Reference material

Interface Agreement between Signals and Communications & Control System Division

This legacy document is published as historical reference material. The content described might be of assistance to individuals and organisations performing work on Transport for NSW Rail Assets.

This document refers to organisational and positional roles and responsibilities in place prior to 1 July 2013 and may have been superseded by other documents.

Authorised by: Chief Engineer Rail, Asset Standards Authority
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Train Control System Interface Agreement

between

Signals and Control Systems Engineering

and

Control Systems

and

Communications

Version 3

Date 25 January 2013

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Train Control System Interface Agreement

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Communications

Version 3

Date 25 January 2013

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1 Introduction

1.1 Purpose of document

The purpose of this document is to:

a) Establish clear responsibilities through the identification of the Train Control System interfaces between Signalling, Control Systems and Telecommunications, and the responsibilities at these interfaces

b) Ensure safety issues are well controlled

c) Formally delegate design authority with agreed conditions for train control system design

1.2 Scope

Interfaces between the sections are considered only when a requirement or output from one section directly impacts on the requirements or outputs of the other.

The train control system interfaces covered by this document include:

- Advanced Train Running Information Control System (ATRICS)
- Blacktown Centralised Train Control (CTC)
- Sydney / Strathfield Train Describer
- Westinghouse Westcad South Coast Train Describer
- Train Describer Timetable Edit System (TDTES)
- Operational System Server (OSS)
- Chatswood Epping Tunnel Control System
- Airport Smoke Management Operator Interface (SMOI)
- Signalling Control Telemetry

The train control system interfaces excluded from this document include:

- Local VDU systems, or small remote train control systems (i.e. where an interlocking is controlled from an adjacent signal box such as Zig Zag from the Coal Stage).
- Telemetry for remote control from a local signal box panel or VDU. These interface definitions do not prevent a local VDU or other product being provided by Control Systems.

Note: responsibilities mentioned for signalling and telecommunications staff within this Interface Agreement are limited to the train control system interface only.

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1.3 Definitions

This section of the document addresses the specific terms and definitions used within the document.

Assessment = Assess the impact of any process or parts of the system as a whole

Audit = Review of the evidence of output to ensure proper process has been followed

CBI = Computer Based Interlocking.

Ownership = Production and accountability for the deliverables

PI = Passenger Information

RCS = Rail Control System

TD = Train Describer

TDM = Telemetry Data Manager

1.4 Referenced Documents

This document refers to the following RailCorp documents:

SPG0710 Type Approval Requirements for Signalling Systems and Equipment

SPG1256 Communication Links For Signalling Control

2 Section responsibilities

2.1 Chief Engineer Signals and Control Systems

Chief Engineer Signals and Control Systems is responsible for:

- Exercising Engineering Authority for Signal Engineering and delegating Engineering Authority.
- Exercising Engineering Authority for Signalling Control Engineering and delegating Engineering Authority.
- Assurance, standards and type approval of signalling, train control systems, their products and links to centralised systems and associated systems.
- The provision of standard designs and specifications for designs, implementation and maintenance of signalling and train control systems.

2.2 Chief Engineer Telecommunications

Chief Engineer Telecommunications is responsible for:

- Exercising Engineering Authority for Telecommunications Engineering and delegating Engineering Authority.
- Assurance, standards and type approval of telecommunications equipment and networks

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2.3 Signalling

Signalling includes Signal Design and Signal Maintenance, who are responsible for:

- Design, implementation and maintenance of signalling systems.
- Exercising any delegated Engineering Authority from the Chief Engineer Signals and Control Systems for the design and approval of signalling systems.

2.4 Control Systems

Control Systems is responsible for:

- Design, implementation and maintenance of train control systems.
- Exercising any delegated Engineering Authority from the Chief Engineer Signals and Control Systems for the design and approval of train control systems, their products and links to centralised systems and associated systems.

2.5 Communications

Communications is responsible for:

- Design, implementation and maintenance of telecommunications equipment and networks.
- Exercising any delegated Engineering Authority from the Chief Engineer Telecommunications for the design and approval of telecommunications equipment and networks.

3 Interfaces

3.1 General

Interfaces can occur in three general areas; Standards and Procedures, Projects and Operational.

The section on Standards and Procedures includes standards, procedures, competencies, engineering authority and type approval. Interface standards and procedures for the discipline are approved by the Chief Engineer Signals and Control Systems. Once a standard is approved, its use may occur without further standards approval, providing the standard is applicable and complied with, and implemented by staff with the appropriate competencies.

The section on Projects includes all items of a project specific nature, such as design and documentation for new projects and existing projects not specifically included in the Operational section. Projects may require direct liaison where the scope of the work from one area (e.g. signals) may impact the other area (e.g. train control systems). The result should be a sign off on the arrangements by both sections.

The section on Operational includes existing site specific setups that do not align to the latest interface standards within the Projects section, including boundaries. Operational interfaces occur where system issues occur during train operations, affecting signals, telecommunications or train control systems, with an impact between their systems. These issues include tracks out of sequence, trains disappearing, etc.

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3.2 Standards and Procedures

Responsibilities are listed below:

Item	Chief Engineer Signals and Control Systems	Control Systems	Communications	Signal Design
Competency certificate	Approval and Audit	Issue certificates		Issue certificates
Process to determine competencies	Approval of process	Assessment of competencies		
Any work in a signalling room or location	Approval Standards and procedures	Advice	Advice	Advice
Engineering - Standard Specifications	Approval	Advice	Advice	Advice
Signalling - Safeworking Procedures	Approval	Advice	Advice	Advice
Work Method Statement / Process Procedures / Systems	Audit	Ownership	Ownership	Ownership
Type Approval	Approval	Assessment	Assessment	Assessment
As Built Design Documentation	Audit	Lodged in the Plan Room for general access	Lodged in the Plan Room for general access	Lodged in the Plan Room for general access

Note: responsibilities mentioned for signalling and telecommunications staff within this Interface Agreement is limited to the train control system interface only.

3.2.1 Type approval

The Type Approval authority rests with Chief Engineer Signals and Control Systems and approval is required for each new product or revision to a product that falls within the scope of SPG0710 Type Approval Requirements for Signalling Systems and Equipment.

Changes to a product that can affect functionality (for example indications, controls, interfaces with signalling systems) will affect Type Approval status. Changes that do not affect functionality (eg reports, housekeeping, non-functional ‘bug’ fixes) will not normally affect Type Approval status. Control Systems staff must have the competency to make the decision whether or not Type Approval status will be affected.

Control Systems must undertake and document the impact of each Change Request; where the assessment concludes that the proposed change is likely to affect Type Approval status, then a request will be made to Chief Engineer Signals and Control Systems for evaluation **before** the item is included in any new product release.

The initial assessment as to whether a change impacts on Type Approval status will be made by Control Systems, as part of the request for approval, and will be subject to agreement by Chief Engineer Signals and Control Systems.

Chief Engineer Signals and Control Systems, must accept all product changes prior to the product being put into operational use. This acceptance will be via one of two methods.

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1. Significant revisions that represent a new version of the software will be issued with an updated Type Approval Certificate.

2. Product changes that are minor and considered to fall within the existing Type Approval will receive a statement of acceptance.

Rejection of a product change will be by formal advice. Unauthorised changes to installed systems shall default Type Approval for those systems.

The request for the approval of a new product must be in accordance with the Signalling Type Approval Specification.

The request for a revised product approval or acceptance must include:

1. The scope of the approval required.

2. A complete list of changes made, including the reason for each change.

3. A document detailing the impact of each of the proposed changes and of the total of the changes including the installation and commissioning. This impact statement will include a summary of the risks identified in each change, and the control measures applied and how this fits into the existing safety requirements, hazard analysis, and risk registers.

4. A copy of revised requirements documentation, test documentation, maintenance documentation, and user documentation.

5. Details of test records for the change.

6. Details of any previous train control systems Type Approvals.

7. A copy of records of approvals or acceptance by Telecommunications, Electrical, Safeworking, and Network Operations. If it is believed that a particular stakeholder does not need to approve or accept the change then the request must have a reason as to why that approval or acceptance is not required.

3.3 Projects

Responsibility for documentation will be driven by the responsibility for design.

Generally all equipment within the signalling equipment configuration will be the responsibility of Signalling and all equipment between signalling equipment and the train control system will be the responsibility of Control Systems (except for remote communications links).

Where a separate room or enclosure is provided only for train control system equipment, then Control Systems will be responsible.

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Responsibilities are listed below:

Item	Chief Engineer Signals and Control Systems	Control Systems	Communications	Signal Design
Product Design	Type approval, Audit and Approval	Compliance with Engineering Design procedures	Compliance with Engineering Design procedures	Compliance with Engineering Design procedures
Specific Location Design using Standard, Elements (type approved)	Audit and Approval	Perform design in compliance with proven Engineering Designs and Standards	Perform design in compliance with proven Engineering Designs and Standards	Perform design in compliance with proven Engineering Designs and Standards
Interface design with Signalling safety Equipment	Approval	Advice	Advice	Responsible
Control Systems Functional Specification	Approval	Production	Agreement	Agreement
Signalling Functional Specification	Approval	Agreement	Agreement	Production
Power Supplies and Earthing including 120v and 240v equipment	Approval	Subsidiary Power Supplies to TDM etc	Subsidiary Power Supplies to telecommunication equipment Communications earthing design, assisting Signals Design with any co-ordination issues	Design of Power Feeds Design of Earthing and Surge Protection Co-Ordination
Design of any work in a signalling room or location	Approval	Advice	Advice	Production
Control System Design	Approval	Production	Advice	Advice
Telecommunication modems	Agreement on Design (as per SPG1256)		Design, Installation and Maintenance	

Note: responsibilities mentioned for signalling and telecommunications staff within this Interface Agreement is limited to the train control system interface only.

A project can be initiated by Signalling or Control Systems. The initiator will manage the project unless there is an agreement otherwise. An agreement shall be in place for managing projects at the interface between Communications, Signalling and Control Systems, based upon a project schedule before the start of any project. Project based guidance, including a minimum set of milestones, are listed within Appendix A - Agreement on Project Milestones.

