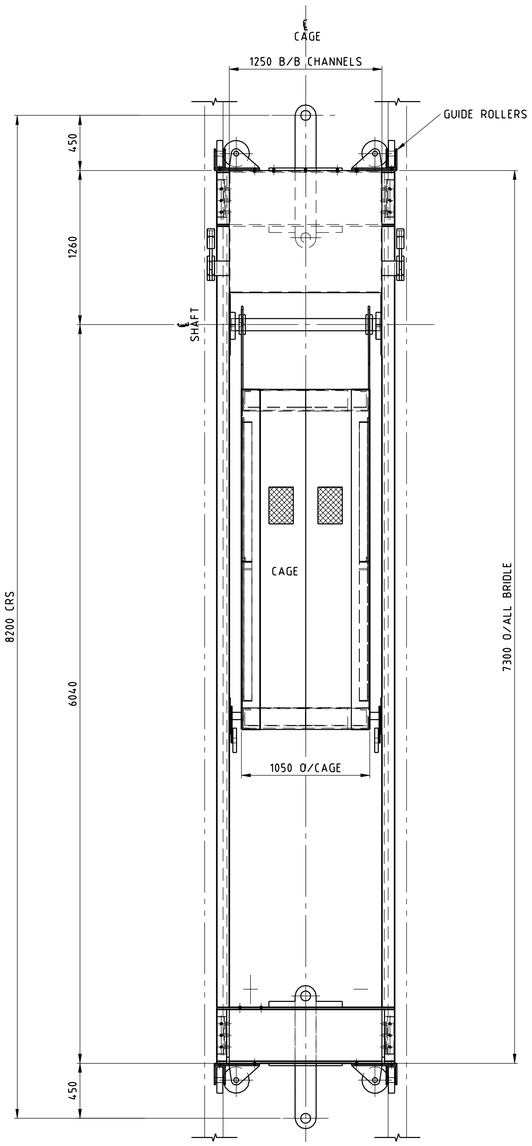
VENTILATION SHAFT-LATERAL DEVELOPMENT
BALE AND REMOVABLE SKIP
GENERAL ARRANGEMENT

DESIGNED BY / DATE	DRAWN BY M.C. BOTHMA DATE 14/10/09
CHECKED BY S. KEEN DATE 14/10/09	DISCIP. ENGR. / DATE
PROJ. DES. COORD. / DATE	PROJ. ENGR. / DATE
PROJ. MGR. M. DAWBORN DATE 14/10/09	

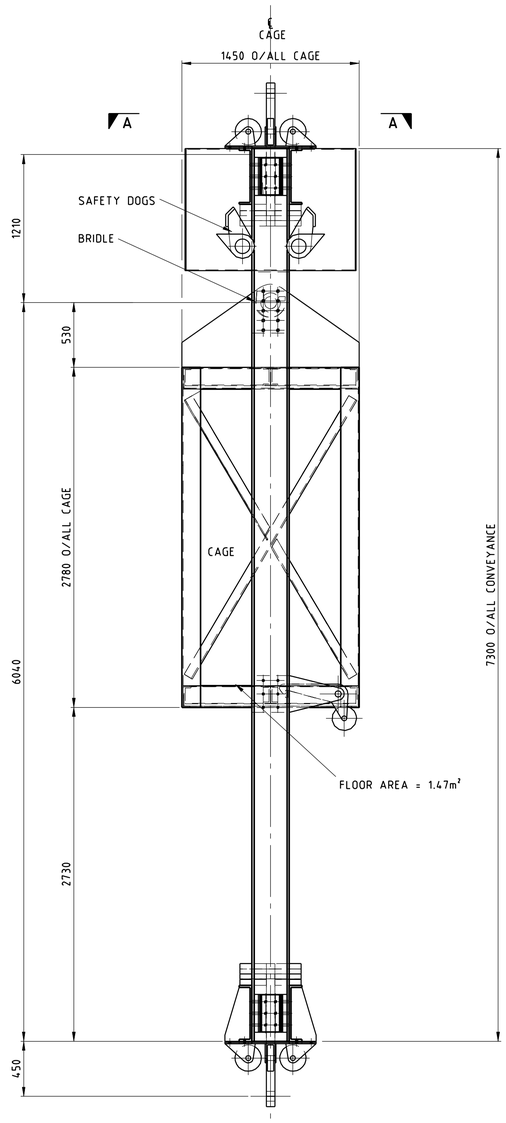
SCALE 1:25 OR AS NOTED
DWG. NO. H333000-WP405-20-042-0015
REV. 00

P:\NUCLEAR\333000\CAD\MA\DGN\H333000-WP405-20-042-0015 - Lateral Developement Bale and Removable Skip Arrangement.dgn
12/3/2009 11:01:44 AM
dan57041

