ICD-R TE - TSS

	Name	Role/Title
Owner	Mikael Olsson	Control engineer, Target Controls and Safety, Target Division
Reviewer	Anders Malm	Electrical Engineer, Target Controls and Safety, Target Division
	Rico Andersson	WUL Target Electrical infra structure and I&C (TE), Target Division
	Simon Strand	Target Electrical infra structure and I&C (TE), Target Division
Approver	Linda Coney	Group Leader, Target Controls and Safety, Target Division
	Håkan Carlsson	WL, Fluid system, Target Division

TABLE OF CONTENT **PAGE**

1. INTRODUCTION

This document describes the interface and the requirements between Target electrical infrastructure (TE) and the Target Safety System (TSS)

2. ISSUING ORGANISATION

This document is issued by, and in cooperation between, WP 5 (Target electrical infrastructure) and WP7 (Target controls and safety) within the Target Division.

3. CONTEXT

The interface between TE and TSS consists of electrical power distribution supply, instrumentation and network cable routing, raceways, equipotential protective bonding, installation and commissioning.

An overview of the electrical power distribution supply interface is described in Figure 1.

The interfaces for instrumentation and network cable routing, raceways, earth grounding protection, installation and commissioning are defined as responsibilities between TS and TSS.

The box in yellow is in the scope of CF.
The box in green is in the scope of TE.
The box in blue and its internal green boxes are in the scope of TSS.

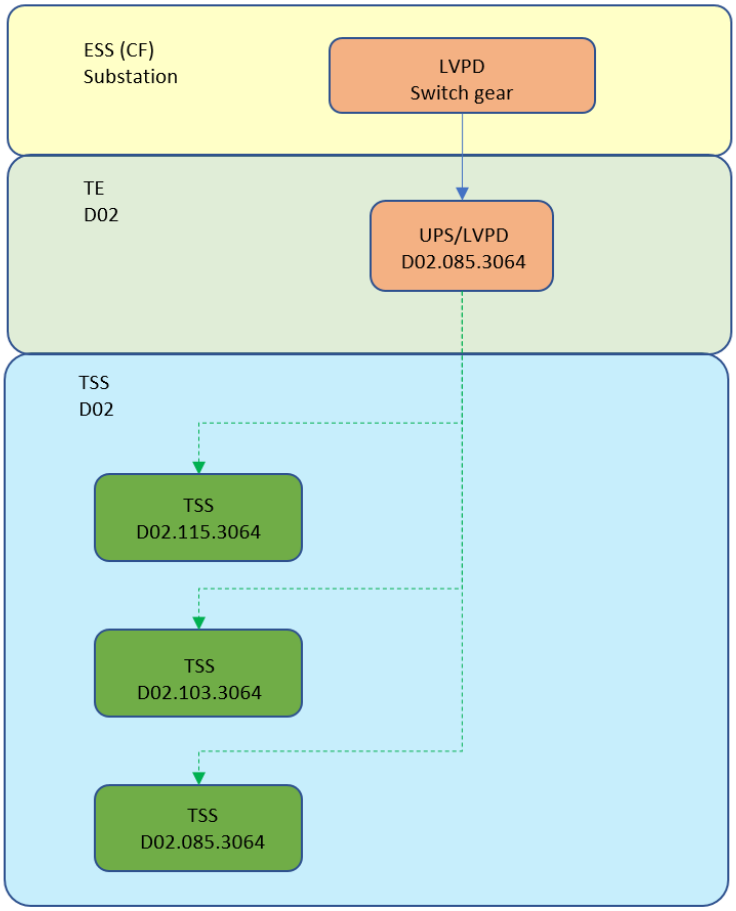


Figure 1 Overview of electrical power supply interface between TE and TSS

3.1. Location overview

The areas of interest within the D02 building are

- the Target utility area, see Figure 2, Figure 3 and Figure 4
- the TSS room #1, see Figure 5
- the Main control room (MCR), see Figure 5
- the Target installation gallery, see Figure 6

The TE UPS unit is located in Target utility area on level 90 in room D02.085.3064.