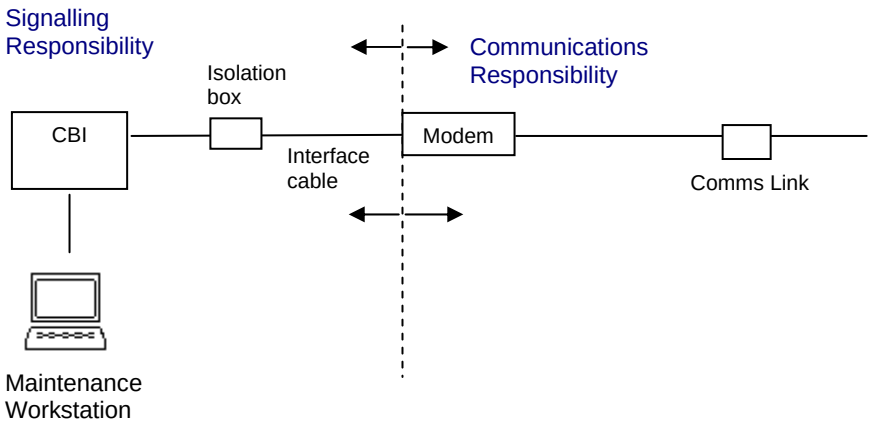
A functional specification will include the following information as a minimum:

1. Operational requirements,
2. Signalling arrangements,
3. Control System arrangements,

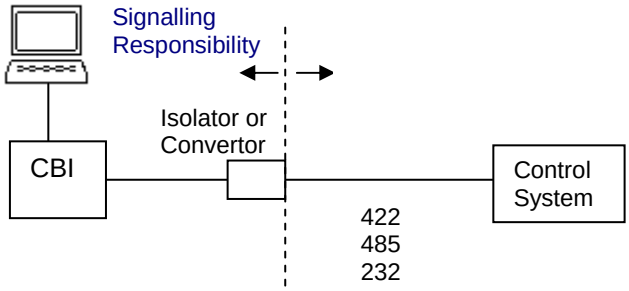
4. Interface changes (if applicable),
5. All interfaces and practical management of interfaces to signalling systems, communication systems, train control systems and other systems for installation where applicable and as documented in Diagrams A-F.
6. Project stages and dates,
7. Technical issues,

3.3.1 Physical Interface

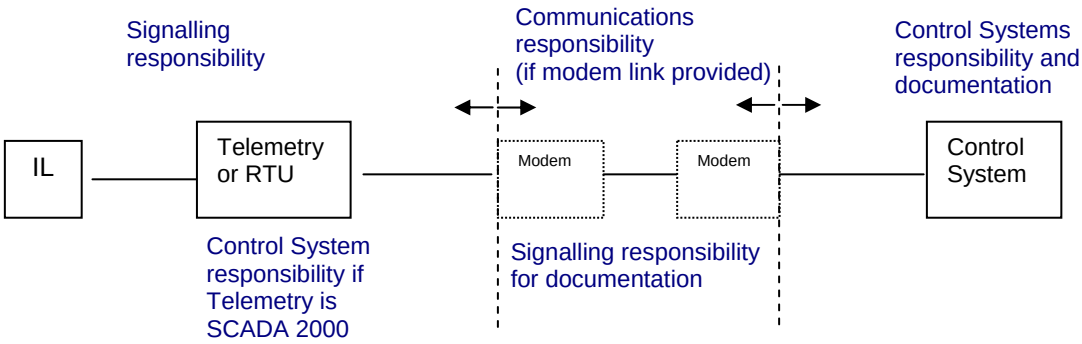
3.3.1.1 Diagram A1 - CBI Interlocking to serial links (via communications links)



3.3.1.2 Diagram A2 - CBI Interlocking to serial links (local)



3.3.1.3 Diagram B – Relay Interlocking with Telemetry or RTU



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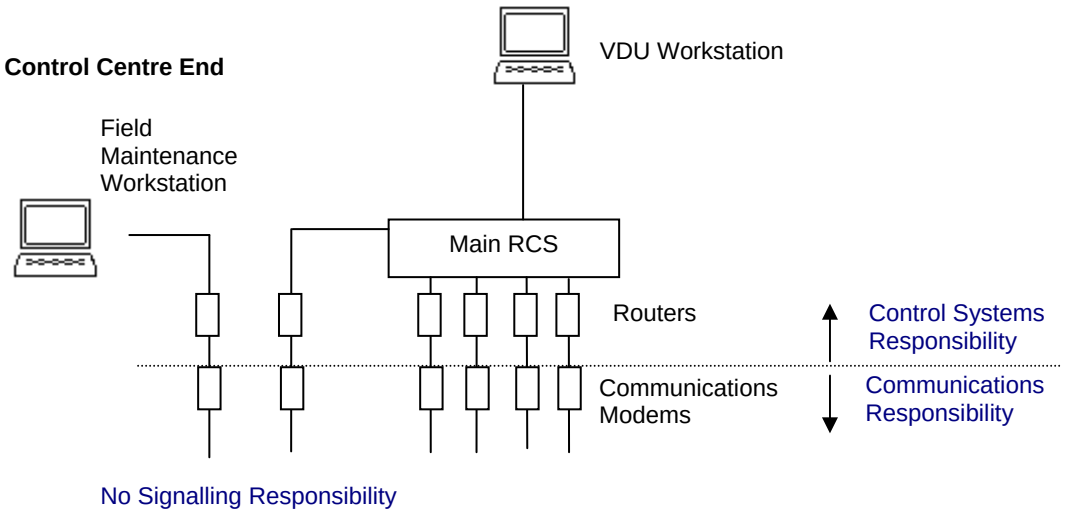
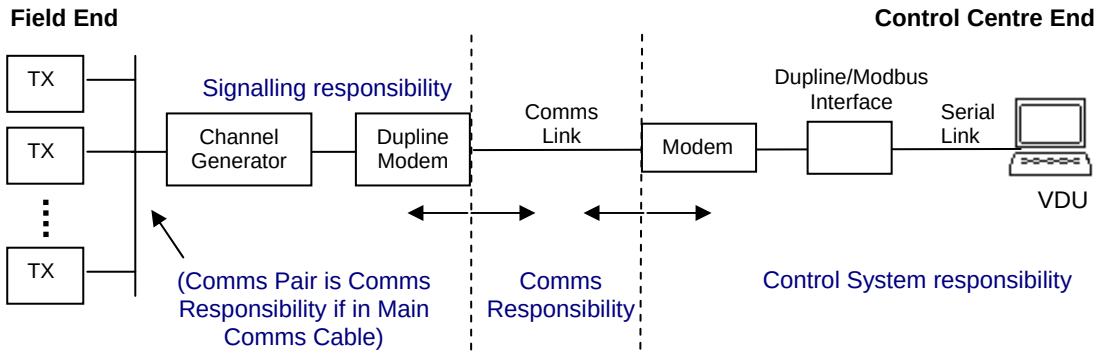
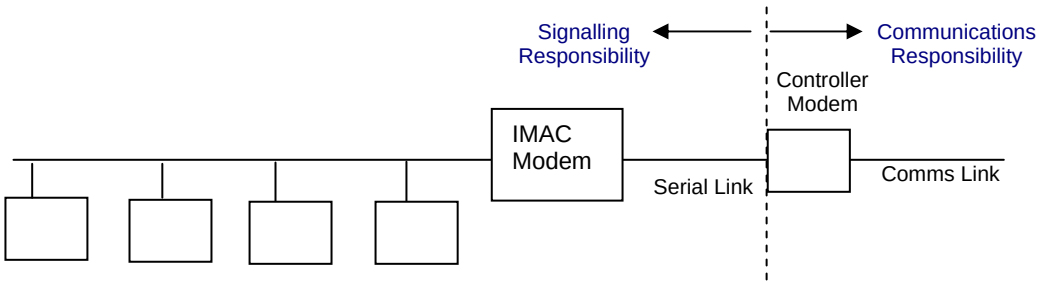
3.3.1.4 Diagram C – Control Centre



3.3.1.5 Diagram D – Dupline System



3.3.1.6 Diagram E – IMac System - Field End



3.3.2 Commissioning Engineer

The commissioning engineer is to be competent in Signalling Safeworking and Network Rules to ensure compliance with the Network Rules.

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3.4 Operational

3.4.1 Definitions

Asset Manager – The group that is responsible for the asset lifecycle of the equipment and is also responsible for ensuring that spare parts exist and are part of the stores systems.

Design – The group responsible for the design of that part of the system.

Level 1 ER (Emergency Response) – The first group called when there is a suspected fault on this piece of equipment.

Level 2 ER (Emergency Response) – The group responsible for providing technical support once the first level of emergency response cannot fix the problem.

RM (Routine Maintenance) – The group that carries out regular maintenance as part of a technical maintenance plan (TMP) on the equipment.