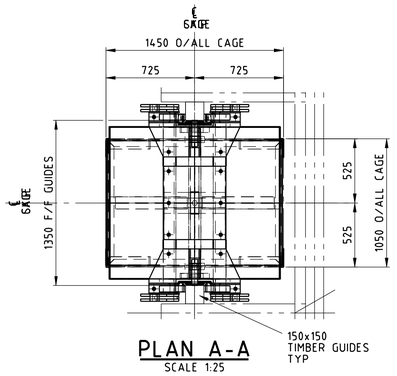
DWG. NO. H333000-WP405-20-042-0016



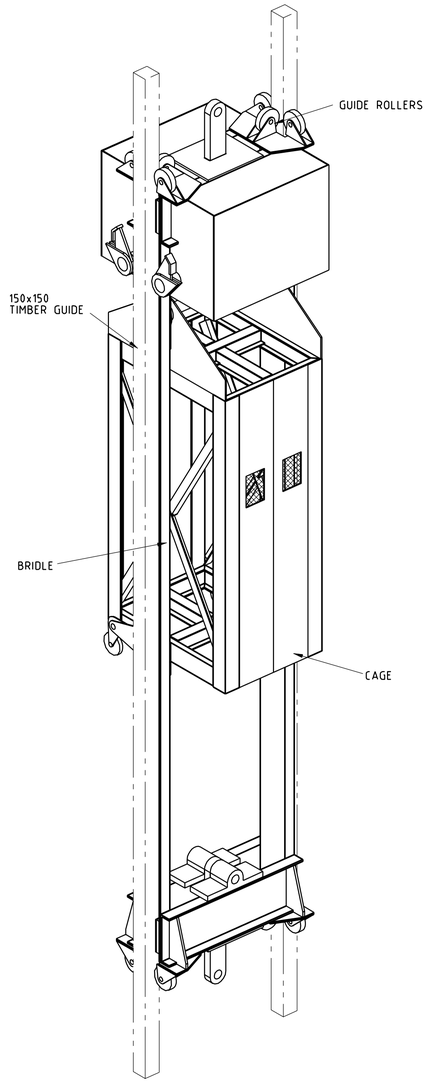
SIDE ELEVATION
SCALE 1:25



ELEVATION ON REMOVABLE CAGE
SCALE 1:25



PLAN A-A
SCALE 1:25



ISOMETRIC VIEW

ITEMS	ESTIMATED MASS
1. PRIMARY STEEL MEMBERS	2 870 KG
2. ROPE ATTACHMENTS	230 KG
3. ALLOWANCE FOR SUNDRIES	700 KG
4. CAGE MATERIAL TRANSPORT	847 KG
TOTAL ESTIMATED MAXIUM MASS	4 647 KG

PRELIMINARY

GENERAL NOTE:-
1. ALL STRUCTURAL STEELWORK TO BE IN ACCORDANCE WITH CAN/CSA-S16-01.
2. ALL STRUCTURAL STEEL TO BE CSA G40.21 350WT UNLESS OTHERWISE NOTED.
3. DRAWING TO BE USED FOR PRELIMINARY DESIGN ONLY, NOT TO BE USED FOR CONSTRUCTION.
4. SIZE OF CONVEYANCE BASED ON SHAFT SIZE FROM CONCEPTUAL DESIGN REPORT.
5. A 2 Tonne ALLOWANCE HAS BEEN MADE FOR EITHER SLINGING OF AN INSPECTION PLATFORM UNDER THE SKIP OR PLACING AN INSPECTION PLATFORM ON TOP OF THE SKIP

DRAWING NO.	DRAWING TITLE

REFERENCE DRAWINGS

NO.	DESCRIPTION	CHK'D	APP'D	DATE

REVISIONS

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner: Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=OPG, ou=Hatch Africa, email=stephen@hatch.co.za, c=ZA Reason: I have reviewed this document Date: 2009.12.04 07:46:16 +02'00'

Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.12.04 14:58:20 -05'00'

Engineering Mangager: Sherwin Aarons 2009.12.04 16:01:55 -05'00'

Project Manager: Digitally signed by M R Dawborn Date: 2009.12.04 15:28:05 -05'00'

Accepted by Owner: Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA Date: 2009.12.11 10:56:31 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD	SAA 03/12/09

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY	DRAWN BY M.C. BOTHMA
DATE	DATE 14/10/09
CHECKED BY S. KEEN	DISCIP. ENGR.
DATE 14/10/09	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR. M. DAWBORN	
DATE 14/10/09	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

