

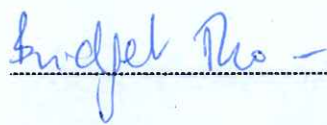
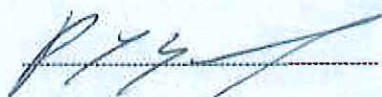




Programme CPD
Project STYLE 63 to Surelock Conversion Project
Document reference SIG-PSEC0104-LUL-SCO-00001 Rev 1

Scope of Works

Design for Style 63 to Surelock Conversion on the Central Line

| | | Signature | Date |
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Document History

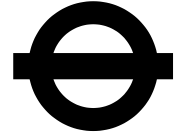
| Revision | Date | Summary of changes |
|----------|----------|--|
| 0.1 | 01/10/15 | Initial draft for comment |
| 0.2 | 26/10/15 | Revised in line with Lead Signalling Design Manager Comments |
| 0.3 | 27/10/15 | Revised in line with additional comments inc. from ERM Manager |
| 1 | 29/10/15 | Approved for Issue |



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1 Introduction

1.1 STYLE 63 Project background

The objective of the Network Replacement Project is to replace Style 63 point machines (1950's design) on the LU Network. The preferred option for replacement is the Surelock point machine (6ft Installation) which was designed as a straight replacement for the Style 63 point machine.

There are currently of 22 no. Style 63 units within scope for replacement on the Central Line which require design.

The Central Line machines were installed in the early 1990s since when they have not been routine changed (replaced like for like). They have some design deficiencies making them non compliant against modern standards, most notably a lack of supplementary detection.

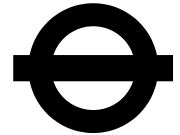
1.2 Supporting Documentation

This document is to be read in conjunction with the following supporting documents:

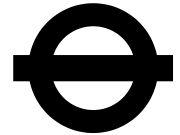
- SPP-SPPDEMER-LUL-PIS-00001 Network Replacement of STYLE 63s Project Requirements
- HOE-TRK-PLN-2014-0331 v1.0 Project Assurance Plan - Conversion of Central Line Style 63 Points to Surelock
- HOE-TRK-STJ-2014-0335 Application of Surelock in 6ft of Modified RE/PW Point System - Generic Safety Justification
- LUSCI-00088-RP-122355 Central line Conversion of STYLE 63 Points to Surelock Feasibility Study & Typical Circuits
- HS111088 Central Line STYLE 63 Typical Circuits
- HS111089 Central Line Surelock Typical Circuits
- Generic Project Materials Schedule

1.3 Specific Requirements

- The design is to allow for the changeover from a Style 63 points machine to a Surelock machine



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- All Central Line switch panels will be modified in line with BB54m specifications. This is the responsibility of the project team.
 - All CVs and DVs switch lengths above will have new SPX supplementary drive detection added to the points locking proving circuit where none currently exist.
 - All EVs and FVs switch lengths will have two new SPX supplementary drive detectors added to the points locking proving circuit where none currently exist.
 - Existing Central Line Style 63 harnesses are fed using keyed type connectors which are incompatible with Surelock machines which are fed using pre-formed harness cables with Deutche connector couplers. The harnesses come in set lengths, which will need to be determined during the correlation stage of the works. New Surelock machines are to be locally fed from a new interface CTB which will pick up the feeds from existing Disconnection Boxes. New supplementary detectors will also be locally fed from a new interface CTB fed using existing spare cores within existing DBs where site conditions allow. New feeds from the SER are only to be run as a last resort.
 - Disconnection box positions are to be designed to minimise the risk of cross-connections between the plug couplers by placing them so that they can only reach their intended connection point. This will be considered further during the site specific hazard analysis prior to the installation phase of the works but should be considered by the designers.
 - Where Condition Monitoring is not present on the points being converted the designers will design a new Strukton monitoring system. Where monitoring has been installed but the masters not updated the supplier will be responsible for bringing the master records up to date with the new site configuration.
 - Where applicable, and agreed with the project team, the supplier will amend existing point heater circuit feeds from a 50v to a 110v



2 Supplier Responsibilities

2.1 General

The following sections do not relieve the supplier from the requirements set out in the applicable standards listed within Section 5 of this document.

2.1.1 Signalling Masters – Requests & Updates

The supplier will work in accordance with W0151, W0152 and W0153 and will formally request signalling master drawings at the relevant stages of the project via the Project Engineer using a completed Register of Interest form. The Project Engineer will submit the ROI to the ERM and will issue the prints/CAD files via formal transmittal. It should be noted by the supplier that a minimum of three weeks are required to attain CAD files.