3.4.2 Interfaces at Locations

The following figures set the responsibilities for all currently installed assets

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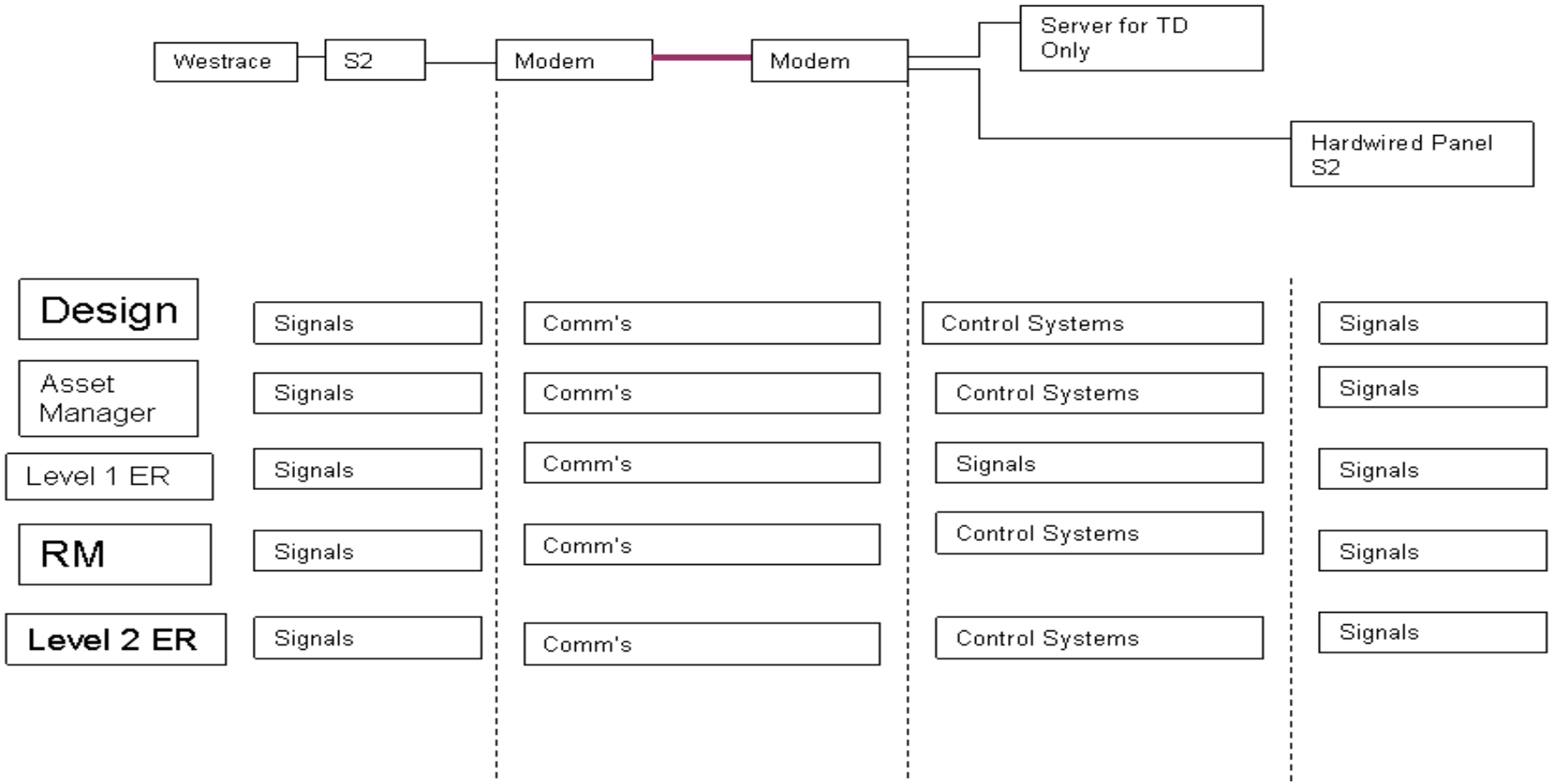

Figure 1: S2 Wollongong

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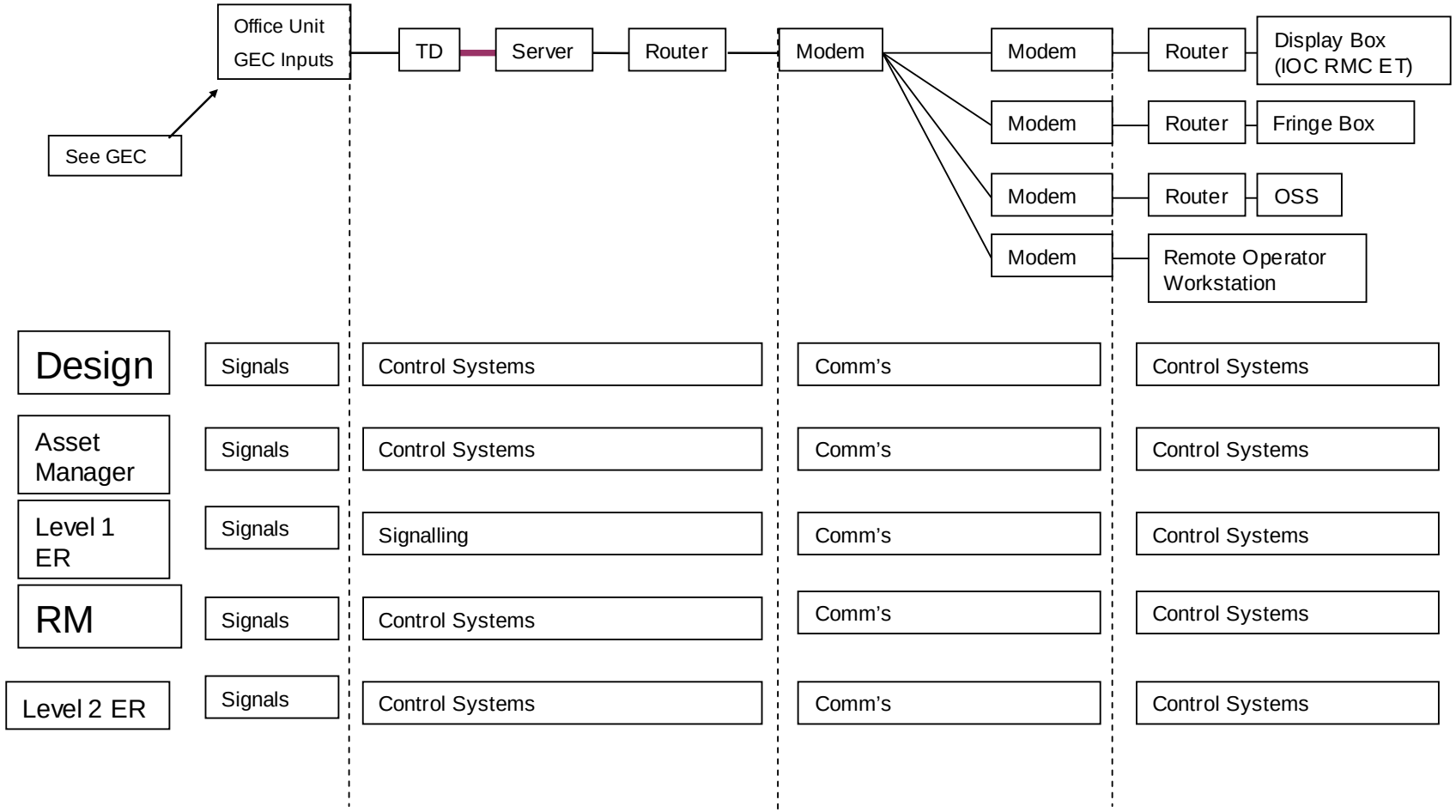

Figure 2: TD Wollongong

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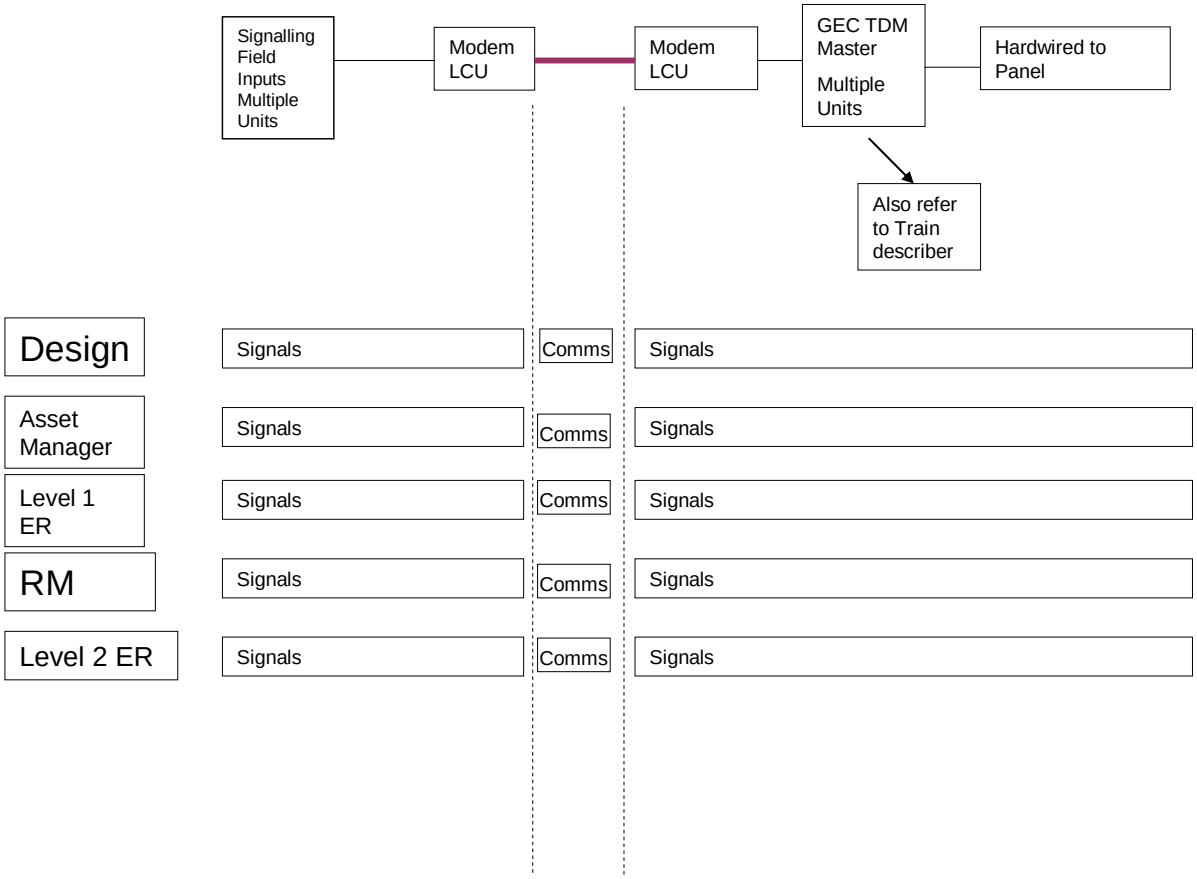