SHAFT HOISTING SYSTEMS

VENTILATION SHAFT-LATERAL DEVELOPMENT BALE AND REMOVABLE CAGE GENERAL ARRANGEMENT

SCALE 1:25 OR AS NOTED

DWG. NO. H333000-WP405-20-042-0016

REV. 00

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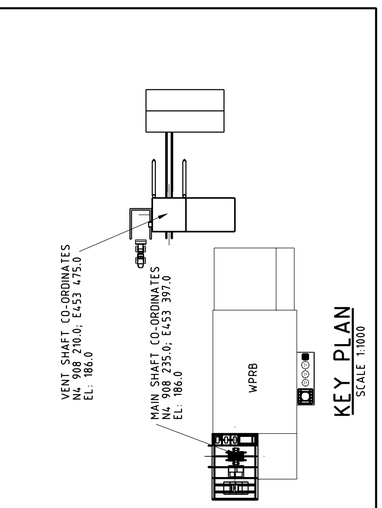
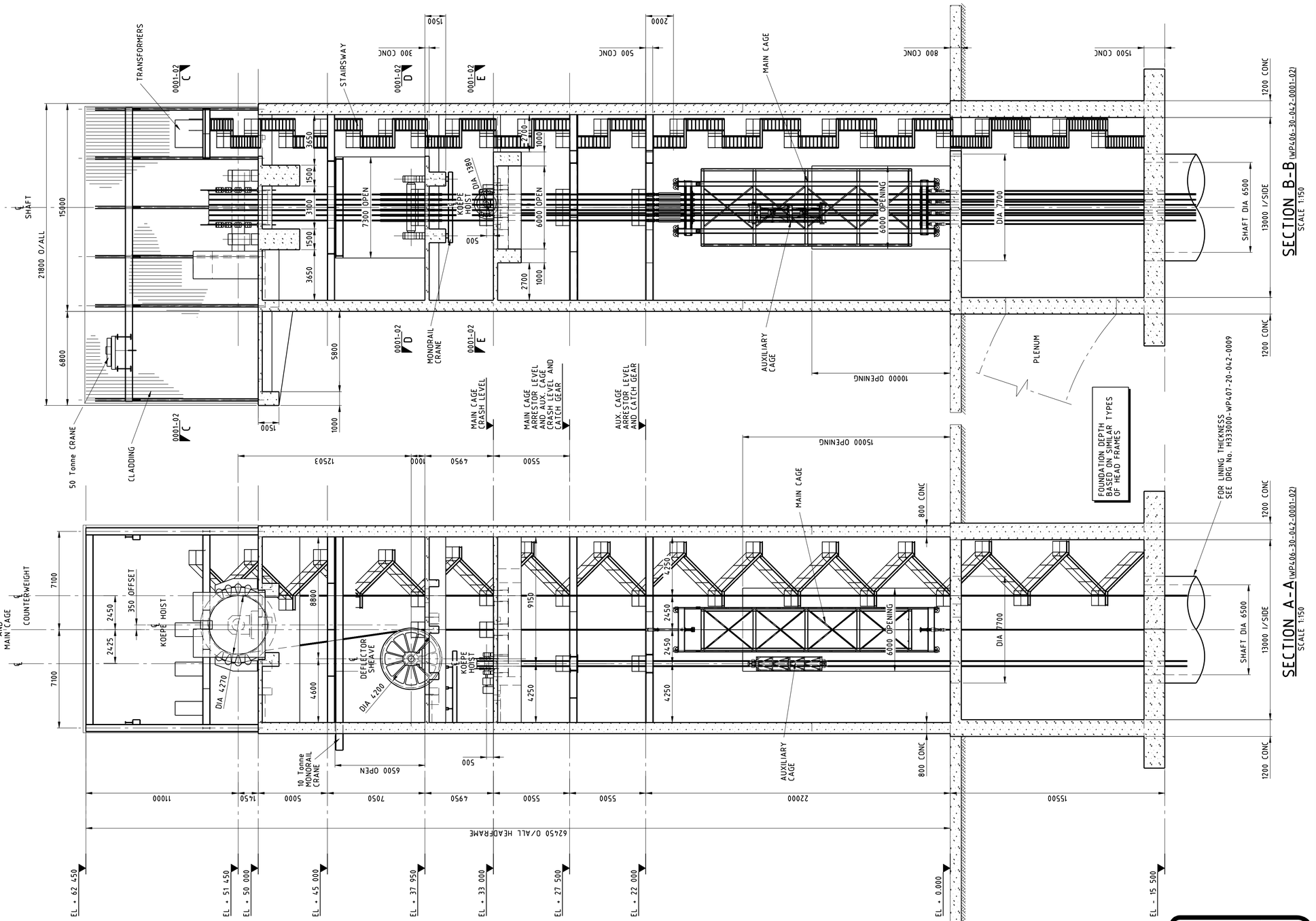
12/3/2009 11:04:24 AM
dan57041

DWG. NO. H333000-WP406-20-042-0001





PRELIMINARY

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION

This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner	Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, c=ZA, o=Hatch Africa, email=skeen@hatch.co.za Reason: I have reviewed this document Date: 2009.12.10 15:50:37 +02'00'
Area Lead	G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.12.10 14:46:49 -05'00'
Engineering Mangager	Sherwin Aarons 2009.12.10 15:47:02 -05'00'
Project Manager	Digitally signed by M R Dawborn Date: 2009.12.11 09:06:42 -05'00'
Accepted by Owner	Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA Date: 2009.12.16 10:04:12 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD	SAA 09/12/09
ISSUE AUTHORIZATION			

HATCH

DESIGNED BY: N. HENDERSON DATE 31/07/09	DRAWN BY: R.LABUSCHAGNE DATE 2009-07-31
CHECKED BY: DATE	DISCIP. ENGR.: DATE
PROJ. DES. COORD.: DATE	PROJ. ENGR.: DATE
PROJ. MGR.: M. DAWBORN DATE 31/07/09	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

