

APPENDIX 1: DRAWINGS

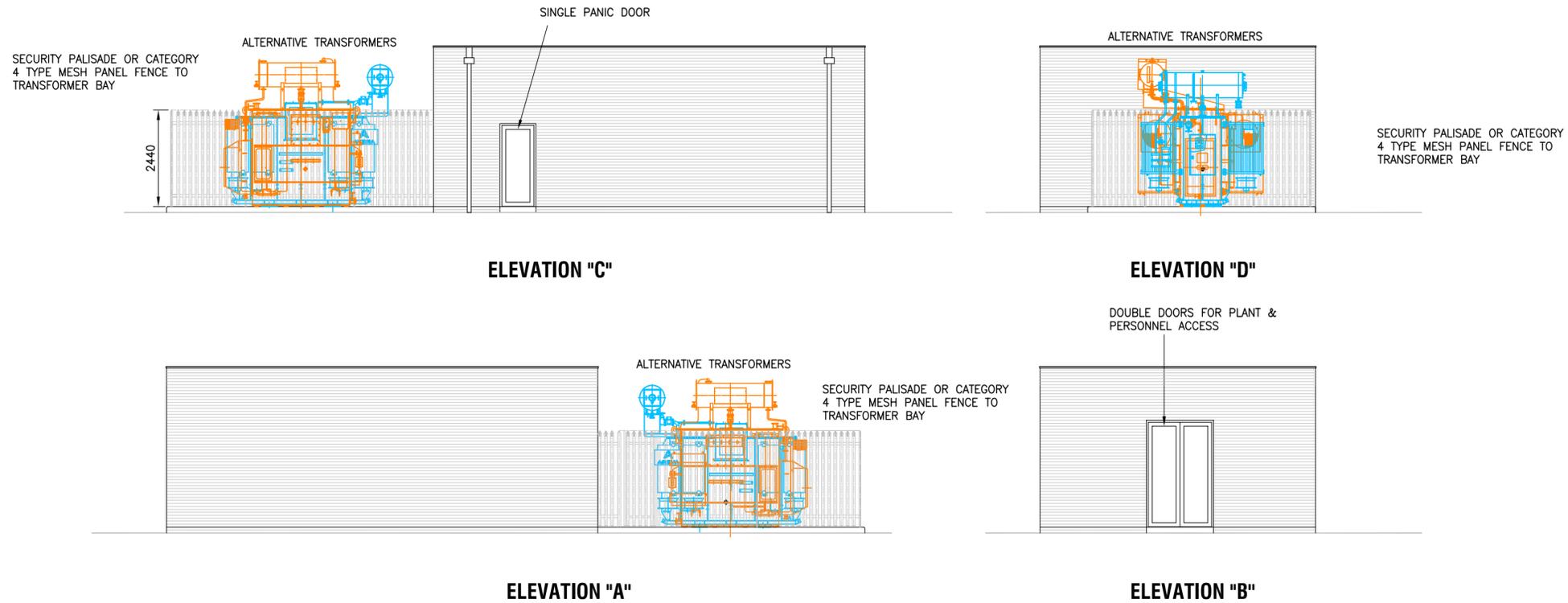
The guidance drawings listed below are typical layout and construction details deemed to satisfy SPEN's functional civil and building requirements for Primary and 33kV Switching Substations.

Constructors shall note that where provided such typical details may be generic and may not reflect exact on-site requirements on a project/site-specific basis.

Where applicable and considered appropriate by SPEN, additional typical deemed to satisfy construction detail drawings may be issued on a project-specific basis.

Variations or changes to the 'deemed to satisfy guidance drawings' shall be submitted to SPEN for audit and agreement prior to any work starting on-site.

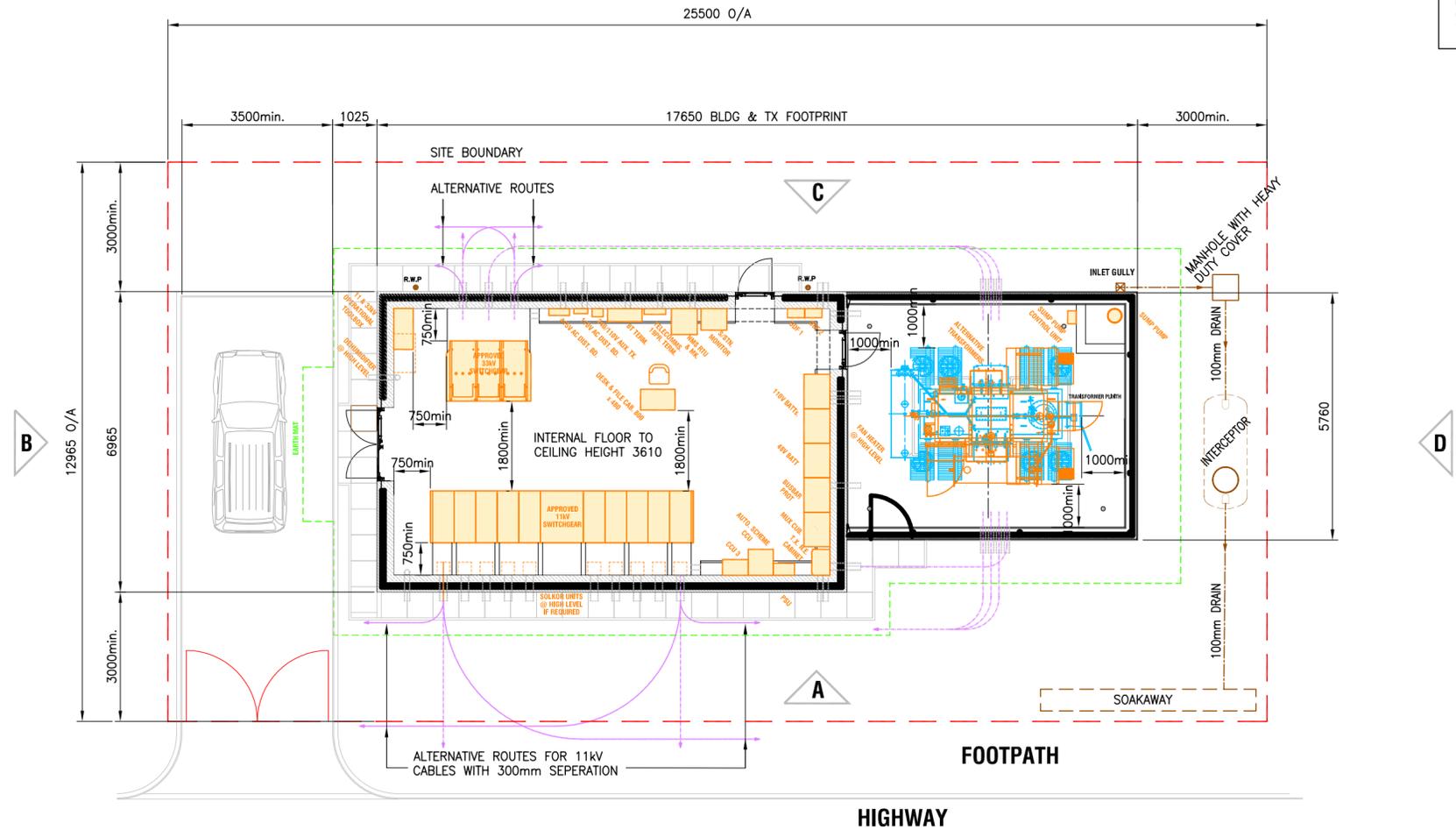
Drawing No.	Drawing Title	Revision
SP4096759	TRADITIONAL BUILD SPM PRIMARY SUBSTATION TYPICAL ARRANGEMENTS SHOWING PLANT AND ACCESS	1
SP 4096760	TRADITIONAL BUILD SPM PRIMARY SUBSTATION TYPICAL FLOOR PLAN	1
SP 4096769	TRADITIONAL BUILD SPM PRIMARY SUBSTATION TYPICAL CIVIL SECTIONS	1
SP 4098105	TRADITIONAL BUILD SPM PRIMARY SUBSTATION TYPICAL ARRANGEMENT SHOWING ALTERNATIVE LAYOUT	1
SP 4096774	TYPICAL LAYOUT FOR COMBINED 11/33KV CONTAINER SOLUTION	1
SP 4096777	TYPICAL MODEL FOUNDATION PLAN FOR COMBINED 11/33KV CONTAINER SOLUTION	1
SP 4096857	TYPICAL LAYOUT FOR SPD CONTAINER SUBSTATION	1
SP 4096782	TYPICAL STEEL ACCESS STEPS/PLATFORMS TO CONTAINER SUBSTATIONS	1
SP 4096878	TYPICAL R.C BUND DETAILS FOR 33/11KV TRANSFORMERS	1



DESIGN & CONSTRUCTION SHALL COMPLY WITH SPEN SPECIFICATION SUB-03-025

- NOTES:
- SUBJECT TO THE CONSTRUCTORS OWN RISK ASSESSMENT, INTERCEPTOR MAY BE OMITTED WHERE EA/SEPA OR OTHER APPLICABLE LOCAL AUTHORITY CONSENT TO DO SO IS CONFIRMED IN WRITING TO SPEN.
 - PRE-COATED COLOURED SECURITY FENCE SYSTEMS THAT IMPAIR ELECTRICAL CONTINUITY FOR EARTHING PURPOSES SHALL NOT BE ACCEPTABLE. APPROPRIATE PAINT SYSTEMS MAY BE APPLIED AFTER ERECTION.