The TSS cabinets are located in rooms D02.085.3064, D02.103.3064, D02.115.3064 (see Figure 3), D02.100.3016 and D02.110.3016 (see Figure 5).

The TSS instruments are located in rooms D02.115.3067, D02.115.4003, D02.115.4001 (see Figure 3 and Figure 4), D02.103.3064 and D02.085.3064 (see Figure 3).

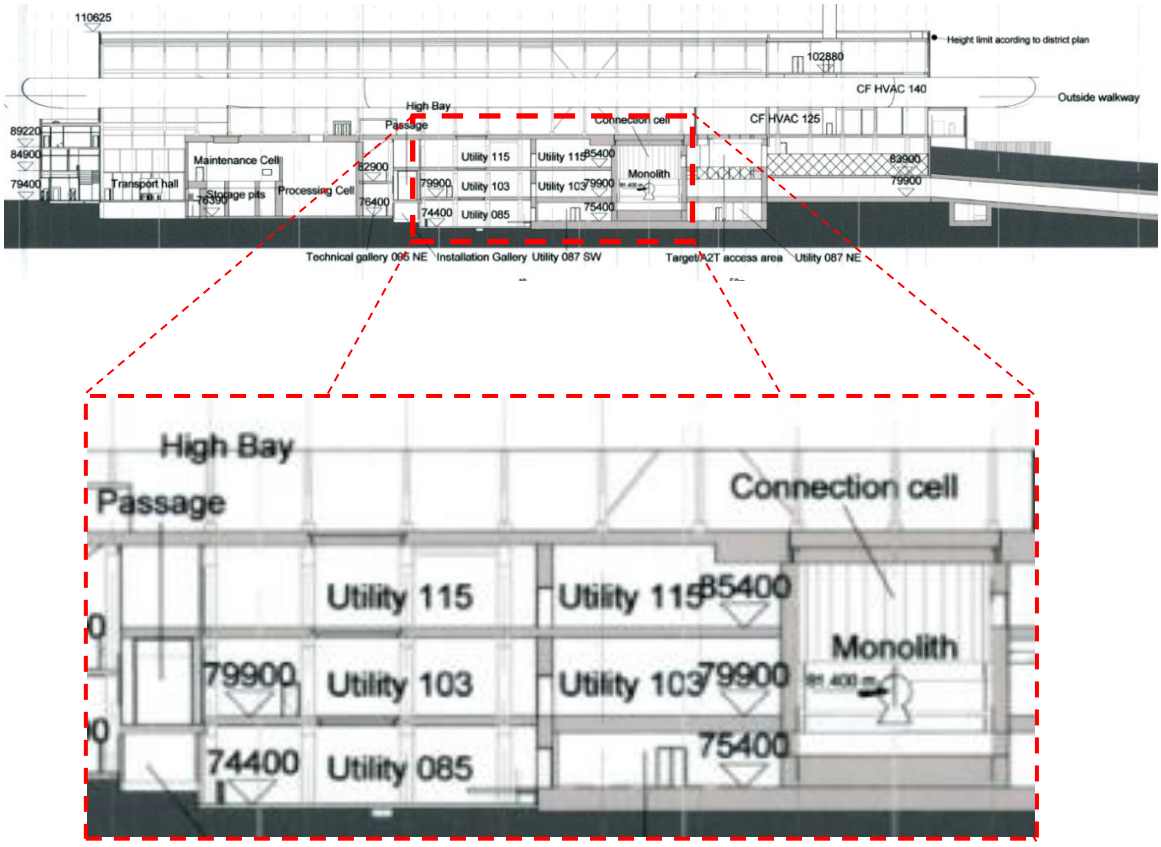


Figure 2 Target utility area of the D02 building.