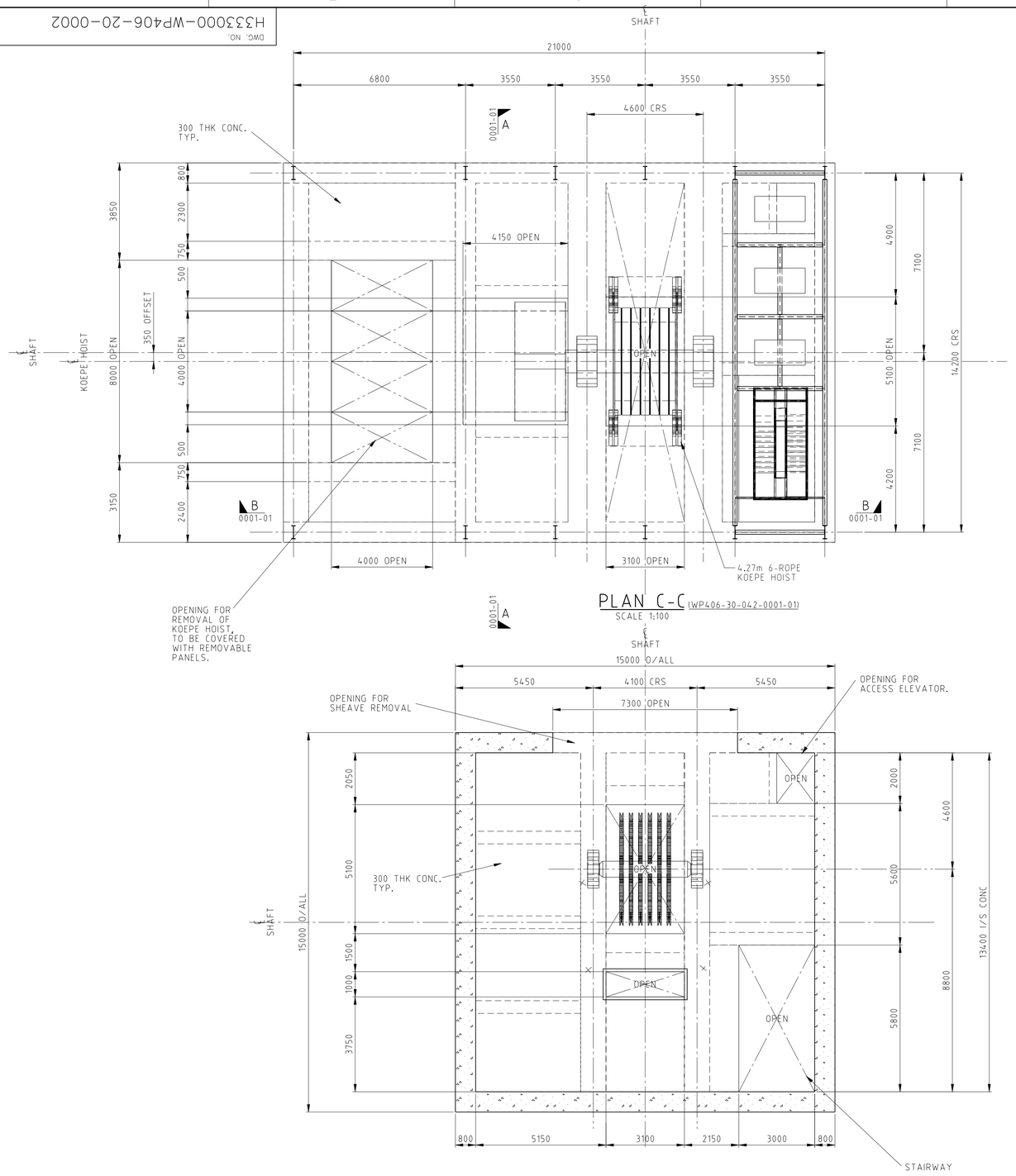
HEADFRAMES

MAIN SHAFT
CONCRETE HEADFRAME
GENERAL ARRANGEMENT

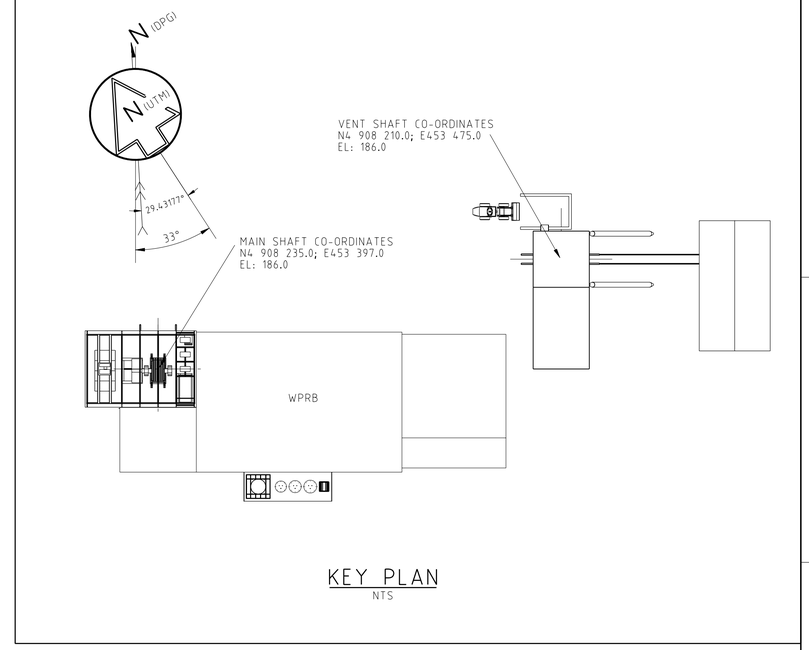
SCALE	DWG. NO.	REV.
1:150 OR AS NOTED	H333000-WP406-20-042-0001	00

P:\NUCLEAR\333000\CAD\CLDGN\H333000-WP406-20-042-0001 — [Concrete Headframe Longitudinal Sections.dgn]
12/10/2009 7:29:01 AM
dons7041