Figure 3: GEC TDM Wollongong

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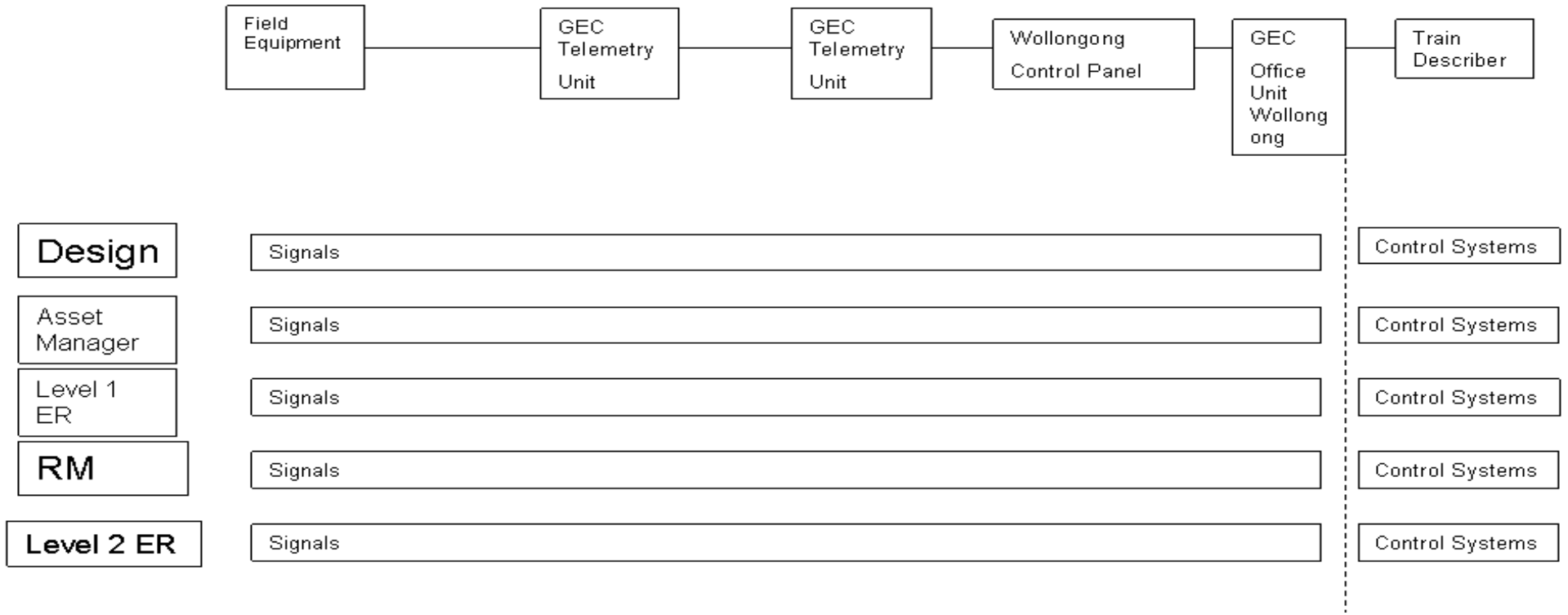

Figure 4: GEC TD Wollongong - Corrimal

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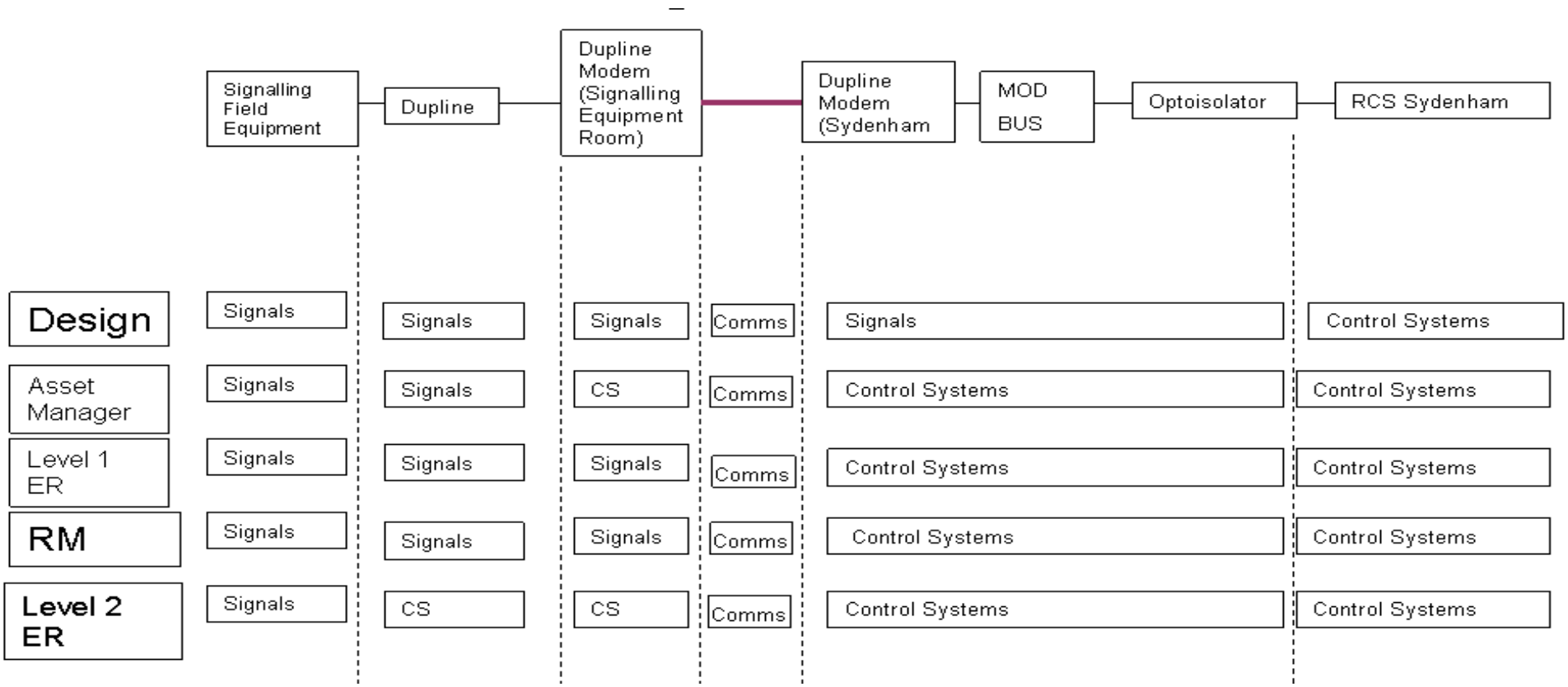

Figure 5: Dupline Sydenham Control Centre

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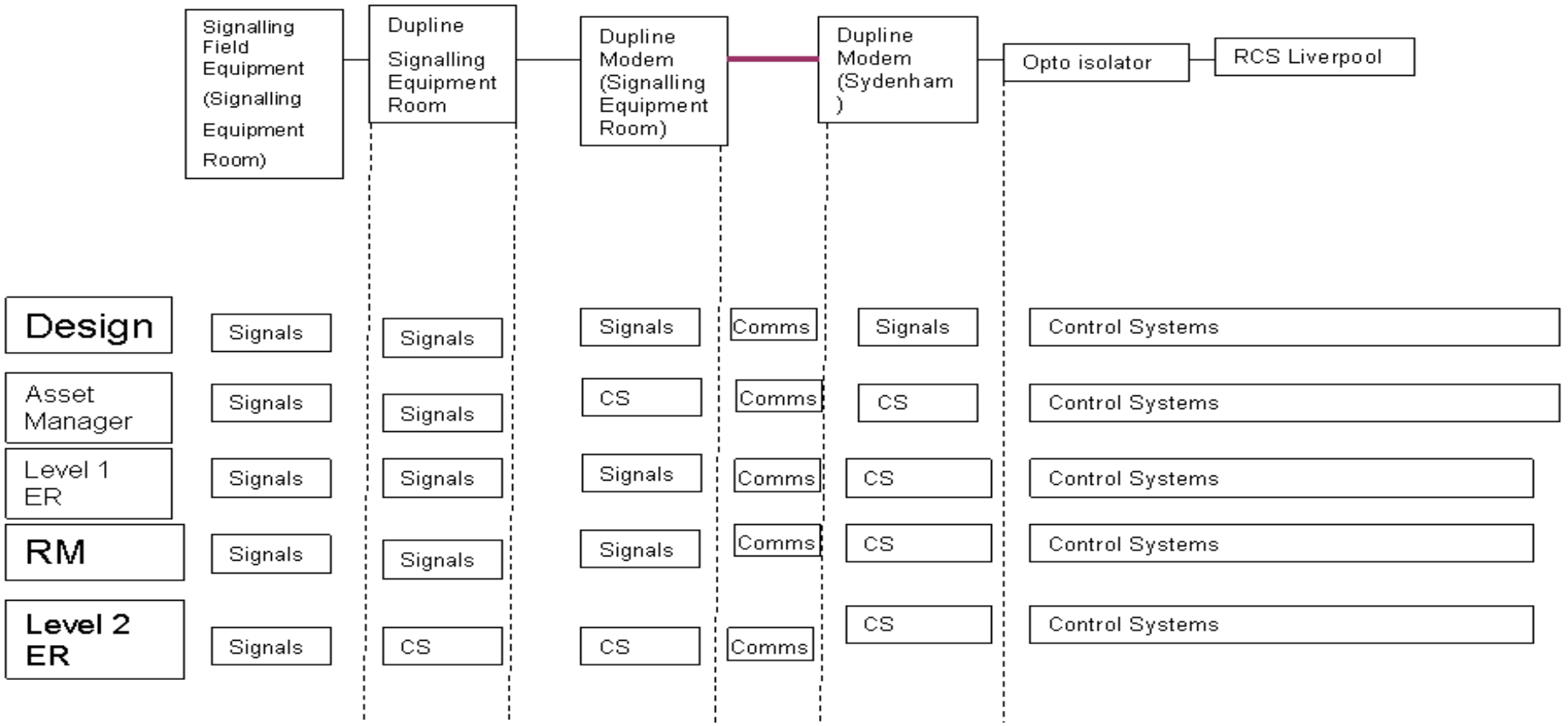