Signalling master records will be updated in line with their existing medium (i.e. paper or CAD) in line with their respective standard or Work Instruction. Checked, signed masters will be returned to the Project Engineer and the associated ROI updated and closed out accordingly.

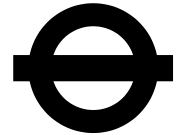
CAD files will be updated and returned in accordance with S1037. Their issue and transmittal will be undertaken on CD.

Should any of the existing masters required by the project currently be in use by another project a parallel working agreement will be implemented by the CPD Project Engineer and supported by the supplier.

2.1.2 Pre Design Correlation

The supplier shall prepare and provide pre-design correlation packs, including QAF18 certificates, correlation plans and issue certificates in accordance with S1200. The supplier shall assume that an individual correlation pack will be required either per site. Should the correlation and commissioning strategy change the supplier will be informed prior to any packs being prepared. All correlation packs will be issued and delivered to CPD Signals, Signals House, Acton for the attention of the Project Engineer.

Any anomalies noted during the correlation stage will be formally communicated by the CPD Signals Project Engineer to the supplier for subsequent investigation and rectification. Any master updates arising as a result of anomalies during the correlation stage of the works will be the responsibility of the supplier.



It should be noted that some sites have had links within the disconnection boxes which have needed to be changed owing to water ingress damage. This should be considered during the correlation.

The Project Engineer will return the signed correlation pack in line with the project programme (see 4.2).

2.1.3 Design Requirements

The supplier will produce, check and approve the signalling design in support of the conversion to Cat S approval in accordance with S1538 to enable the project team to submit the design for review and approval by the Asset Engineers through a compliance submission. When the design is undergoing internal Cat S approval it shall also be submitted to LU for checking in parallel by the CPD TiC.

The supplier shall assume that an individual design pack will be issued for each set of points. Where access allows CPD signals will combine sites. This will be communicated to the supplier in good time.

An Issue Certificate and Design Check Certificate will also be provided as part of the submission.

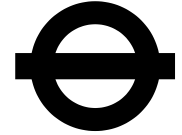
The supplier will create and maintain a Design Hazard Log for the duration of the project. All residual risks or issues will be formally communicated to the Project Engineer as part of the submission.

The design will include any relevant label schedules. A generic PMS has already been prepared for the STYLE 63 conversion project so individual PMS will not be required.

In line with W1052 the supplier will provide a formal issue of the CAT S approved design to CPD Signals, Signals House, Acton for the attention of the Project Engineer. The issue will consist of four copies on A3 paper marked separately as below:

- "Installation"
- "Installation Management Copy"
- "Test Copy"
- "Test Management Copy"
- A scanned PDF version, watermarked "Reference Copy No Works To Be Carried Out Against This Drawing" will also be provided.

The design will then be submitted by the CPD PE for approval via a formal compliance submission. The design will be amended in line with any comments received during the compliance review. Dependant upon the level of alteration the supplier will provide either a revised design pack or revised sheets accordingly.



2.1.4 Testing and Commissioning Documentation & Support

2.1.4.1 Testing Documentation

In line with W0152, two weeks prior to the planned commissioning date the supplier will formally issue the project with

- Two copies of test prints on A3 pink paper, one 'Tester in Charge', the other 'Principles Tester'
- Two copies of post commissioning wire counts will be provided on A3 or A4 as appropriate
- One copy of on-site maintenance prints in the same size and format as existing prints. Kiosk located prints will be laminated where applicable.
- Post commissioning wire count certificates and QAF 18s

2.1.4.2 Commissioning Support

The supplier will provide weekday off-site technical advice during the build up to the commissioning. It is not envisaged that any on-site attendance during commissionings will be required.

2.1.5 Master Updates

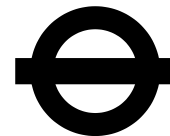
The supplier will provide copies of master maintenance records in line with W0151 including:

2.1.5.1 Commissioning Masters

- Two weeks prior to the commissioning the supplier will contact the ERM to inform them of the planned commissioning works
- No later than one working week prior to the commissioning the supplier will provide the ERM and the CPD Project Engineer with signed PDF copies of the master (or signed 'wet ink' hard copies where the originals are not CAD files). The ERM will circulate the updated masters and update the Design Office library and the CPD PE will update the Acton Signals House library

2.1.5.2 Master Records

- Following the commissioning the supplier will return all updated masters to the ERM in their original format and will close the ROI



2.1.6 ELLIPSE Data Update

No works will be required on behalf of the supplier for ELLIPSE data.