DWG. NO. H333000-WP406-20-0002



PLAN C-C (WP406-30-042-0001-01)
SCALE 1:100



KEY PLAN
NTS

PLAN D-D (WP406-30-042-0001-01)
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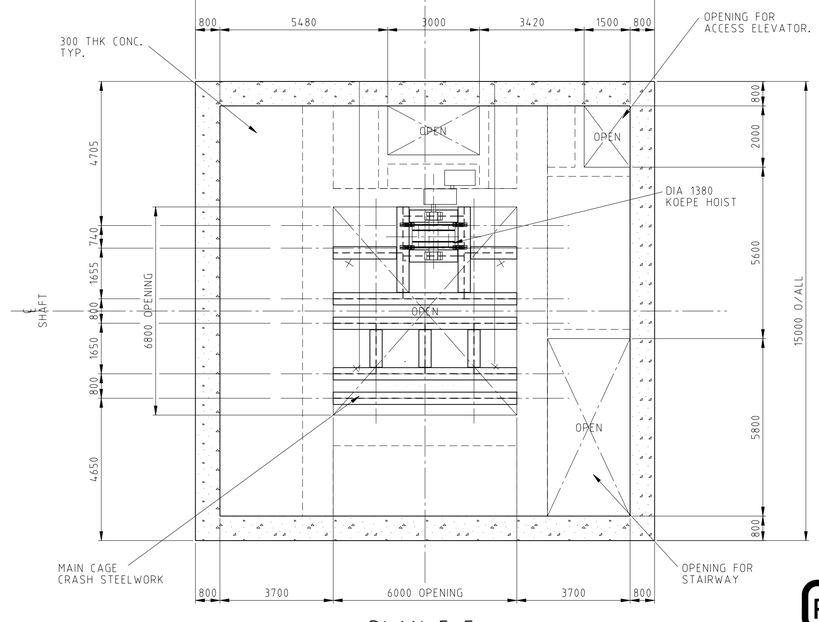


PLAN E-E (WP406-30-042-0001-01)
SCALE 1:100

PRELIMINARY

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.

Work Package Owner: Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=OA, ou=Hatch Africa, email=skeen@hatch.co.za Reason: I am approving this document Date: 2009.12.11 18:06:44 +02'00'

Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.12.11 11:46:09 -05'00'

Engineering Manager: Shenwin Aarons 2009.12.11 13:20:54 -05'00'

Project Manager: Digitally signed by M R Dawborn Date: 2009.12.11 13:41:24 -05'00'

Accepted by Owner: Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca c=CA Date: 2009.12.16 10:22:35 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	GRD	SAA 09/12/09
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY	DRAWN BY
N. HENDERSON	R.LABUSCHAGNE
DATE 05/11/09	DATE 2009-11-05
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR.	
M. DAWBORN	
DATE 05/11/09	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