Figure 6: Dupline Fairfield - Guildford

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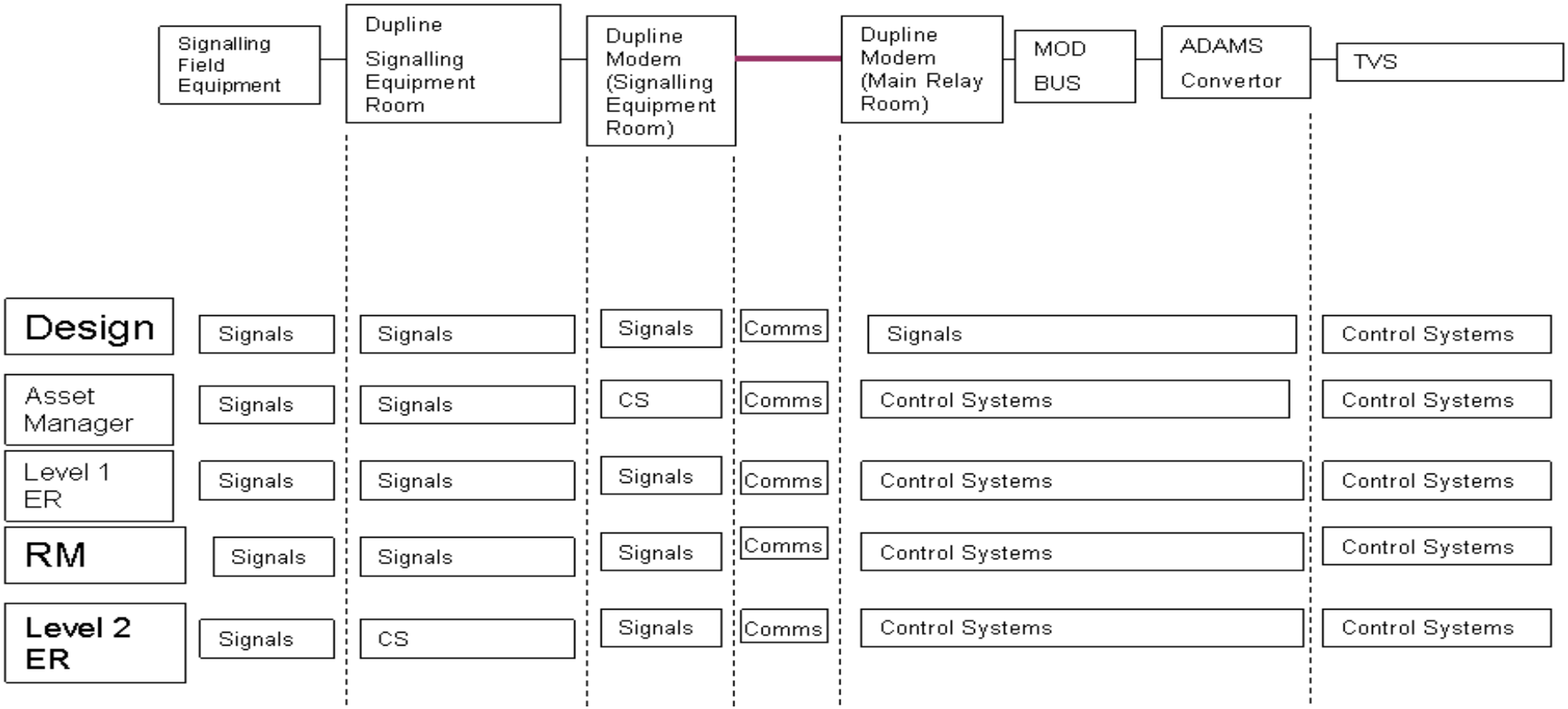

Figure 7: Dupline West Line Auto Sections

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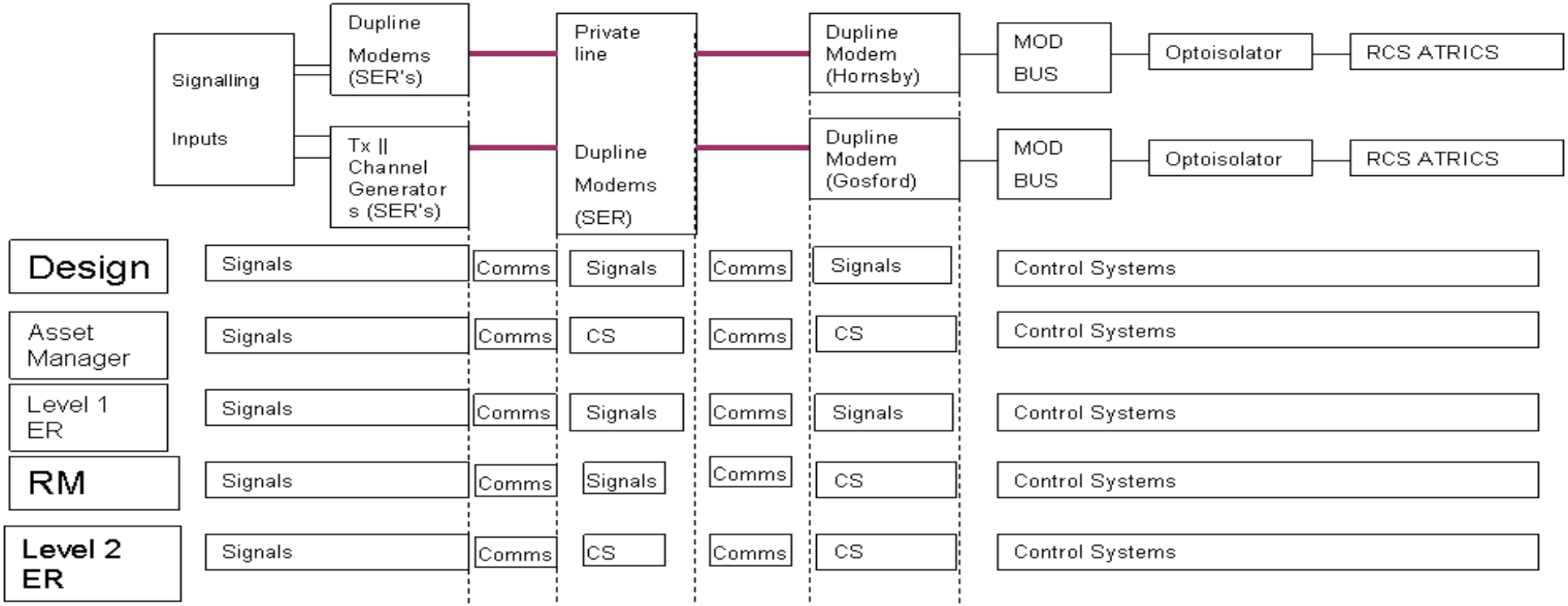

Figure 8: Dupline IASS Hawkesbury River to Eraring

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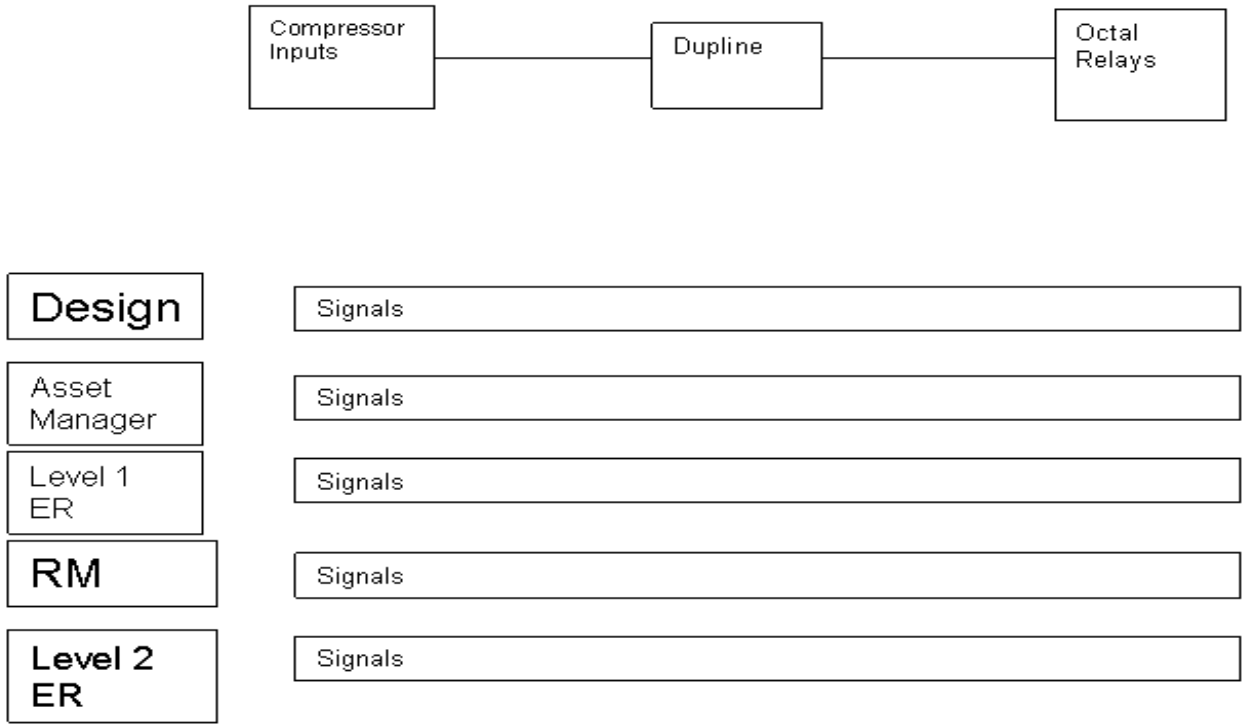