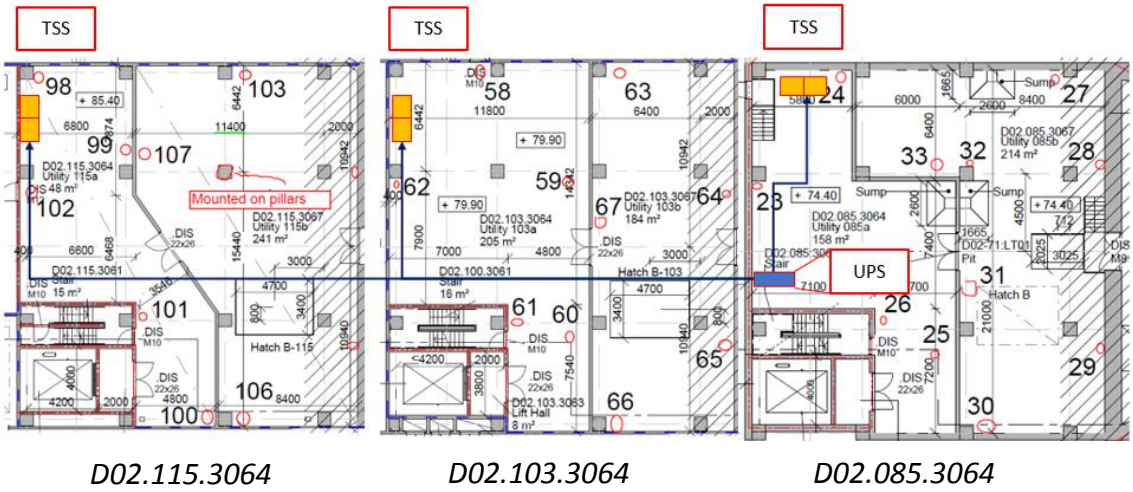


Figure 3 Location overview of the TE UPS and the TSS on the three levels in the Target utility block.