HEADFRAMES

MAIN SHAFT
CONCRETE HEADFRAME
FLOOR PLANS

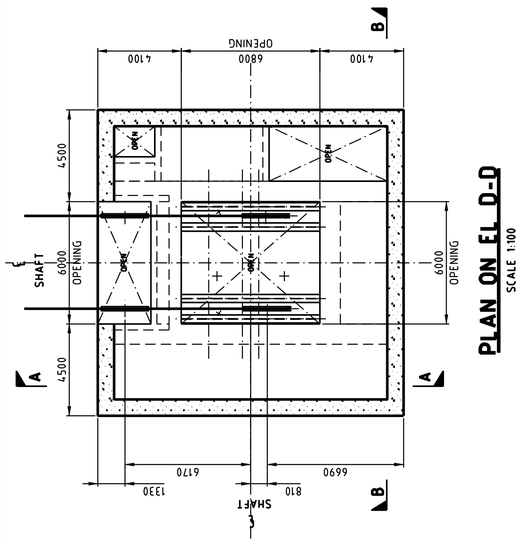
SCALE 1:100 OR AS NOTED

DWG. NO. H333000-WP406-20-042-0002

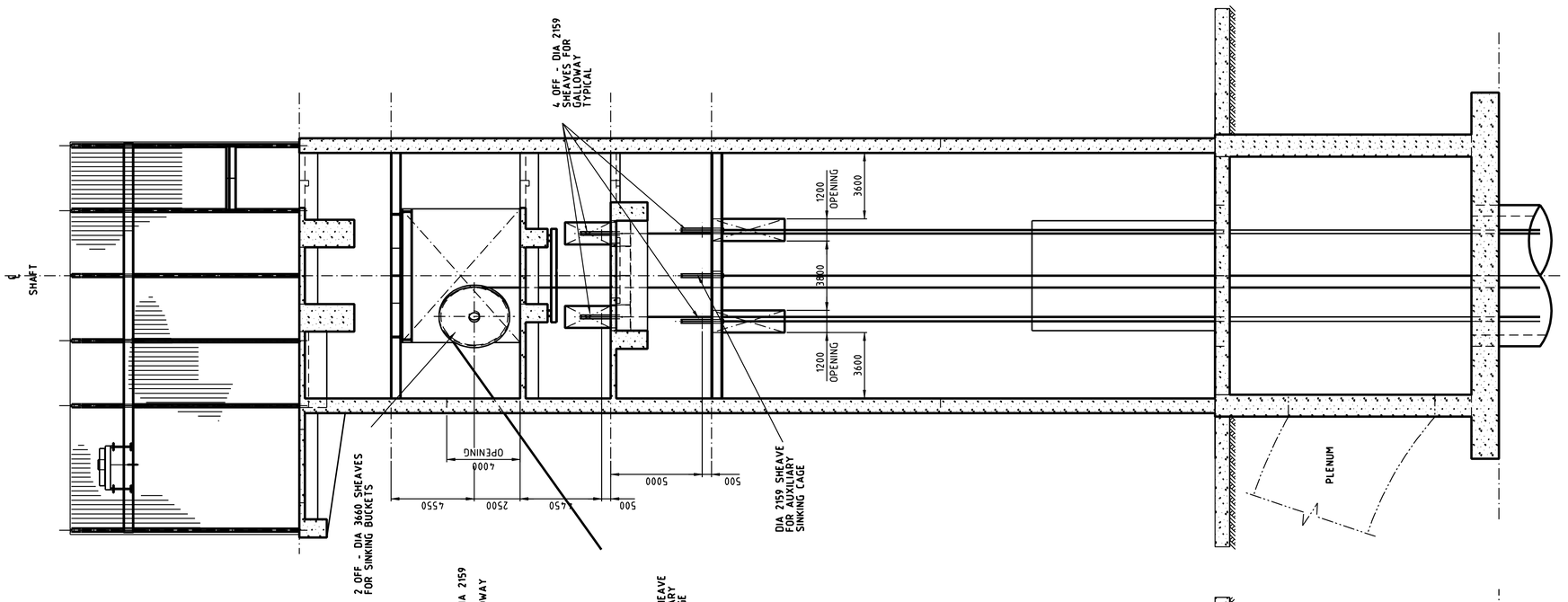
REV. 00

P:\NUCLEAR\333000\CAD\C\DGN\H333000-WP406-20-042-0002 - Concrete Headframe Plans.dgn
2009/12/11 12:29:36 PM
ARWS6265