Figure 9: Dupline Sydenham Compressor Room

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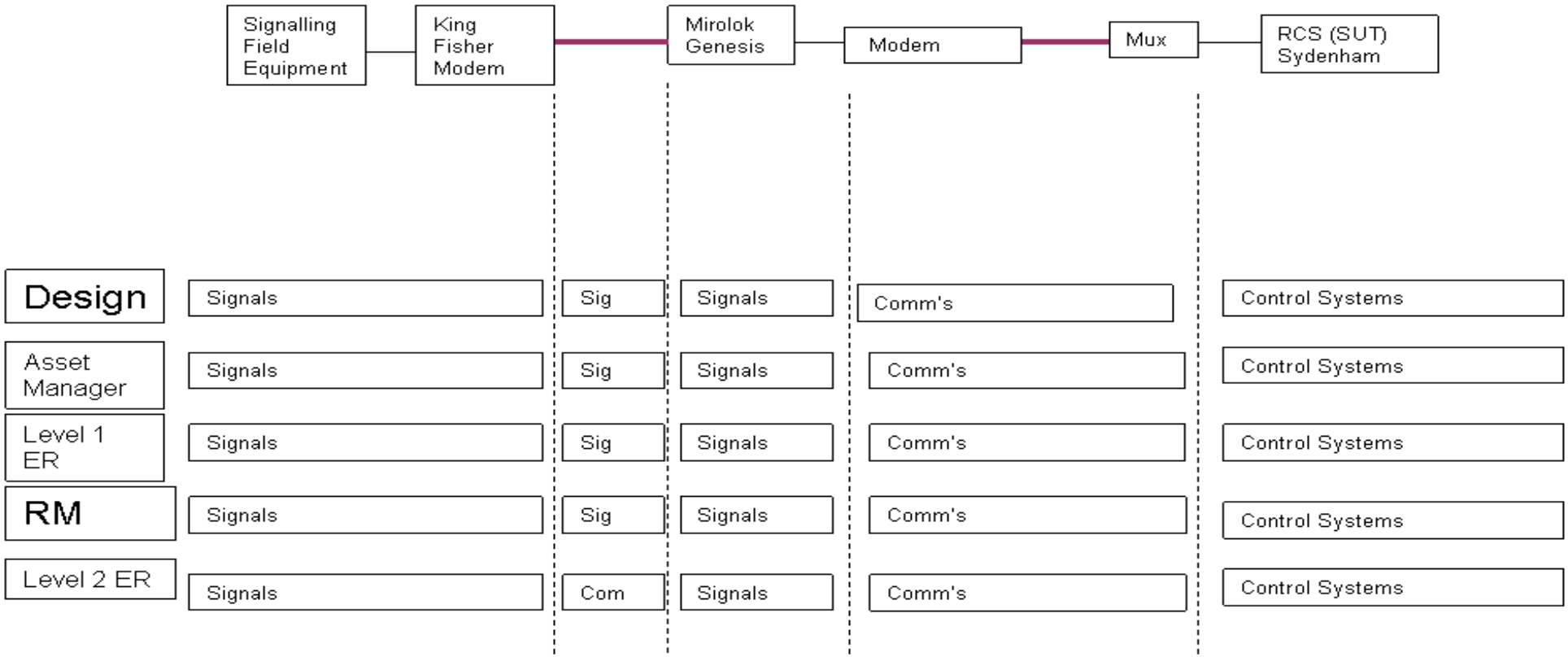

Figure 10: Kingfisher Cronulla

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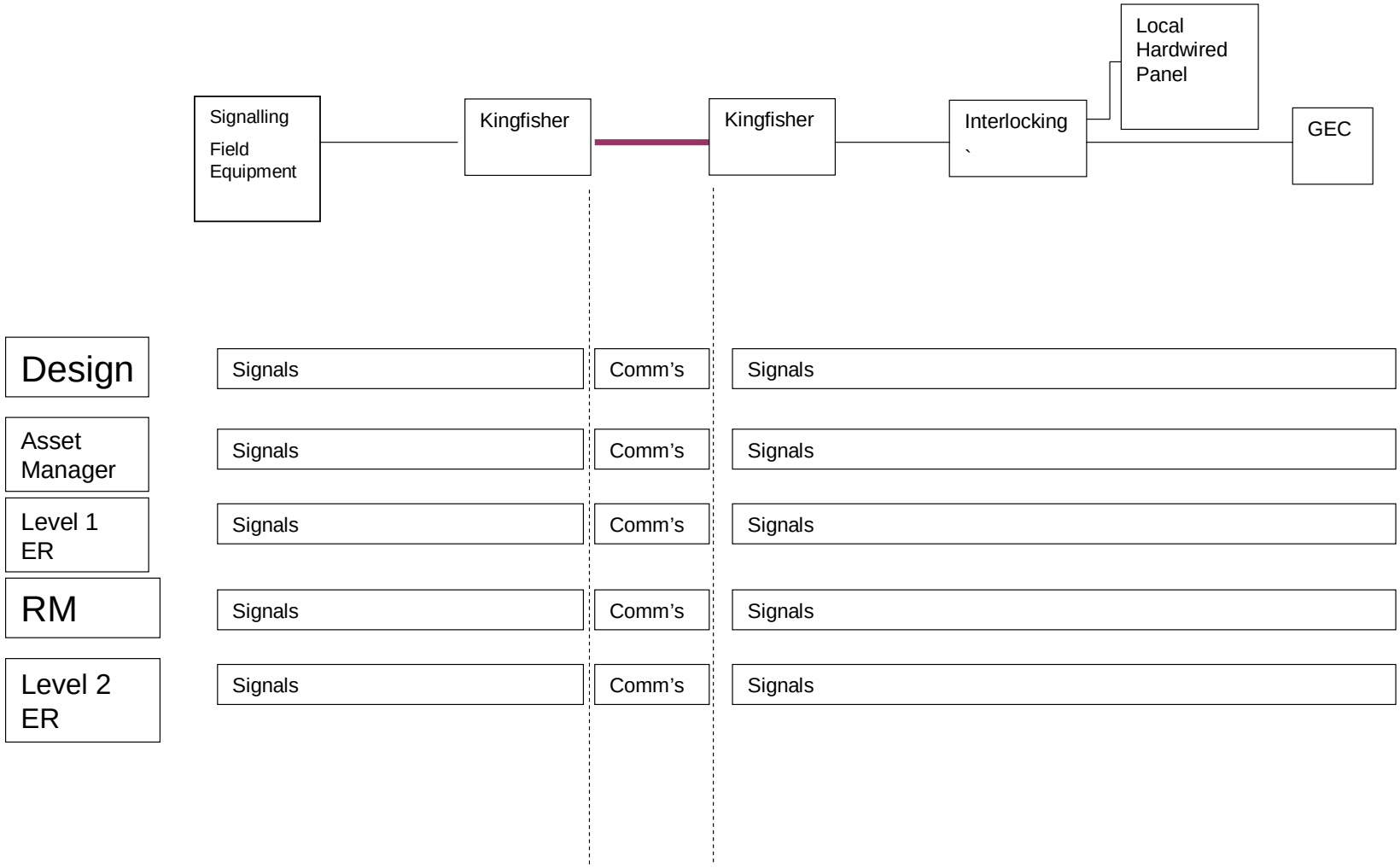

Figure 11: Kingfisher Helensburgh Otford Helensburgh to Metrop Colliery Junction

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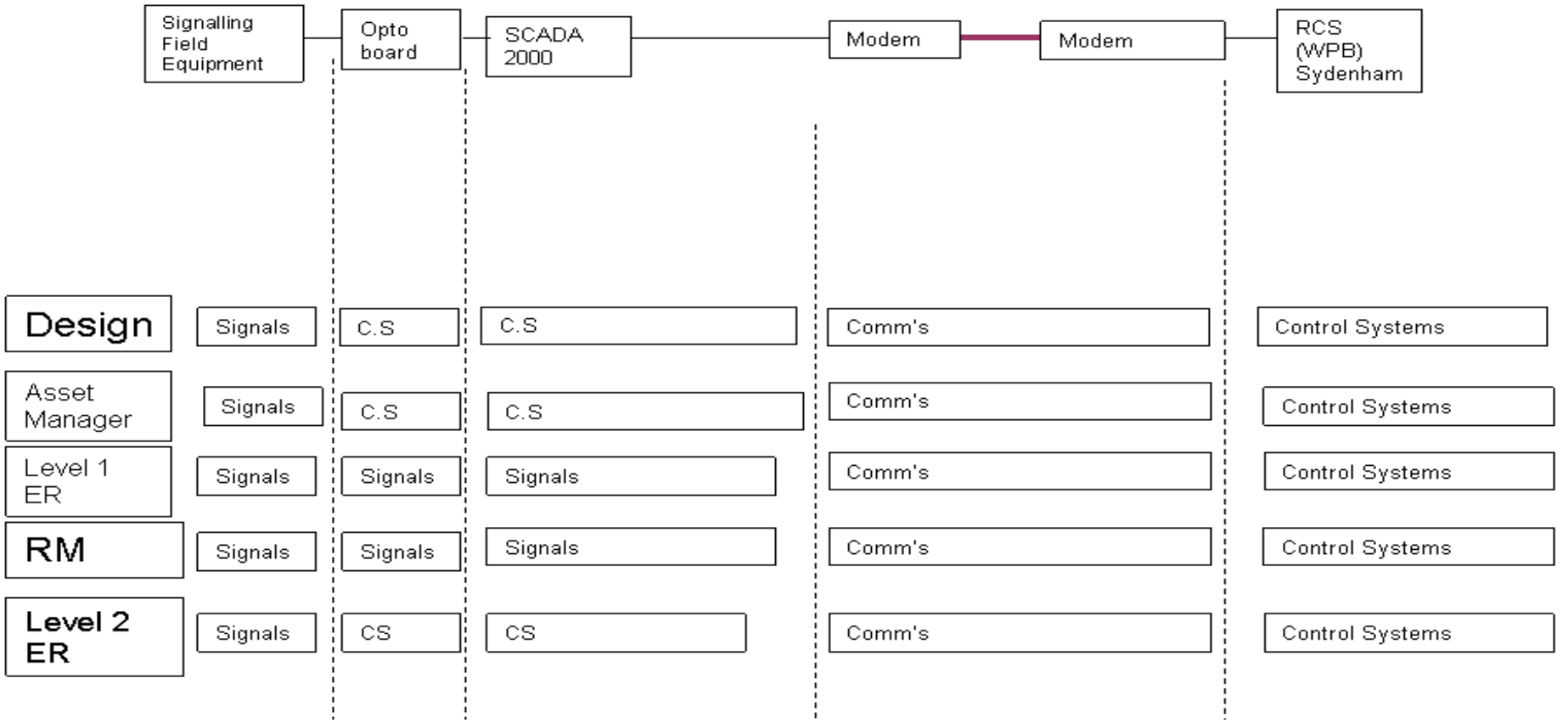