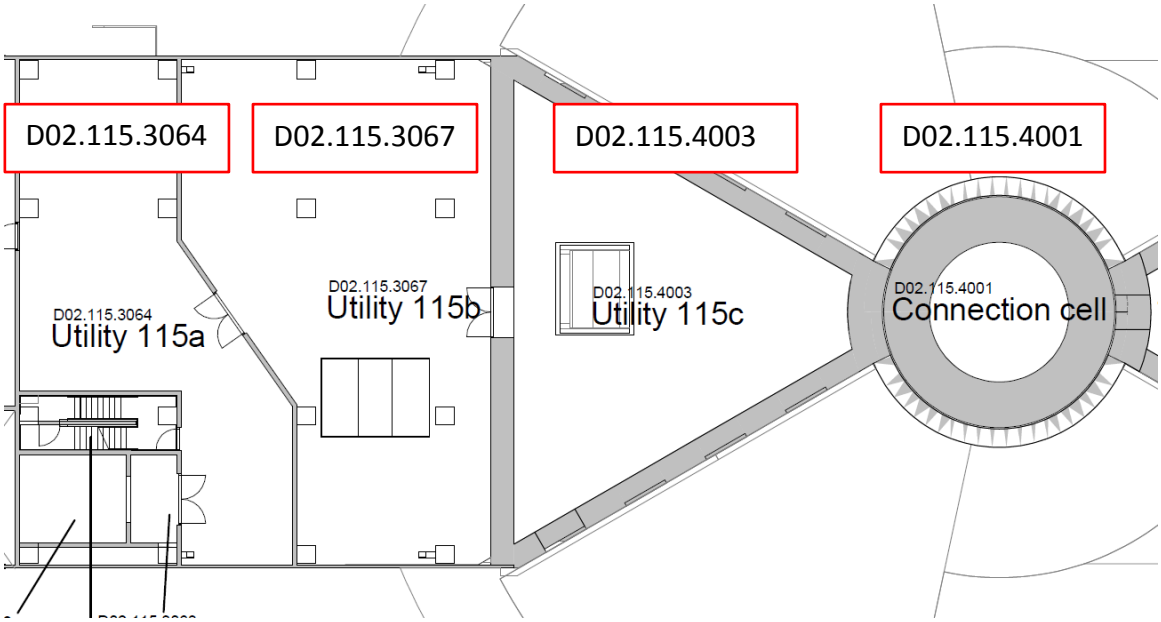
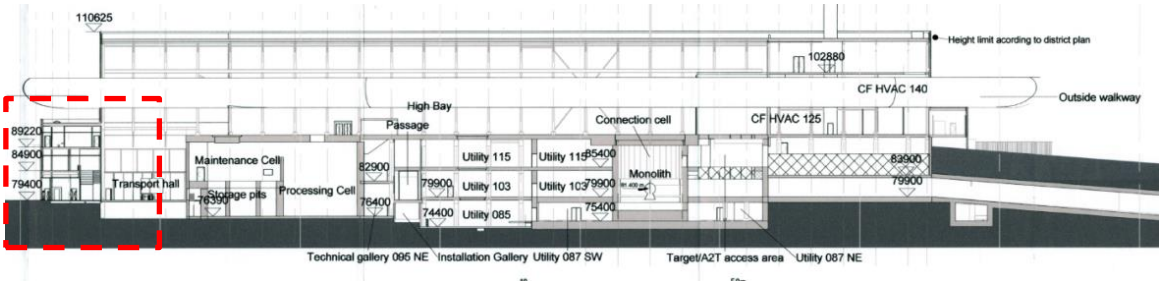
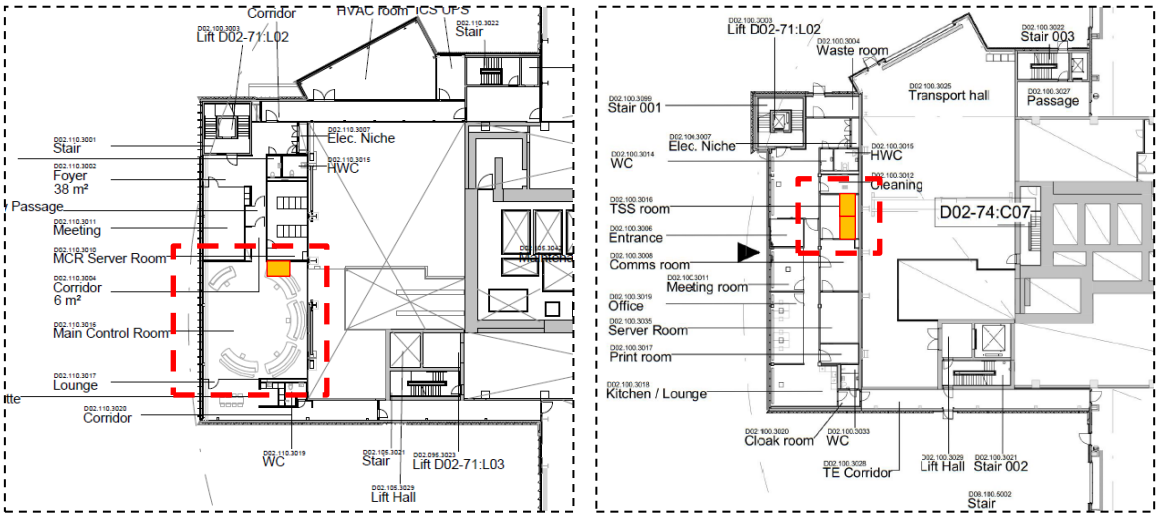


Figure 4 Overview of areas with TSS instruments on the top level (115) in the Target utility block.