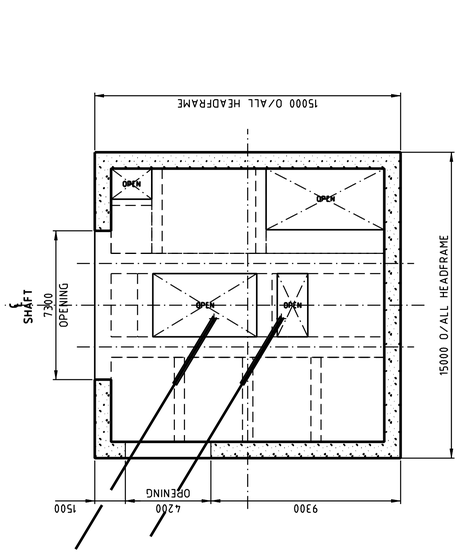
DWG. NO. H333000-WP406-20-042-0003



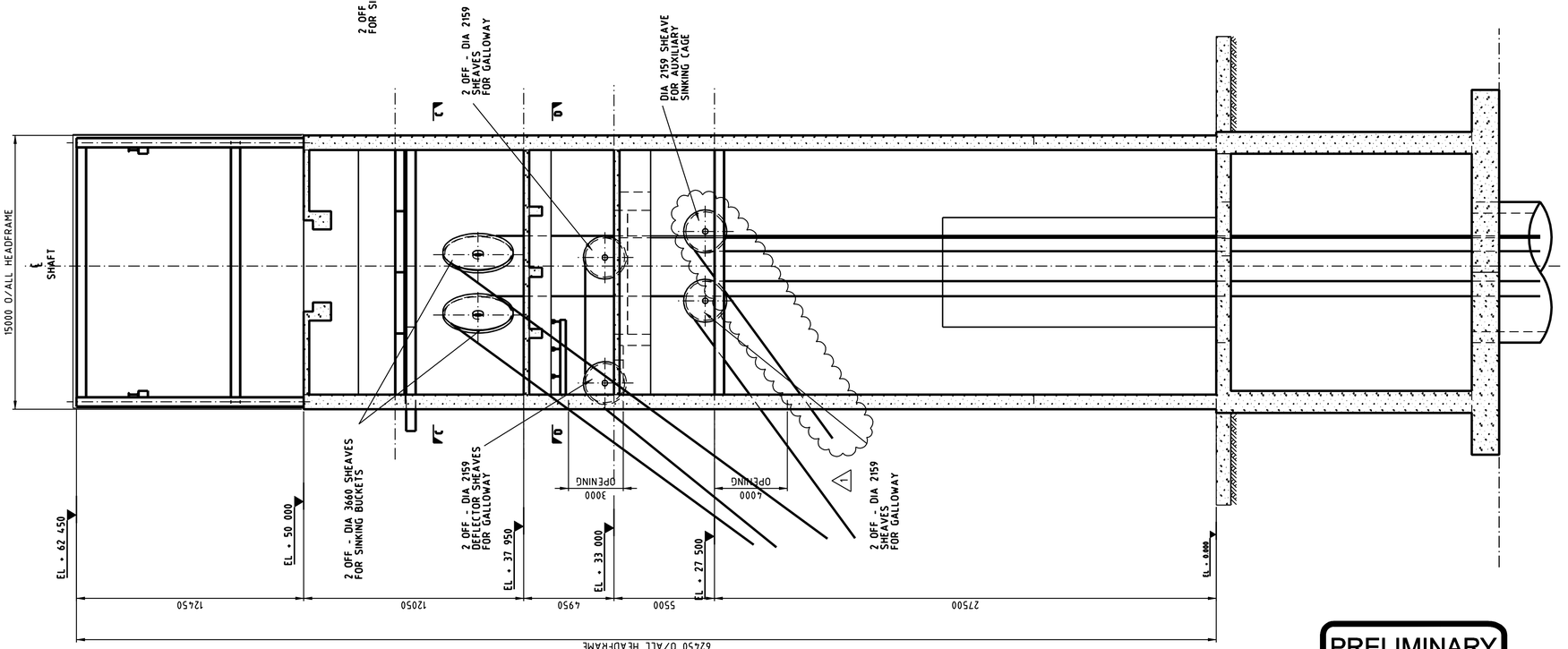
PLAN ON EL D-D
SCALE 1:100



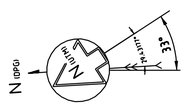
ELEVATION B-B
SCALE 1:100



PLAN ON C-C
SCALE 1:100



ELEVATION A-A
SCALE 1:100



PRELIMINARY

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
01	ROPE LINES DIRECTIONS CHANGED			

REVISIONS

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner: Stephen Keen
Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge, Date: 2010.03.01 15:15:51 -05'00'
Engineering Manager: Sherwin Aarons, 2010.03.02 10:40:21 -05'00'
Project Manager: Digitally signed by M.R.Dawborn, Date: 2010.03.02 11:18:44 -05'00'
Accepted by Owner: Digitally signed by Derek Wilson, DN: cn=Derek Wilson, o=OPG, ou=Nuclear Waste Management Division, Date: 2010.03.03 08:22:34 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
01	APPROVED FOR USE	GRD SAA	01/03/10
00	APPROVED FOR USE	GRD SAA	12/01/10

ISSUE AUTHORIZATION

HATCH™

DESIGNED BY	DRAWN BY
S. LO DRAGO	R.LABUSCHAGNE
DATE 2009-12-08	DATE 2009-11-27
CHECKED BY	DISCIP. ENGR.
DATE	DATE
PROJ. DES. COORD.	PROJ. ENGR.
DATE	DATE
PROJ. MGR. M. DAWBORN	
DATE 2009-12-08	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

HEADFRAMES

MAIN SHAFT
HEADFRAME - SINKING CONDITION
GENERAL ARRANGEMNT

SCALE 1:150 OR AS NOTED

DWG. NO. H333000-WP406-20-042-0003

REV. 01

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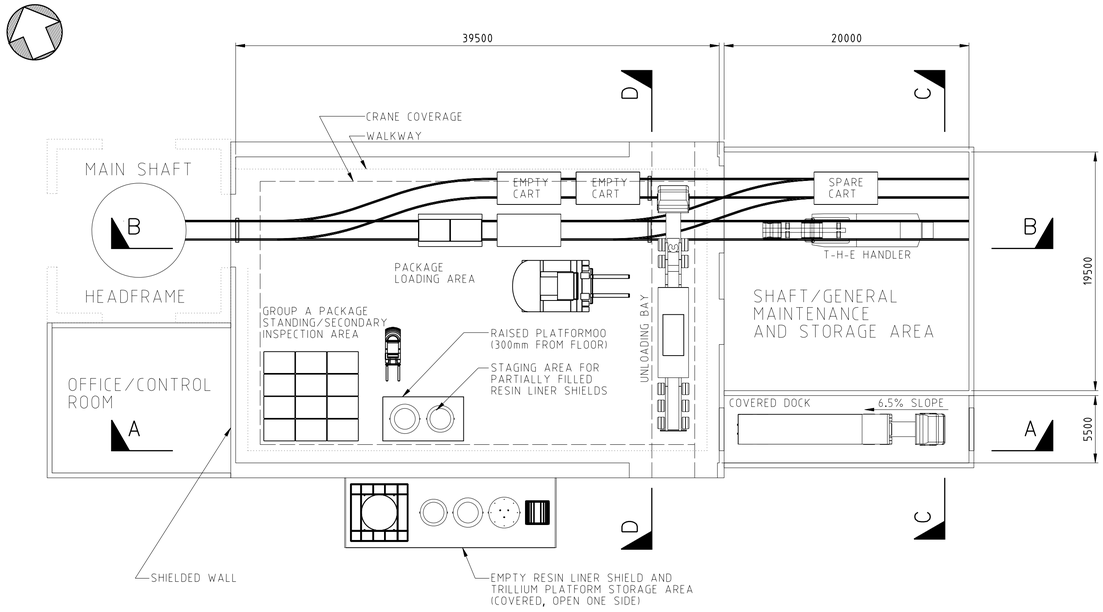
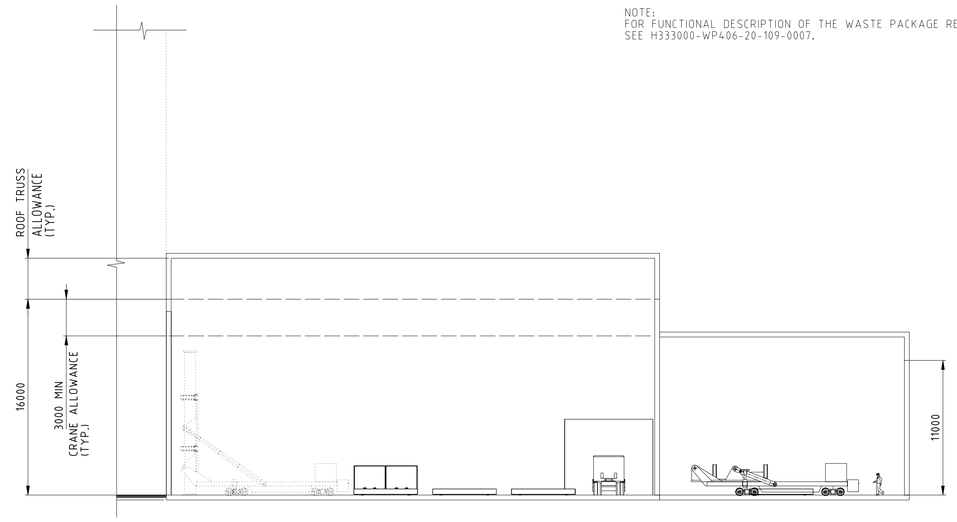
3/1/2010 1:25:45 PM
doni57041