ALTERNATIVE AND/OR EXTENDED BOUNDARY DIMENSIONS MAY BE REQUIRED IF ACCESS FOR TRANSFORMER INSTALLATION/REMOVAL OR FOR FITTERS VEHICLE VARIES FROM THAT SHOWN.



PLAN
(WITH ACCESS FROM DIRECTION OF ARROW A)

Rev. 1.0	Date				
Drawn					
Checked					
Approved					

ScottishPower EnergyNetworks

SP PowerSystems Ltd
Investment Delivery Drawing Office
3 Prenton Way , Prenton , CH43 3ET

Title: **SPECIFICATION SUB - 03 - 025
TRADITIONAL BUILD SPM PRIMARY SUBSTATION -
TYPICAL ARRANGEMENT SHOWING PLANT & ACCESS**

Location: **STANDARDS**

Drawn	Date	Checked	Date	Approved	Date
R. ADAMS	FEB 2013	C. WOOD	FEB 2013	A.J. ROWLEY	FEB 2013

Status: **FOR ISSUE**

Drg. No.: **SP4096759**

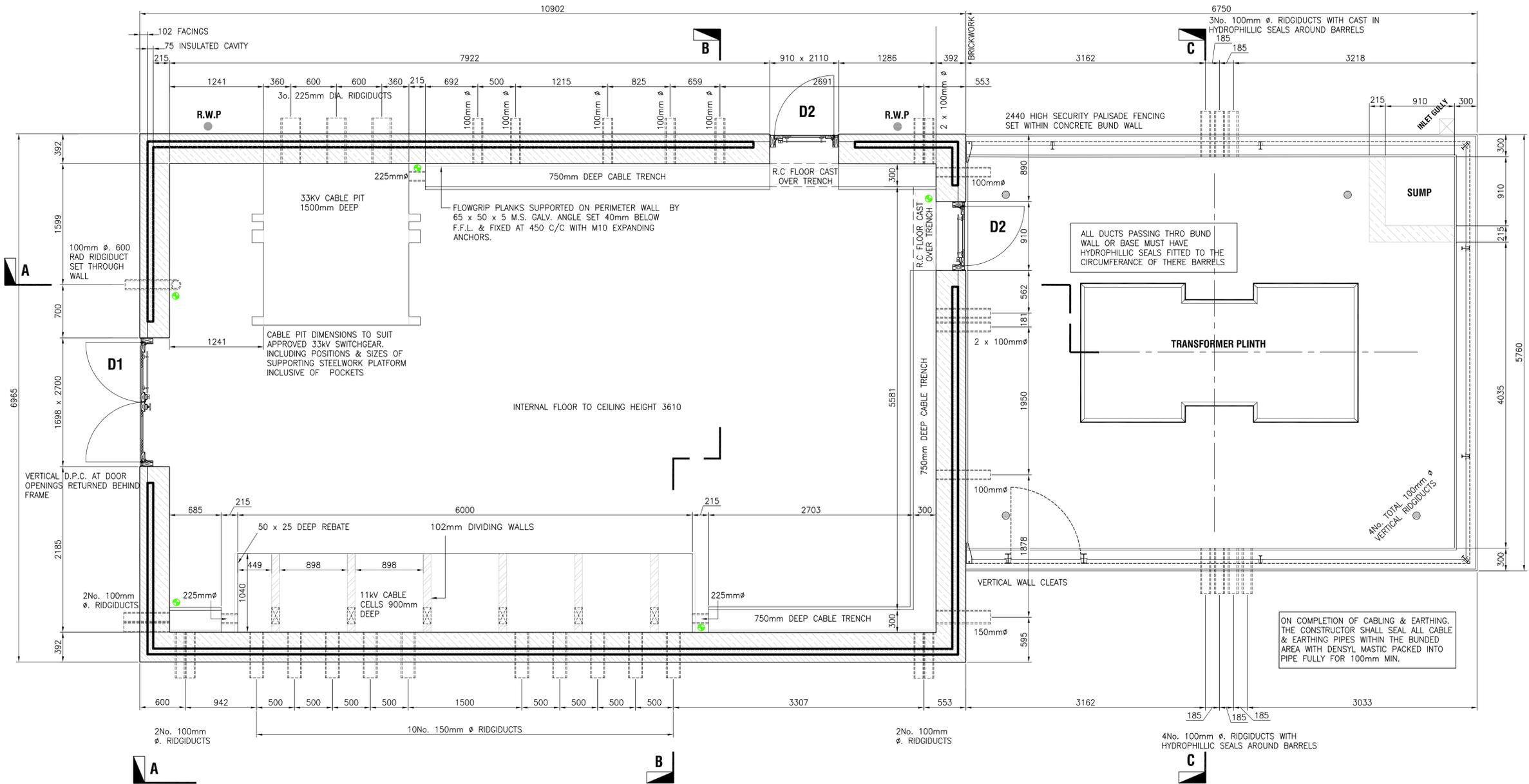
Rev.: **1.0**

Scale: **1/100**

Size: **A2**

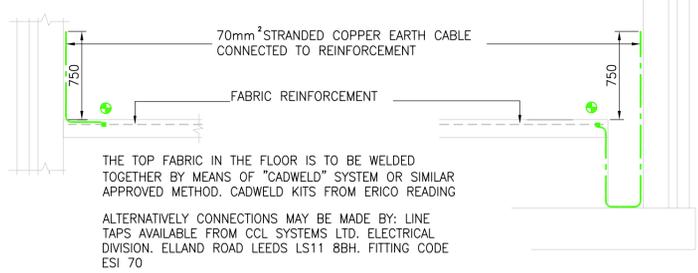
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DESIGN & CONSTRUCTION SHALL COMPLY WITH SPEN SPECIFICATION SUB-03-025

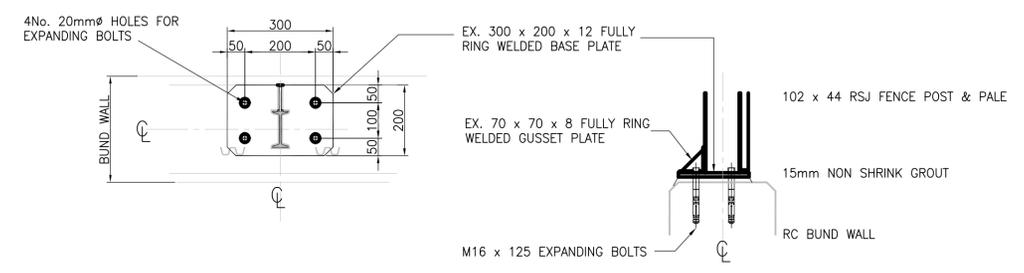


- LEGEND**
- FACING BRICKS TO ENGINEERS/PLANNERS APPROVAL MIN. COMPRESSIVE STRENGTH $\geq 30N/mm^2$, WATER ABSORPTION N.E. 12%
 - 215mm THICK FAIR FACED SOLID CONCRETE BRICKS COMPRESSIVE STRENGTH $\geq 20N/mm^2$ IN ENGLISH BOND
 - BELOW DPC/GROUND LEVEL BRICKWORK NONE TO BE SHOWN ON OUTER FACE TO BE MIN. COMPRESSIVE STRENGTH GREATER THAN $75N/mm^2$ WATER ABSORPTION N.E. 7%
 - APPROX. POSITION OF FLEXIBLE EARTH CONNECTION TO FABRIC REINFORCEMENT AT FLOOR LEVEL POSITION TO BE AS CLOSE AS PRACTICAL TO CORNER/WALL

IMPORTANT NOTE :
 TYPICAL GUIDANCE DRAWINGS ASSUME A SAFE MIN. GROUND BEARING CAPACITY OF $100kN/m^2$. APPROPRIATE LOCATION SPECIFIC BOREHOLE DATA SHOULD BE TAKEN PRIOR TO DESIGN CHECK OF ALL STRUCTURAL ELEMENTS BY A SUITABLY QUALIFIED STRUCTURAL/CIVIL ENGINEER.