MCR D02.110.3016 *TSS room #1 D02.100.3016*

Figure 5 D02 building administration area including MCR and TSS room #1

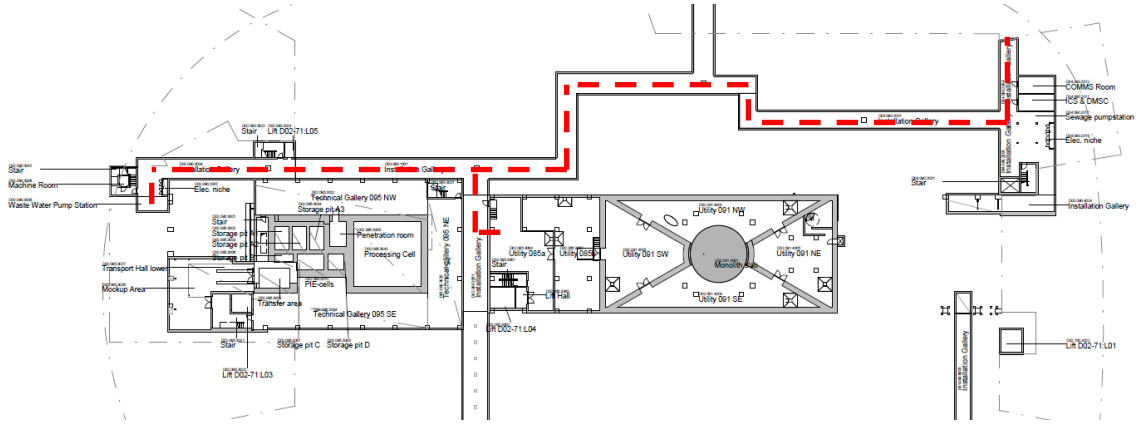


Figure 6 TSS cable routing in Installation gallery on level 090 in D02 building

4. NOTATION FOR DESCRIPTION

System 1600: Equipotential protective bonding
System 1626: UPS Power distribution system 400 VAC
System 1664: Earth grounding protection
System 1670: Cable raceway
System 1080: Target safety system (TSS)

5. INTERFACES DESCRIPTIONS

5.1. System 1626 – 1080 – 400 VAC Power distribution UPS

ID	16261080-001 Power distribution
Interface	TE shall provide UPS Power distribution to each of the TSS I&C cabinets in the target utility block (see Figure 1 and Figure 2) with the following: • 400/230V 50Hz TN-S system with separate neutral conductor and protective conductor. • UPS supply circuit overcurrent protection 16A. Selectivity shall be based on that rated current to TSS internal sectional overcurrent protection is a 10A circuit breaker characteristic C. • UPS minimum capacity time 15 minutes. • UPS feeder shall be supplied with Grid power (GP) and Back-up power (BP). TSS shall provide: • Maximum three I&C cabinets to be supplied from the TE UPS. The responsibility between TSS and TE is defined in Table 1.
Rationale/Reference	Central UPS is recommended rather than local UPS in ESS-0016586 [1]. Rated TSS load data to each cabinet: • L1 = 1180W • L2 = 740W • L3 = 260W • Above rated loads may be changed, however not more than is expected to be covered by 16A overcurrent protection in the UPS supply circuit. The TSS has requirement for high availability, see TSS-TSS-305 in ESS-0002776 [2].

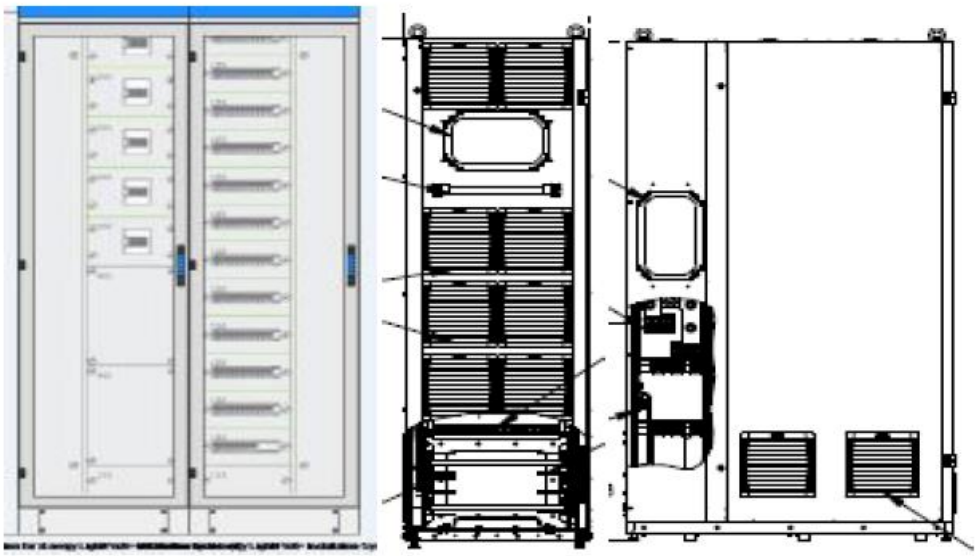


Figure 7 Typical cabinet design of a central UPS

5.2. System 1664 – 1080 – Grounding

ID	16641080-001 Equipotential protective bonding
Interface	TE shall provide equipotential protective bonding to the TSS I&C components in the Target building (see Figure 1 - Figure 6) according to Table 1.
Rationale/Reference	To define design responsibilities between TE and TSS