DWG. NO. H333000-WP406-20-042-0005

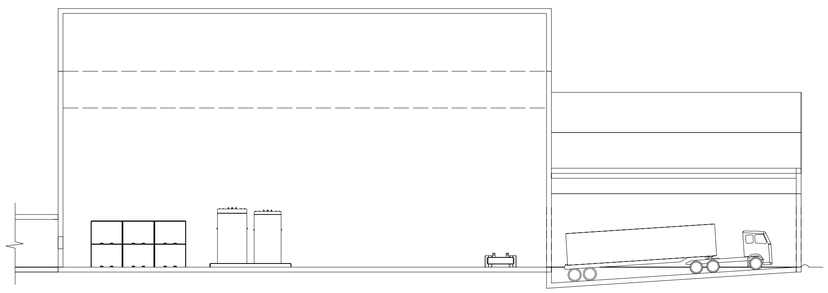


PLAN

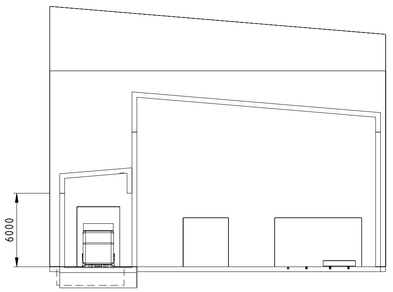
NOTE:
FOR FUNCTIONAL DESCRIPTION OF THE WASTE PACKAGE RECIEVING BUILDING SEE H333000-WP406-20-109-0007.



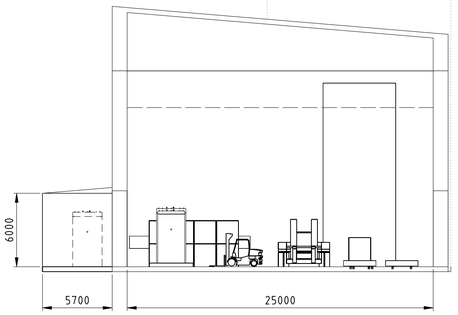
SECTION B-B



SECTION A-A



SECTION C-C



SECTION D-D

PRELIMINARY

NOT FOR CONSTRUCTION

DRAWING NO.	DRAWING TITLE
REFERENCE DRAWINGS	

NO.	DESCRIPTION	CHK'D	APP'D	DATE
REVISIONS				

NOT FOR CONSTRUCTION
This drawing has been reviewed for the purposes of DGR Preliminary Engineering only and must not be used for other purposes.
Work Package Owner: Stephen Keen — Digitally signed by Stephen Keen DN: cn=Stephen Keen, o=NWMO, ou, email=skeen@nwmo.ca, c=CA Date: 2009.11.19 10:54:10 -05'00'
Area Lead: G.R. Davidge — Digitally signed by G.R. Davidge Date: 2009.11.19 16:40:22 -05'00'
Engineering Mangager: Sherwin Aarons 2009.11.19 21:02:38 -05'00'
Project Manager: Digitally signed by M R Dawborn Date: 2009.11.20 08:25:13 -05'00'
Accepted by Owner: Digitally signed by Derek Wilson DN: cn=Derek Wilson, o=NWMO, ou, email=dwilson@nwmo.ca, c=CA Date: 2009.11.25 15:17:56 -05'00'

REV.	ISSUE FOR	AUTH. BY	DATE
00	APPROVED FOR USE	DW	SAA2009-11-12
ISSUE AUTHORIZATION			

HATCH™

DESIGNED BY B. PERRY DATE 2009-10-19	DRAWN BY K. BUSHEY DATE 2009-10-19
CHECKED BY DATE	DISCIP. ENGR. DATE
PROJ. DES. COORD. DATE	PROJ. ENGR. DATE
PROJ. MGR. M. DAWBORN DATE 2009-11-12	

NUCLEAR WASTE MANAGEMENT ORGANIZATION
DEEP GEOLOGIC REPOSITORY PROJECT

WASTE PACKAGE RECEIVING BUILDING

GENERAL ARRANGEMENT

SCALE	DWG. NO.	REV.
1:250 OR AS NOTED	H333000-WP406-20-042-0005	00

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