STANDARD **SPECIAL**
DETAIL AT EARTH FIXINGS



PLAN & SECTION AT REMOVABLE FENCE POST
 (POSITIONS AS INDICATED ON SITE-SPECIFIC G.A. DRAWINGS)
Scale 1/10

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1.0	
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Approved	



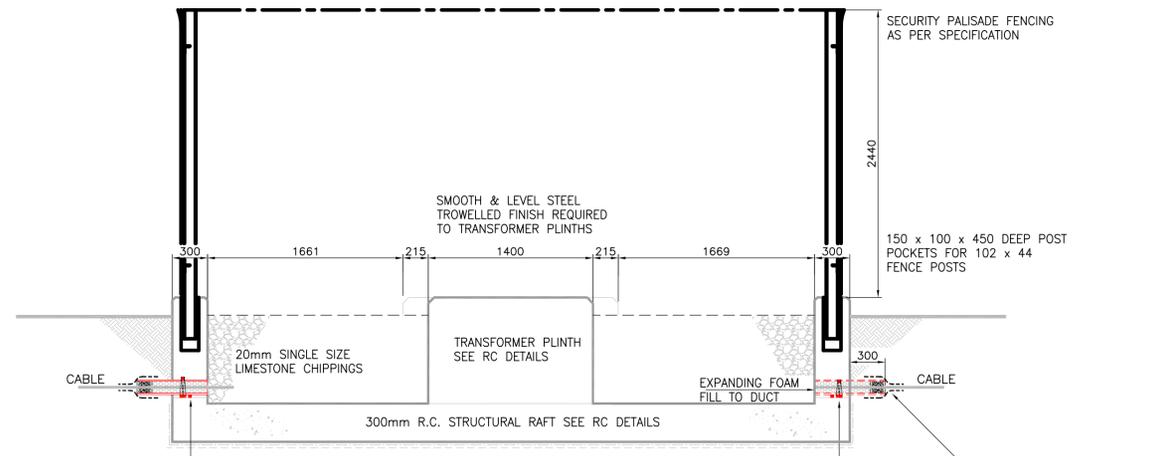
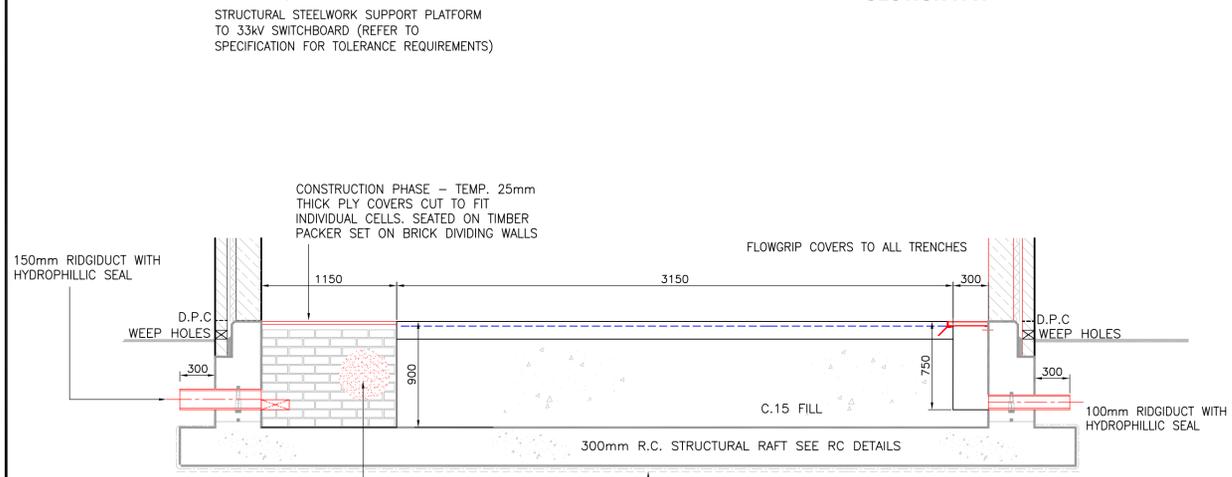
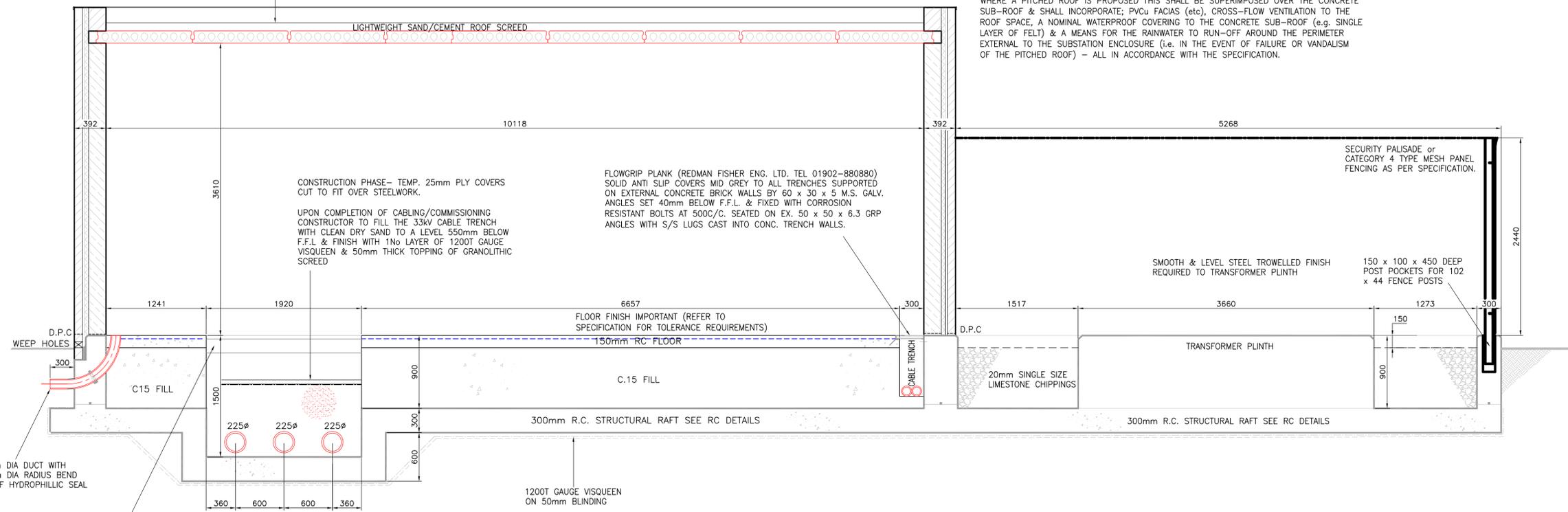
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Title
SPECIFICATION SUB - 03 - 025
TRADITIONAL BUILD SPM PRIMARY SUBSTATION.
TYPICAL FLOOR PLAN

Standards					
Drawn	Date	Checked	Date	Approved	Date
R.ADAMS	FEB 2013	C.WOOD	FEB 2013	A.J.ROWLEY	FEB 2013
Status	Drg. No.			Rev.	
ISSUE	SP4096760			1.0	
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					1/30
					Size
					A1

REFER TO SPECIFICATION FOR WATERPROOF ROOF COVERINGS

WHERE A PITCHED ROOF IS PROPOSED THIS SHALL BE SUPERIMPOSED OVER THE CONCRETE SUB-ROOF & SHALL INCORPORATE; PVCu FACIAS (etc), CROSS-FLOW VENTILATION TO THE ROOF SPACE, A NOMINAL WATERPROOF COVERING TO THE CONCRETE SUB-ROOF (e.g. SINGLE LAYER OF FELT) & A MEANS FOR THE RAINWATER TO RUN-OFF AROUND THE PERIMETER EXTERNAL TO THE SUBSTATION ENCLOSURE (i.e. IN THE EVENT OF FAILURE OR VANDALISM OF THE PITCHED ROOF) - ALL IN ACCORDANCE WITH THE SPECIFICATION.