ID	16641080-002 Protective bonding
Interface	TSS shall provide protective bonding of TSS I&C components in the Target building (see Figure 1 - Figure 6) according to Table 1.
Rationale/Reference	To define design responsibilities between TE and TSS

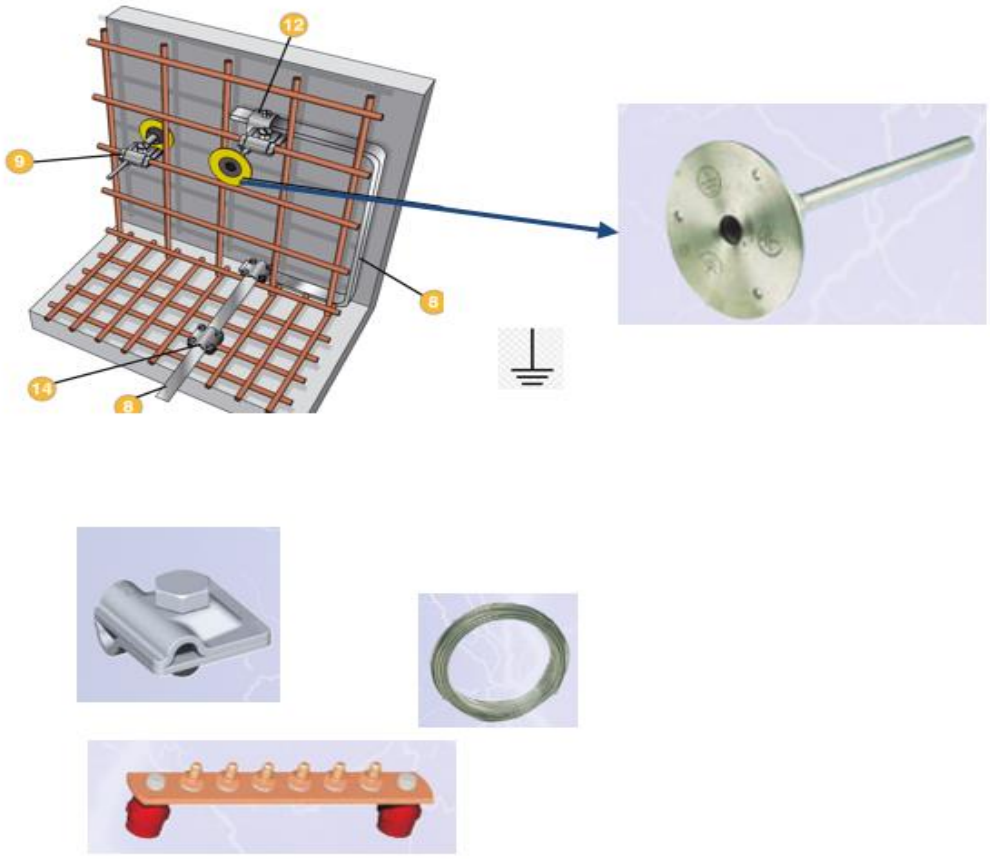


Figure 8 Typical components for equipotential protective bonding

5.3. System 1670 – 1080 – Raceways, trays and cables

ID	16701080-001 Raceways, trays and cables for TSS power
Interface	TE shall provide design, routing, procurement, installation and test of UPS power cables and UPS power cable raceways to TSS according Table 1.
Rationale/Reference	To define design responsibilities between TE and TSS

ID	16701080-002 Raceways, trays and cables for TSS instruments
Interface	TE and TSS shall share design, routing, procurement, installation and test of TSS instrument cables and instrument cable raceways according Table 1.
Rationale/Reference	To define design responsibilities between TE and TSS.