2.1.7 Technical Queries and Test Logs

The supplier will respond to all formally transmitted Installation Queries, Test Logs or similar queries within 5 working days of their receipt.



3 Communications

The supplier will be required to attend initial start-up meetings and fortnightly design reviews for the first two designs. The Project Engineer will run a Design Review meeting for the first site.

Following this period the supplier will be available for a weekly conference call to discuss progress.

3.1 Competencies

The supplier will ensure that all staff are competent as detailed within S1203. All supplier design staff will hold valid IRSE licences or will be working under the mentorship and approval of a licenced individual.

The supplier will provide LU with CVs for all staff as well as licence numbers and will nominate and formally record the staff and their roles. CVs will demonstrate that staff have the relevant background knowledge.

The Cat S Checker and Approver will have demonstrable knowledge and understanding of the Central Line signalling system.

Should any of the named staff change during the project the supplier will formally notify LU of the change and provide new CVs accordingly.



4 Requirements

4.1 List of Affected Sites

(Note this list is not exhaustive and any amendment to existing or additional requirements will be formally communicated, costed and agreed). The switch lengths will be formally confirmed to the supplier prior to the commencement of the correlation works.

| Site | Points | Switch Length |
|-------------------|--------|---------------|
| Woodford | 7301 | BVs |
| | 7304 | BVs |
| | 7305 | BVs |
| | 7306 | BVs |
| | 7314 | BVs |
| Woodford Junction | 7318 | CVs |
| | 7319 | CVs |
| Newbury Park | 6402 | BVs |
| | 6403 | EVs |
| | 6404 | BVs |
| | 6405 | BVs |
| Debden | 7900 | CVs |
| | 7901 | BVs |
| | 7902 | BVs |
| | 7903 | BVs |
| | 7904 | BVs |
| | 7905 | BVs |
| Leyton | 5800 | FVs |
| Leytonstone | 5812 | EVs |
| | 5813 | EVs |
| | 5814 | EVs |
| | 5815 | EVs |



4.2 Programme & Commissioning Strategy

The programme is transmitted separately to this scope of works.

Commissioning orders are liable to change in line with site access and other constraints. The supplier should ensure that they retain adequate resources to amend commissioning documentation and master updates should this be necessary.

4.3 Timescales

The following timescales will be adhered to for all documentation formally submitted from LU to the supplier:

| Item | Turnaround |
|-------------------------------------|----------------|
| Technical Query / Test Log | 5 Working Days |
| Contractor's Communication | 5 Working Days |
| Early Warning Notification Response | 5 Working Days |
| | |
| | |
| | |



5 Applicable Standards & Abbreviations

5.1 Applicable Standards:

The following standards are applicable to this scope of works. The supplier is to ensure that they work in accordance with all standards or notify the Project Engineer should a concession be required.

| Standard | Title |
|----------|--|
| S1538 | Assurance |
| S1194 | Signalling Control – Functional Requirements |
| S1195 | Signalling – Functional Requirements |
| S1196 | Signalling and Signalling Control – Concept and Requirements |
| S1197 | Signalling and Signalling Control – Design and Implementation |
| S1198 | Signalling and Signalling Control - Installation, Testing, Commission and Handover |
| S1199 | Signalling and Signalling Control – Operation and Maintenance |
| S1200 | Signalling and Signalling Control – Alterations to Systems |
| S1201 | Signalling and Signalling Control – Approvals |
| S1202 | Signalling equipment overhaul |
| S1203 | Competence of personnel working on signal and signal control systems |
| S1037 | Computer Aided Design (CAD) Data |
| W0151 | Signalling Document Control |
| W0152 | Issue of Signalling Drawings and Documents |
| W0153 | Modifications to Signalling Drawings |



5.2 Abbreviations

| Abbreviation | Definition |
|--------------|----------------------------------|
| CAD | Computer Aided Design |
| CPD | Capital Programmes Directorate |
| DCC | Design Check Certificate |
| DSIM | Duty Signalling Incident Manager |
| ERM | Engineering Records Management |
| ROI | Register of Interest |
| SOM | Signalling Operations Manager |
| WI | Work Instruction |