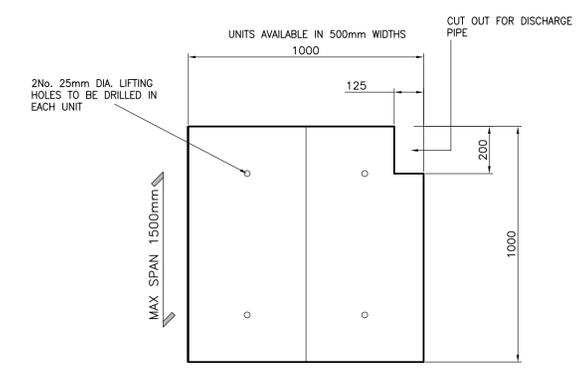
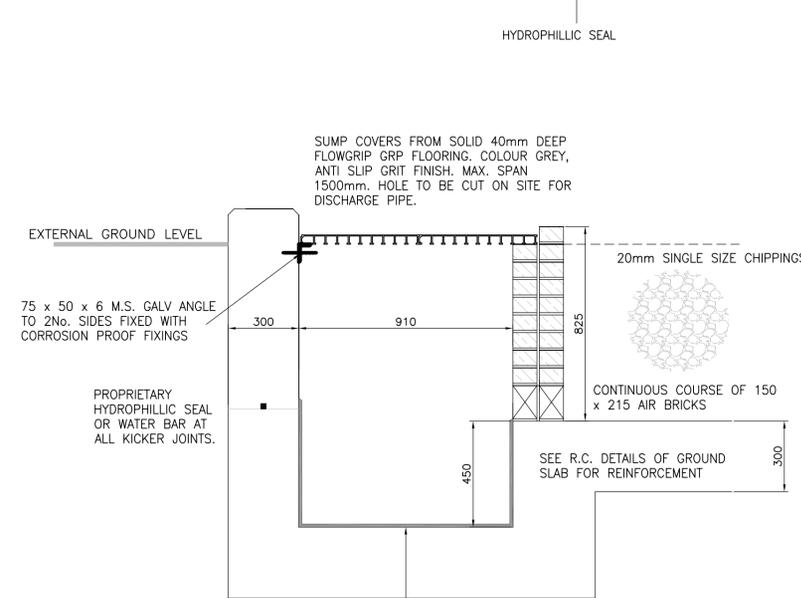
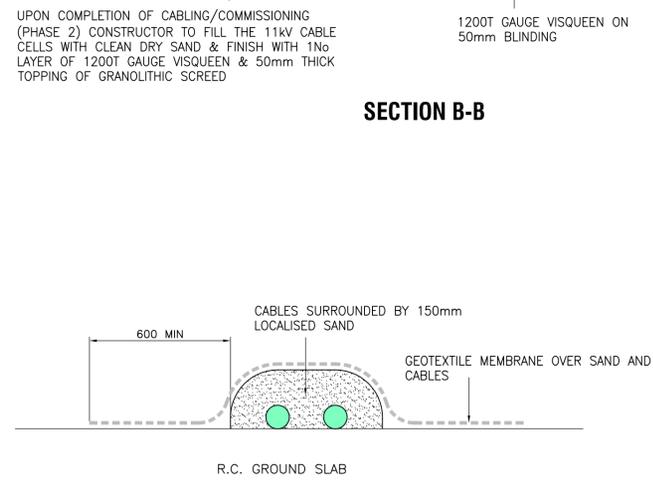


DESIGN & CONSTRUCTION SHALL COMPLY WITH SPEN SPECIFICATION SUB-03-025

- LEGEND**
- FACING BRICKS TO ENGINEERS/PLANNERS APPROVAL MIN. COMPRESSIVE STRENGTH $\geq 30N/mm^2$, WATER ABSORPTION N.E. 12%
 - 215mm THICK FAIR FACED SOLID CONCRETE BRICKS COMPRESSIVE STRENGTH $\geq 20N/mm^2$. IN ENGLISH BOND.
 - BELOW DPC/GROUND LEVEL BRICKWORK NONE TO BE SHOWN ON OUTER FACE TO BE MIN. COMPRESSIVE STRENGTH GREATER THAN $75N/mm^2$ WATER ABSORPTION N.E. 7%

IMPORTANT NOTE :

TYPICAL GUIDANCE DRAWINGS ASSUME A SAFE MIN. GROUND BEARING CAPACITY OF $100kN/m^2$. APPROPRIATE BOREHOLE DATA SHOULD BE OBTAINED PRIOR TO DESIGN CHECK OF ALL STRUCTURAL ELEMENTS BY A SUITABLY QUALIFIED STRUCTURAL/CIVIL ENGINEER.



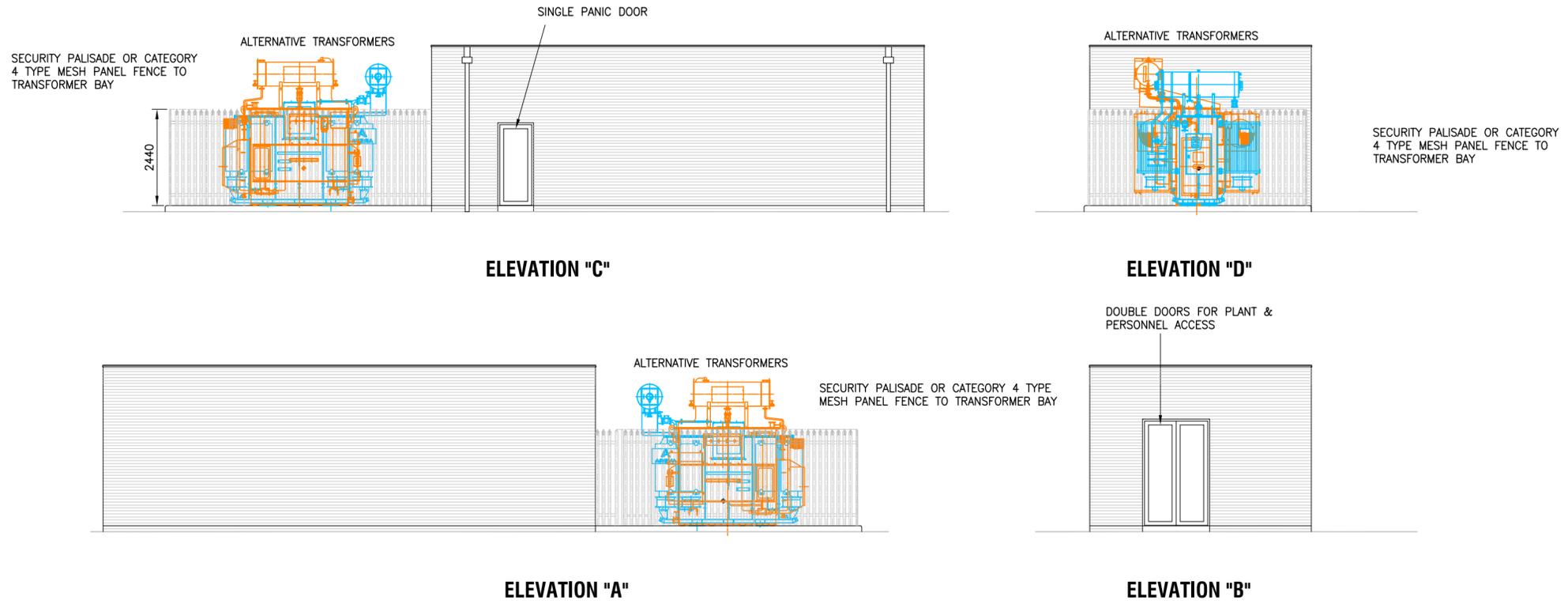
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Title
**SPECIFICATION SUB - 03 - 025
TRADITIONAL BUILD SPM PRIMARY SUBSTATION
TYPICAL CIVIL SECTIONS**