ID	16701080-003 Raceways, trays and cables for TSS network
Interface	TE and TSS shall share design, routing, procurement, installation and test of TSS network cables and network cable raceways according Table 1. *Note that installation of network cables may be excluded from this requirement; installation may be performed on a general ESS level since the cables are laid out also outside the Target building.*
Rationale/Reference	To define design responsibilities between TE and TSS

6. GLOSSARY

Term	Definition
BP	Back-up Power (diesel)
CF	Conventional Facilities
E3D	Everything 3D (Aveva)
GP	Grid Power
I&C	Instrumentation and control
LVPD	Low Voltage Power Distribution
MCR	Main Control Room
TE	Target Electrical infrastructure system
TSS	Target Safety System
UPS	Uninterruptable Power Supply
WP	Work Package

7. REFERENCES

[1] ESS-0016586, ESS Guideline For Use Of UPS Power
[2] ESS-0002776, TSS system requirement specification

DOCUMENT REVISION HISTORY

Revision	Reason for and description of change	Author	Date
1	Released for TE PDR and updated PSAR	Rico Andersson	2018-05-07
2	Released for TSS CDR Added responsibilities for I&C including the table in the Appendix	Mikael Olsson	2018-12-03

APPENDIX

Table 1 Detailed list of responsibilities

Task	Discipline	Sub-discipline	Responsibility	
			TE	TSS
Design ePLAN	Power	UPS power	X	
		FBS, LBS TAG naming	X	
		UPS power cable routing output ePLAN to .xls to E3D	X	
		FBS, LBS TAG naming	X	
	Grounding	Equipotential bonding: bars and wires to all necessary I&C	X	
		FBS, LBS TAG naming	X	
		Protective bonding: I&C components		X
		FBS, LBS TAG naming		X
	I&C	I&C cabinets and junction boxes		X
		FBS, LBS TAG naming		X
		I&C network cable routing output, ePLAN to .xls to E3D		X
		FBS, LBS TAG naming		X
		I&C field instruments cable routing output, ePLAN to .xls to E3D		X
		FBS, LBS TAG naming		X
Routing and allocation E3D	Cable raceway	UPS power cable raceways/drop-off	X	
		FBS, LBS TAG naming	X	
		I&C network cable raceway/drop-off	X	
		FBS, LBS TAG naming	X	
		I&C field instrument cable raceway/drop-off	X	
		FBS, LBS TAG naming	X	
	Cable routing	UPS power cable routing to I&C cabinet	X	
		FBS, LBS TAG naming	X	
		I&C network cable routing (input from .xls, see above)	X	
		FBS, LBS TAG naming	X	
		I&C field instrument cable routing (input from .xls, see above)	X	
		FBS, LBS TAG naming	X	
	Grounding	Equipotential bonding: bars and wires to all necessary I&C	X	
		FBS, LBS TAG naming	X	
		Protective bonding: I&C components	X	
		FBS, LBS TAG naming	X	
	I&C	I&C cabinets and junction boxes, placement	X	
		FBS, LBS TAG naming	X	
		I&C field instruments, placement	X	
		FBS, LBS TAG naming	X	
Procure HW	Power	UPS power	X	
		UPS power raceway	X	
		UPS power raceways drop-offs	X	
		UPS power distribution cable to I&C cabinets	X	
	Grounding	Equipotential bonding: bars and wires to all necessary I&C	X	
		Protective bonding: I&C components		X
	I&C	I&C cabinets, junction boxes and HW inside		X
		I&C network cables		X
		I&C field instrument cables		X
Install	Power	UPS power UPS	X	
		UPS power raceways	X	
		UPS power raceways drop-offs	X	
		UPS power distr. cable to I&C cabinet	X	
	Grounding	Equipotential bonding: bars and wires to all necessary I&C	X	
		Protective bonding: I&C components		X
	I&C	I&C cabinets and junction boxes		X
		I&C network cables		X
		I&C field instruments cables		X
		I&C field instruments		X

Task	Discipline	Sub-discipline	Responsibility	
			TE	TSS
Test	Power	UPS power	X	
	Grounding	Equipotential bonding: bars and wires to all necessary I&C	X	
		Protective bonding: I&C components		X
	I&C	FAT, SAT, commissioning		X