Figure 12: SCADA 2000 Wardell Road

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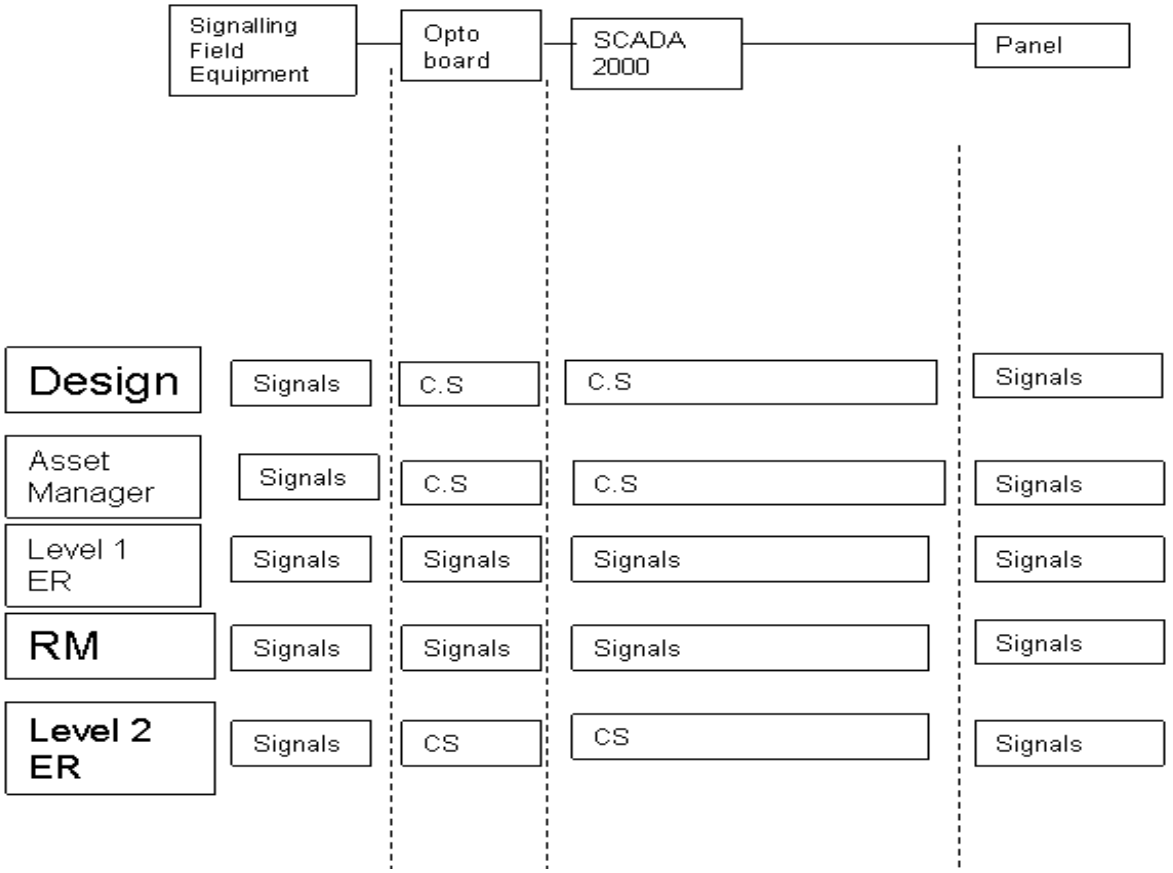

Figure 13: SCADA 2000 St Marys

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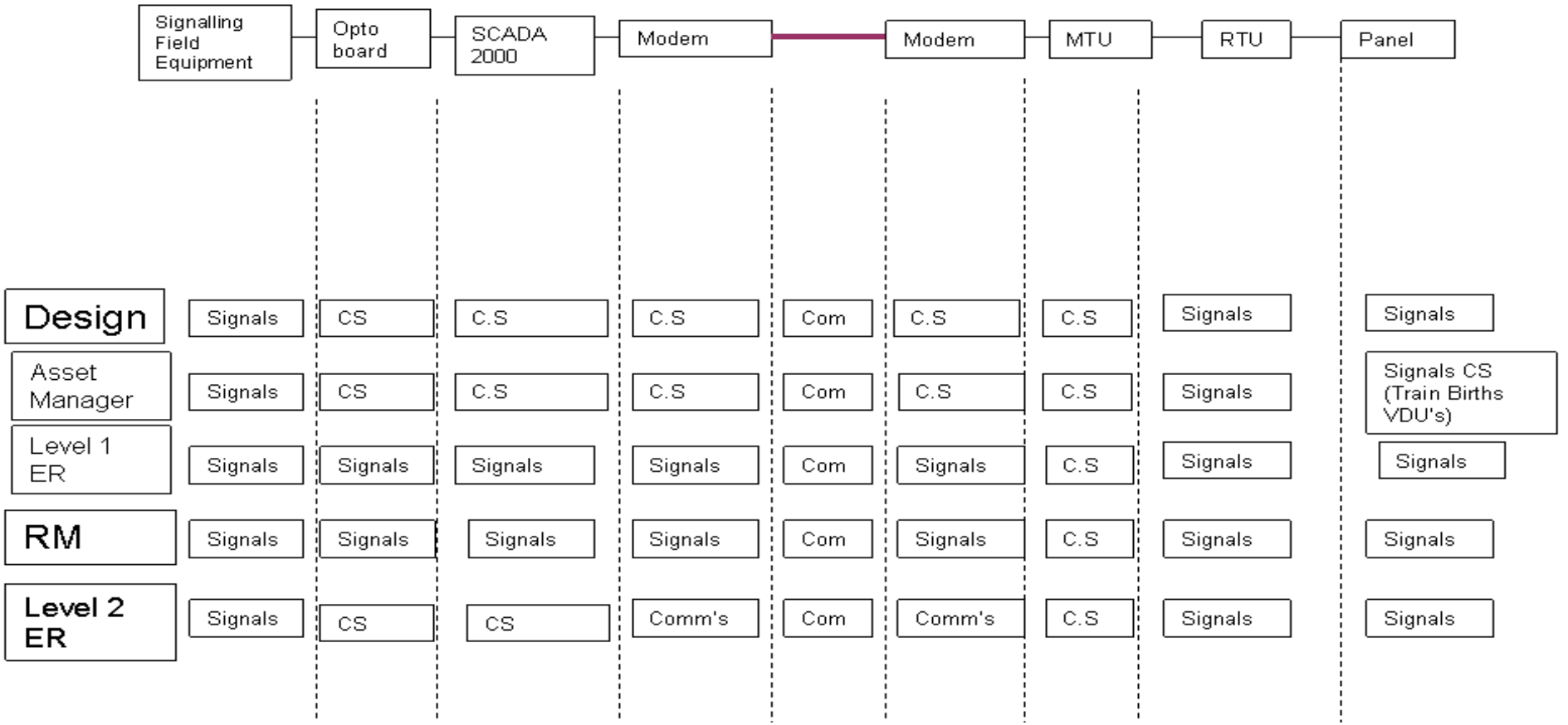