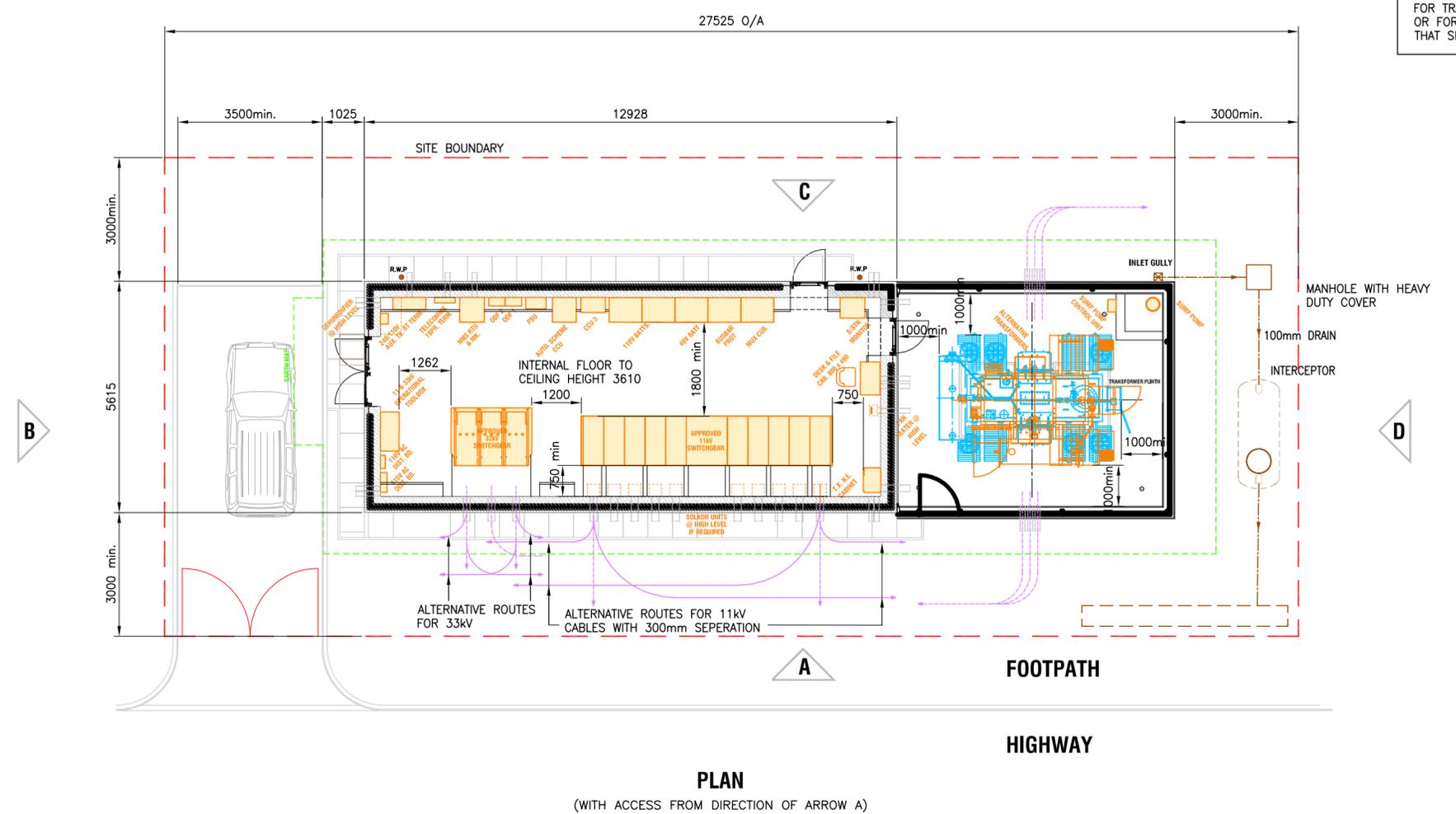
Standards					
Drawn	Date	Checked	Date	Approved	Date
R.ADAMS	FEB 2013	C.WOOD	FEB 2013	A.J.ROWLEY	FEB 2013
Status	Drg. No.			Rev.	
ISSUE	SP4096769			1.0	
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					Size A1



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- NOTES:
1. SUBJECT TO THE CONSTRUCTORS OWN RISK ASSESSMENT, INTERCEPTOR MAY BE OMITTED WHERE EA/SEPA OR OTHER APPLICABLE LOCAL AUTHORITY CONSENT TO DO SO IS CONFIRMED IN WRITING TO SPEN.
 2. PRE-COLOURED SECURITY FENCE SYSTEMS THAT IMPAIR ELECTRICAL CONTINUITY FOR EARTHING PURPOSES SHALL NOT BE ACCEPTABLE. APPROPRIATE PAINT SYSTEMS MAY BE APPLIED AFTER ERECTION.

ALTERNATIVE AND/OR EXTENDED BOUNDARY DIMENSIONS MAY BE REQUIRED IF ACCESS FOR TRANSFORMER INSTALLATION/REMOVAL OR FOR FITTERS VEHICLE VARIES FROM THAT SHOWN.



PLAN
(WITH ACCESS FROM DIRECTION OF ARROW A)

Rev.	Date				
1.0					
Drawn					
Checked					
Approved					

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Title
**SPECIFICATION SUB - 03 - 025
TRADITIONAL BUILD SPM PRIMARY SUBSTATION -
TYPICAL ARRANGEMENT SHOWING ALTERNATIVE LAYOUT**

Location
STANDARDS

Drawn	Date	Checked	Date	Approved	Date
N.DUNN	FEB 2013	C.WOOD	FEB 2013	A.J.ROWLEY	FEB 2013

Status
FOR ISSUE

Org. No.
SP4098105

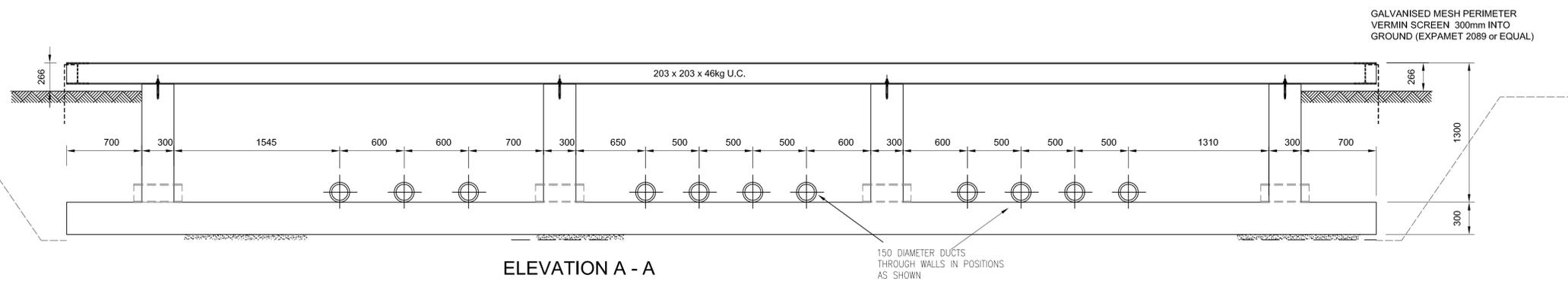
Rev.
1.0

Scale
1/100

Size
A2

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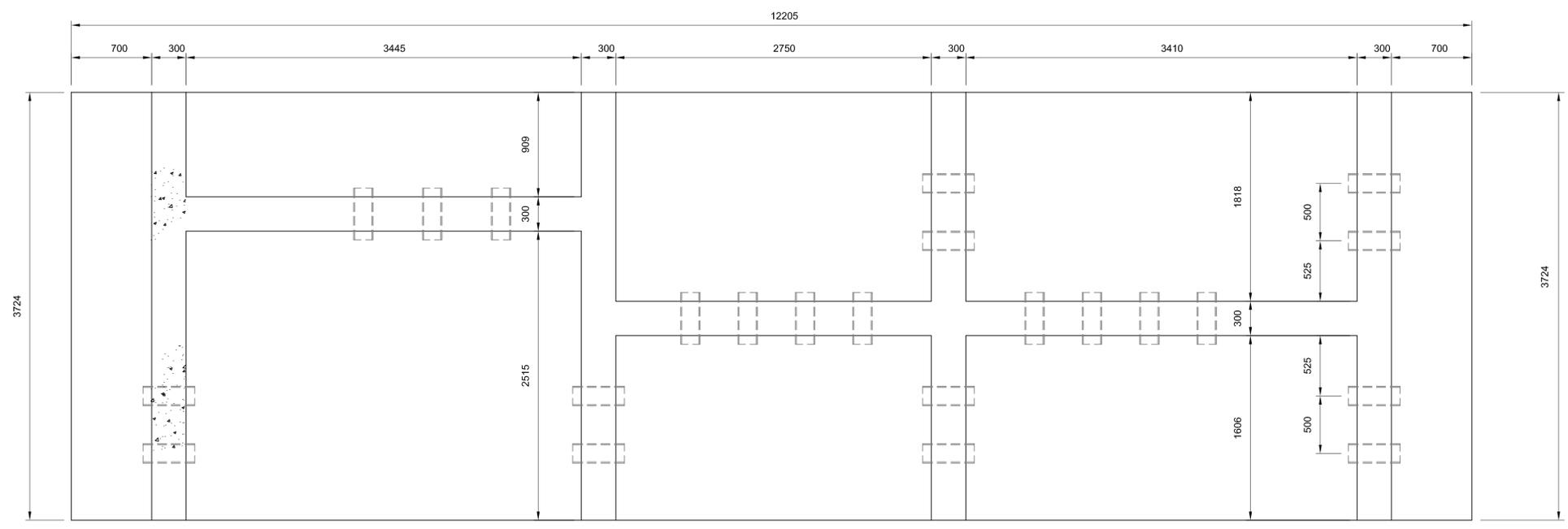
DESIGN & CONSTRUCTION SHALL COMPLY WITH SPEN SPECIFICATION SUB-03-025



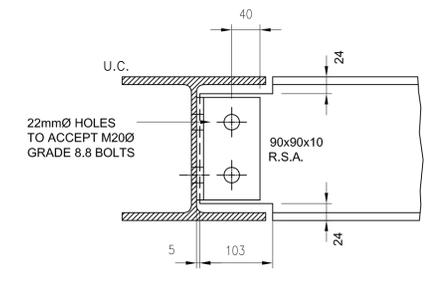
ELEVATION A - A

NOTES

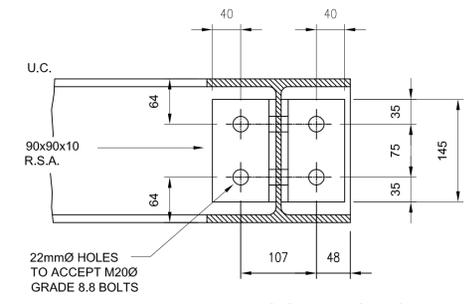
1. TYPICAL GUIDANCE DRAWINGS ASSUME A MINIMUM SAFE GROUND BEARING CAPACITY OF 100kN/m². APPROPRIATE BOREHOLE DATA SHOULD BE OBTAINED PRIOR TO DESIGN OF ALL STRUCTURAL ELEMENTS BY A SUITABLY QUALIFIED STRUCTURAL/CIVIL ENGINEER.
2. DETAILS OF PROPOSALS FOR FOUNDATIONS TO CONTAINERS "WITHOUT FLOORS" SHALL BE SUBMITTED FOR CONSIDERATION BY SPEN PRIOR TO PROCUREMENT. FOUNDATIONS TO SUCH CONTAINERS SHALL BE SUCH THAT A SUITABLE ENVIRONMENT FOR INDOOR EQUIPMENT IS MAINTAINED WITHIN AND ALL SERVICE ENTRIES ARE FULLY SEALED (CABLES/EARTH & DUCTS).



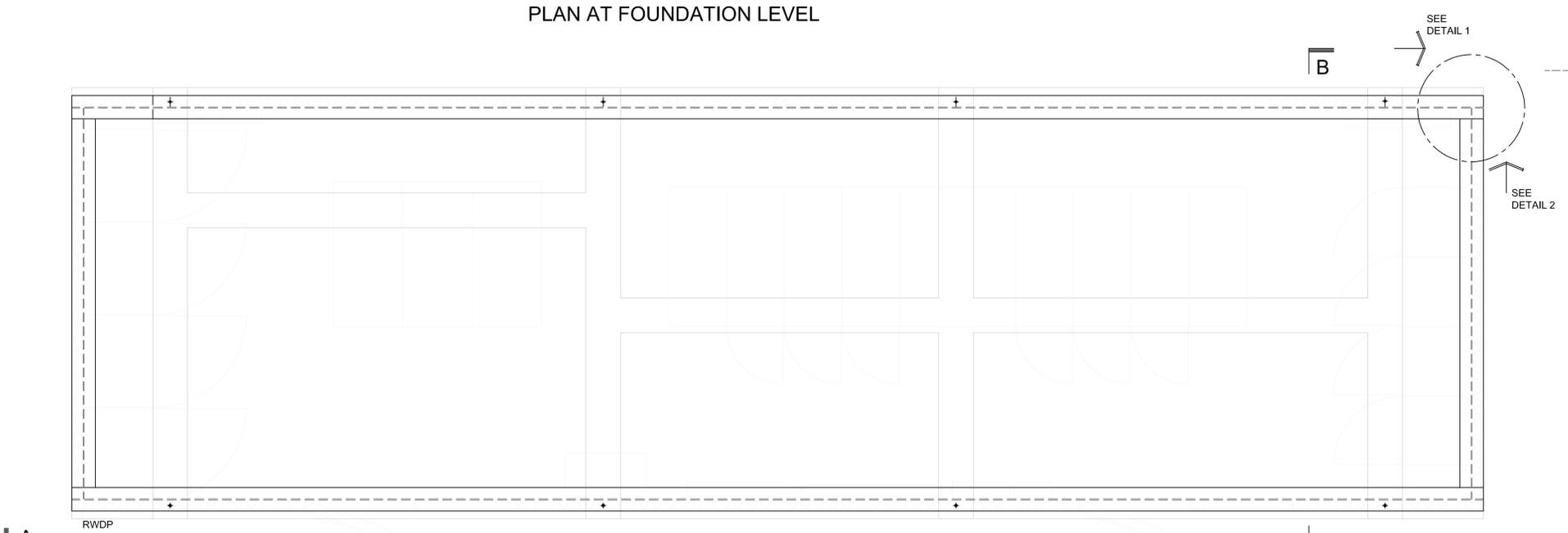
PLAN AT FOUNDATION LEVEL



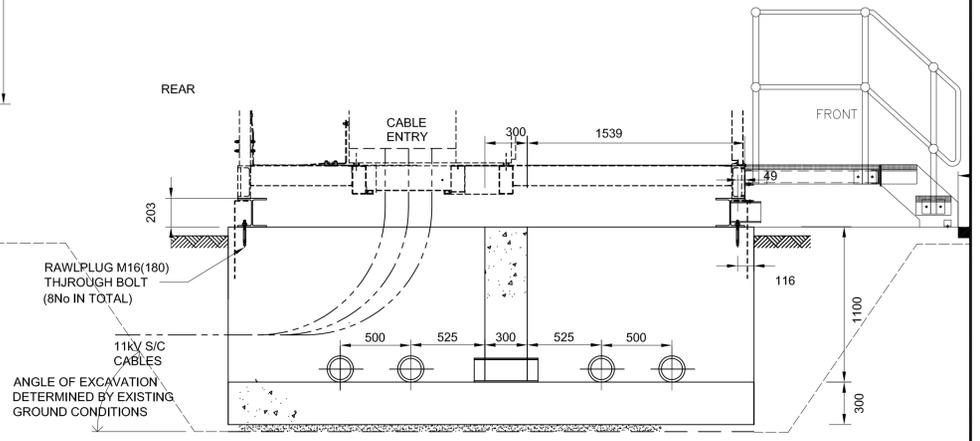
CONNECTION DETAIL '1'



CONNECTION DETAIL '2'



PLAN AT GROUND LEVEL



SECTION B - B

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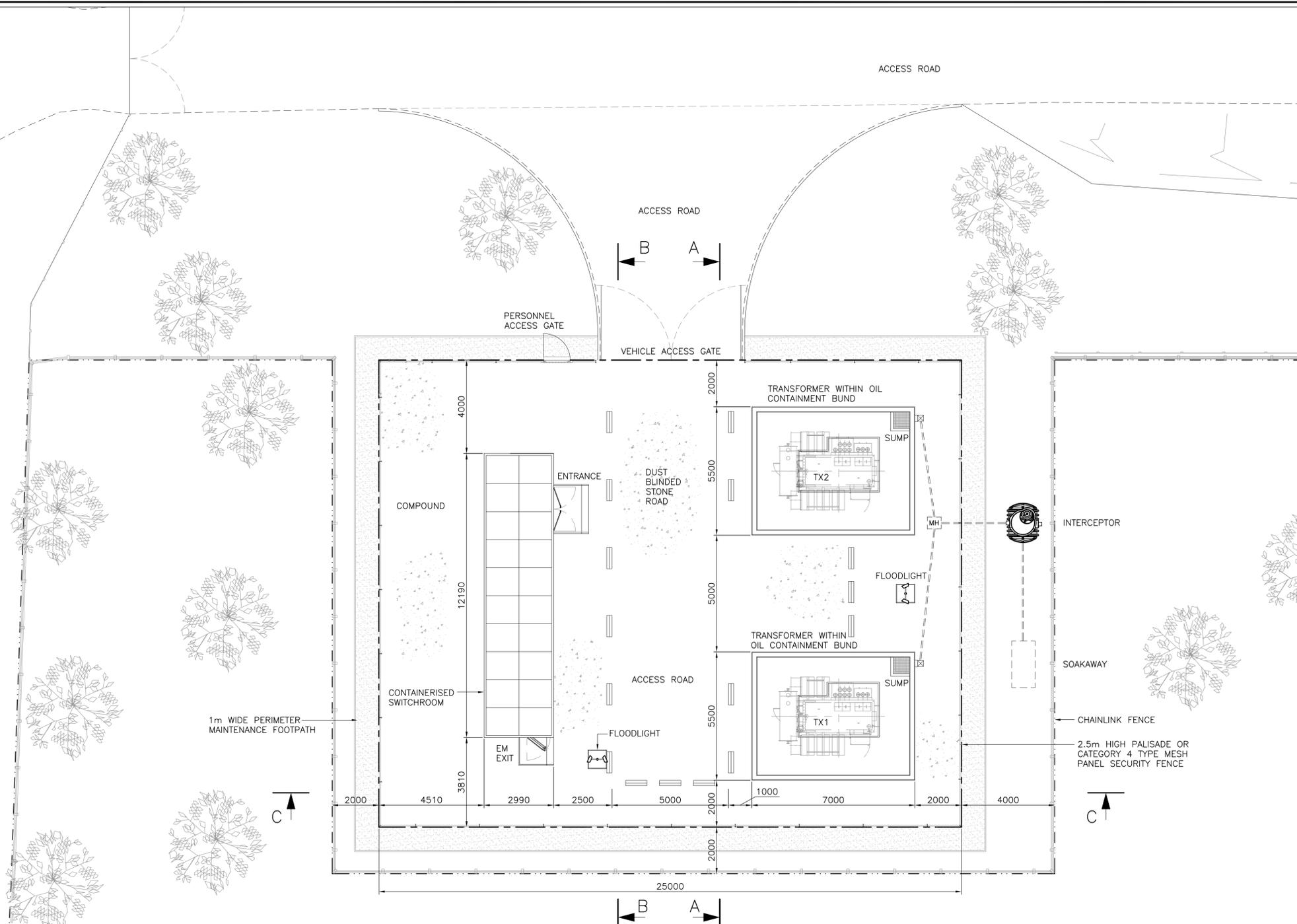
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Location: STANDARDS
 Title: SPECIFICATION SUB - 03 - 025
 TYPICAL MODEL FOUNDATION PLAN FOR
 COMBINED 11/33kV CONTAINER SUBSTATION

Drawn	Date	Checked	Date	Approved	Date
R.A	FEB 2013	C.W	FEB 2013	A.J.R	FEB 2013
Status	FOR ISSUE		Org. No.	Rev.	
			SP4096777	1.0	
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				1:25	A1

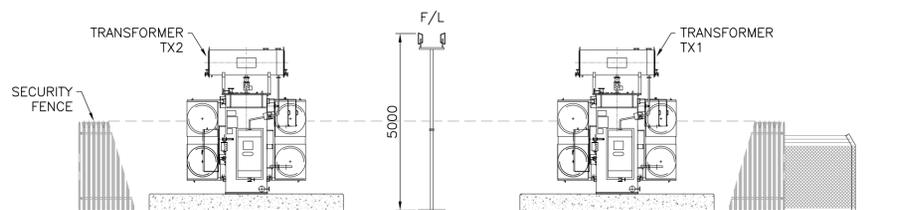
DESIGN & CONSTRUCTION SHALL COMPLY WITH SPEN SPECIFICATION SUB-03-025

SITE PLAN
SCALE 1:100

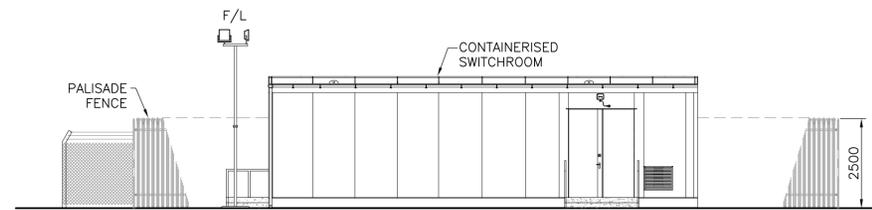


NOTES

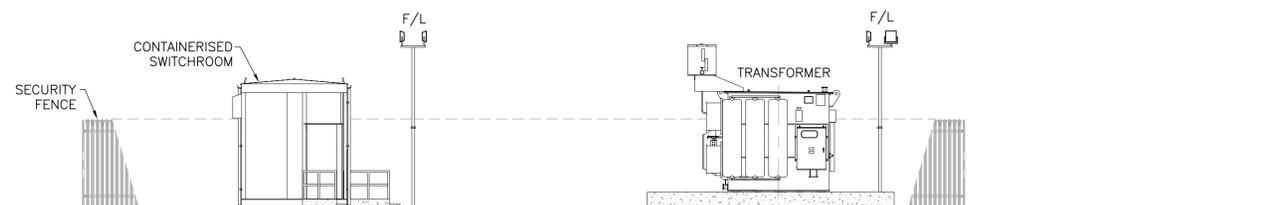
- SUBJECT TO THE CONSTRUCTOR'S OWN RISK ASSESSMENT, INTERCEPTOR MAY BE OMITTED WHERE EA/SEPA OR OTHER APPLICABLE LOCAL AUTHORITY FORMAL CONSENT TO DO SO IS CONFIRMED IN WRITING TO SPEN.
- PRE-COLOURED SECURITY FENCE SYSTEMS THAT IMPAIR ELECTRICAL CONTINUITY FOR EARTHING PURPOSES SHALL NOT BE ACCEPTABLE. APPROPRIATE PAINT SYSTEMS MAY BE APPLIED AFTER ERECTION.



SECTION A-A
SCALE 1:100



SECTION B-B
SCALE 1:100



SECTION C-C
SCALE 1:100

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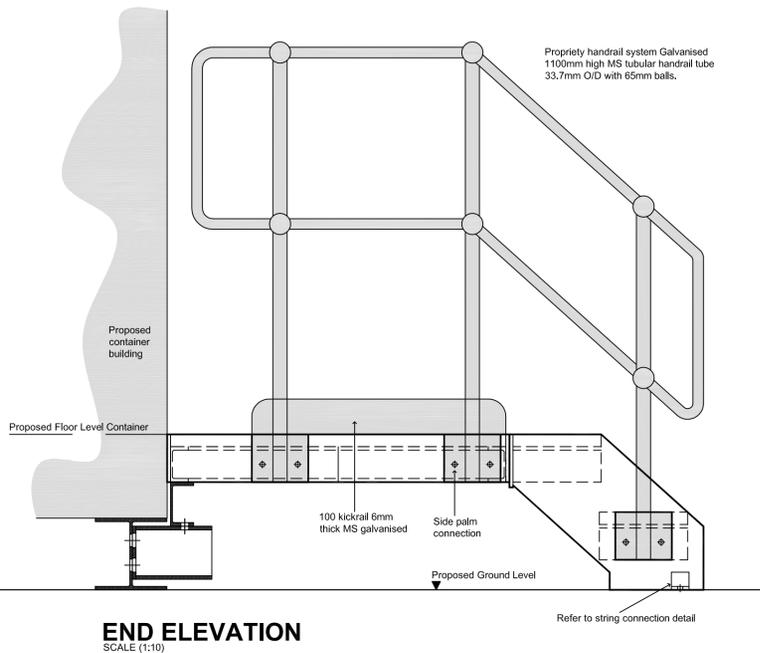
TITLE
SPECIFICATION SUB - 03 - 025
TYPICAL LAYOUT FOR SPD
CONTAINER SUBSTATION

STANDARDS

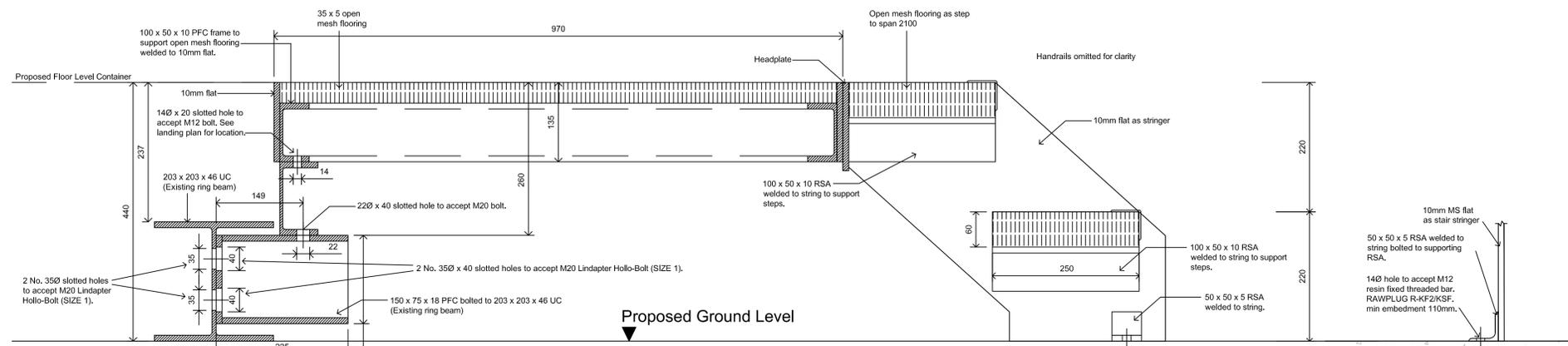
Drawn	Date	Checked	Date	Approved	Date
R.A	FEB 2013	C.W	FEB 2013	A.J.R	FEB 2013

Status	Dir. No.	Rev.
FOR ISSUE	SP4096857	1.0

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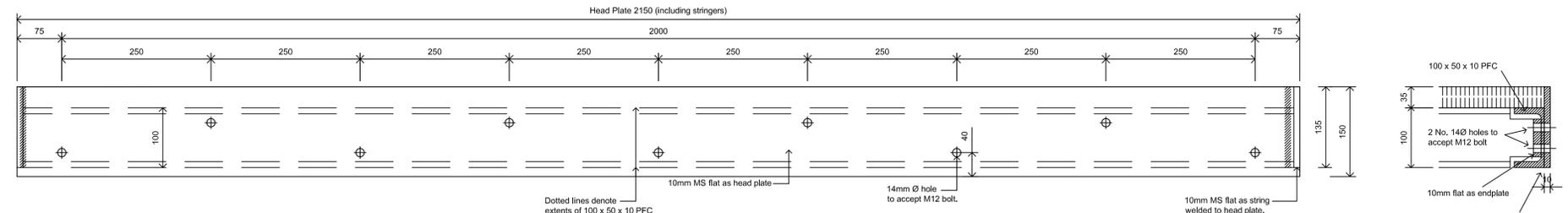


END ELEVATION
SCALE (1:10)



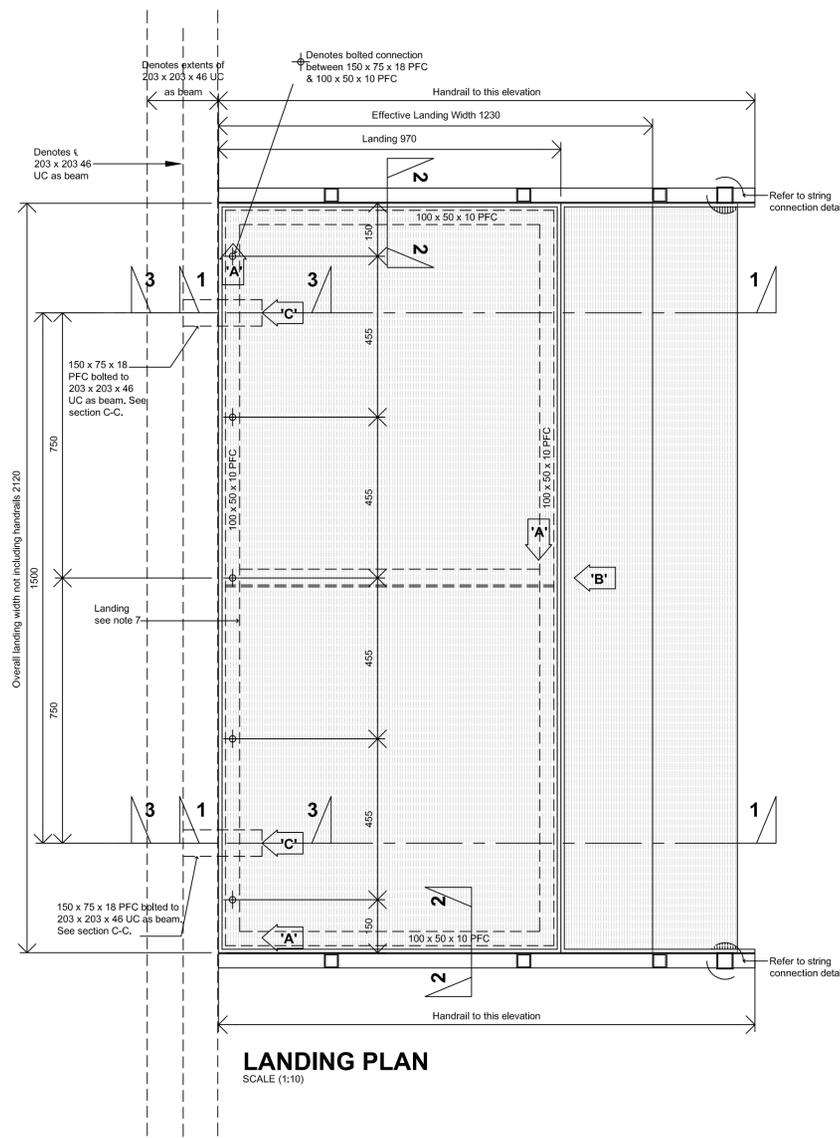
SECTIONAL ELEVATION 1-1
SCALE (1:5)

TYPICAL STRING CONNECTION DETAIL
SCALE (1:5)



STRINGER HEADPLATE DETAIL AS VIEWED ON 'B'
SCALE (1:5)

TYPICAL FRAME CONNECTION DETAIL AS VIEWED ON 'A'
SCALE (1:5)

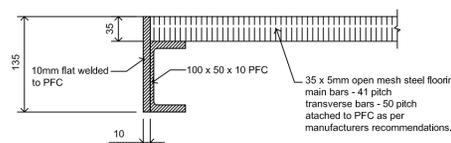


LANDING PLAN
SCALE (1:10)

CONNECTION DETAIL AS VIEWED ON 'C'
SCALE (1:5)

SECTION 3-3
SCALE (1:5)

TYPICAL FRAME CONNECTION DETAIL AS VIEWED ON 'A'
SCALE (1:5)



TYPICAL SECTION THROUGH LANDING 2-2
SCALE (1:5)

DESIGN & CONSTRUCTION SHALL COMPLY WITH SPEN SPECIFICATION SUB-03-025

- NOTES;
1. STEPS / PLATFORMS AND HANDRAILS MAY BE ALTERNATIVE GRP CONSTRUCTION.
 2. STEPS / PLATFORMS SHALL BE DEMOUNTABLE AND HANDRAILS REMOVABLE.
 3. ALTERNATIVE R.C STEPS / PLATFORMS WOULD BE ACCEPTABLE WHERE SPEN EXPRESSLY CONFIRM THAT FUTURE ACCESS FOR EXCAVATION IS NOT REQUIRED (E.G. FOR CABLE FAULT ACCESS).

Rev. 1.0	Date
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Title
**SPECIFICATION SUB - 03 - 025
TYPICAL STEEL ACCESS STEPS/PLATFORMS
TO CONTAINER SUBSTATIONS**

Location
STANDARDS

Drawn	Date	Checked	Date	Approved	Date
R.A	FEB 2013	C.W	FEB 2013	A.J.R	FEB 2013
Status	Org. No.	Rev. No.			
FOR ISSUE		SP4096782	1.0		
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