Figure 14: SCADA 2000 Zig Zag Edgecombe

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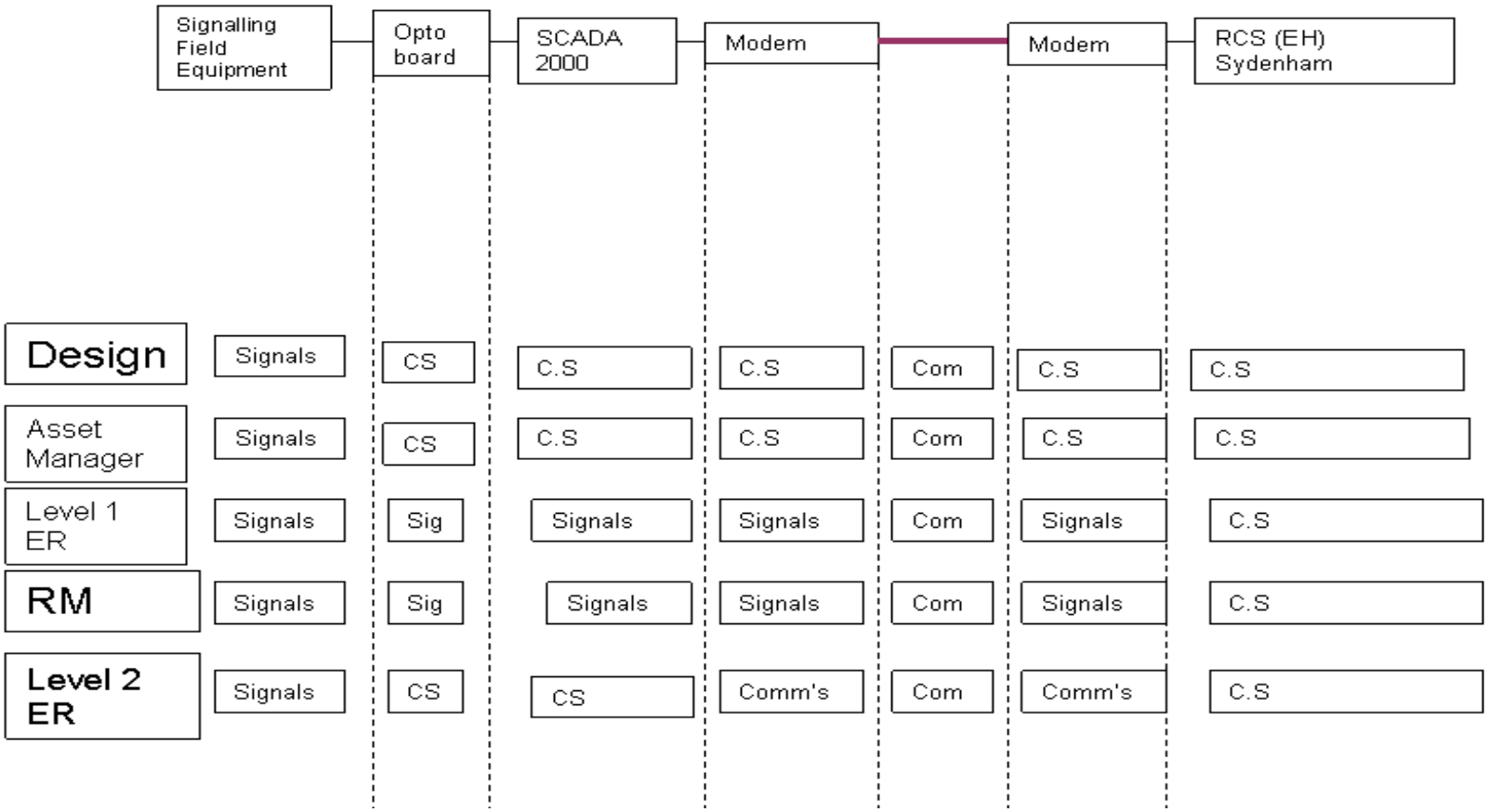

Figure 15: SCADA 2000 Beverly Hills - Sydenham

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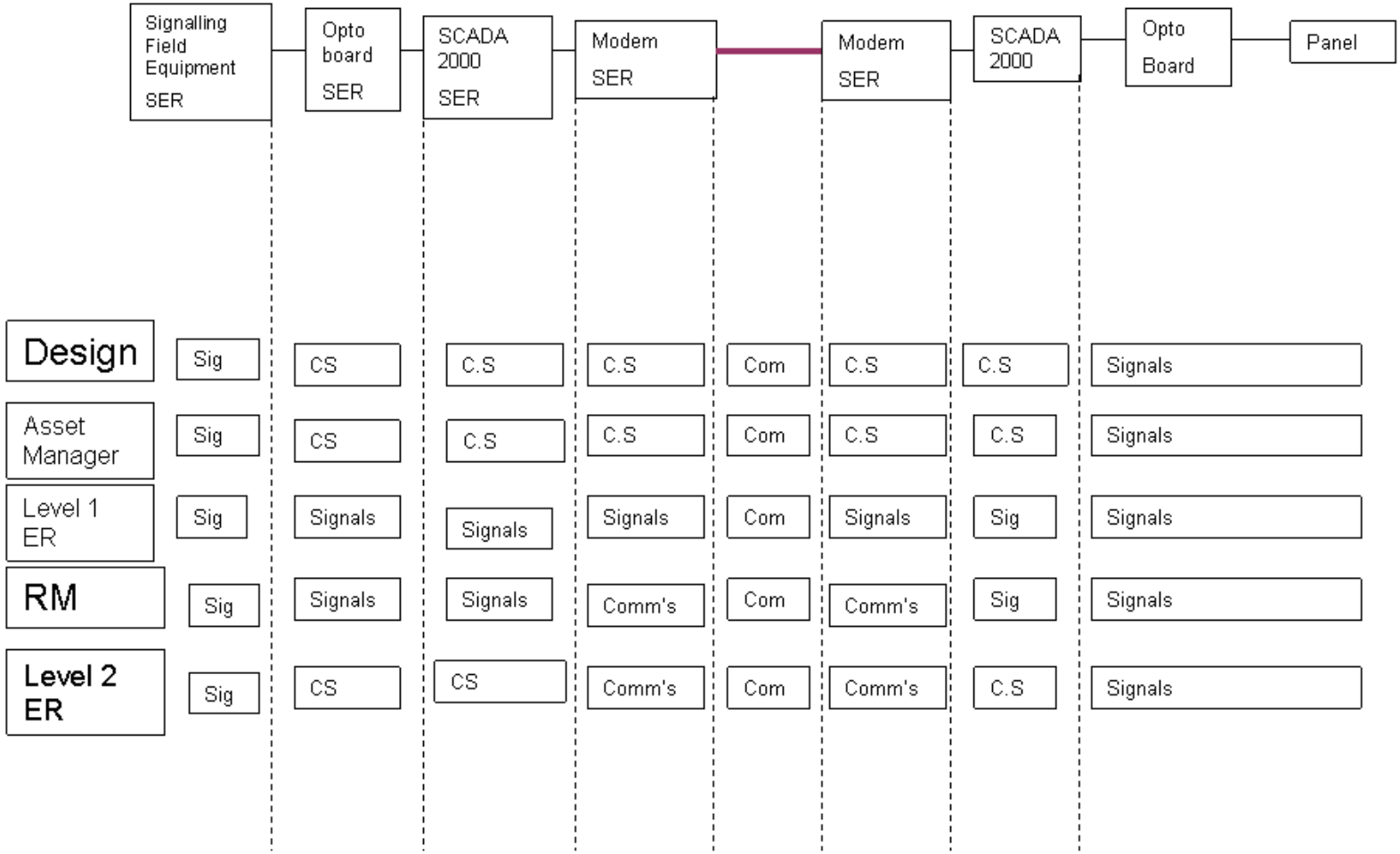

Figure 16: SCADA 2000 Eraring, Awaba, Fassifern, Sulphide Junction, Broadmeadow, Berowra and Cowan

Reference material - for information only

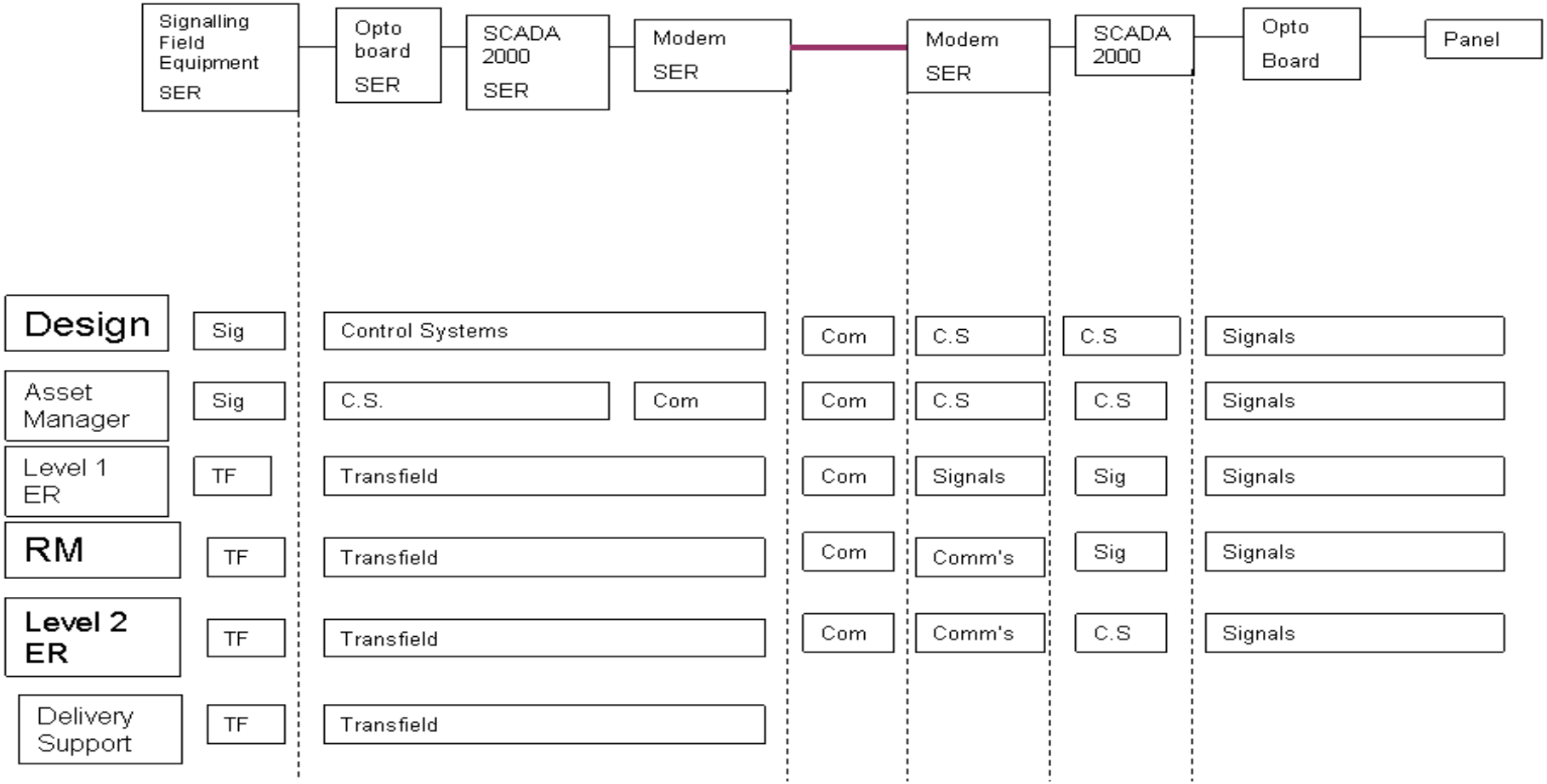

Figure 17: SCADA 2000 Green Square Mascot, Domestic, International, Wolli Creek

Reference material - for information only

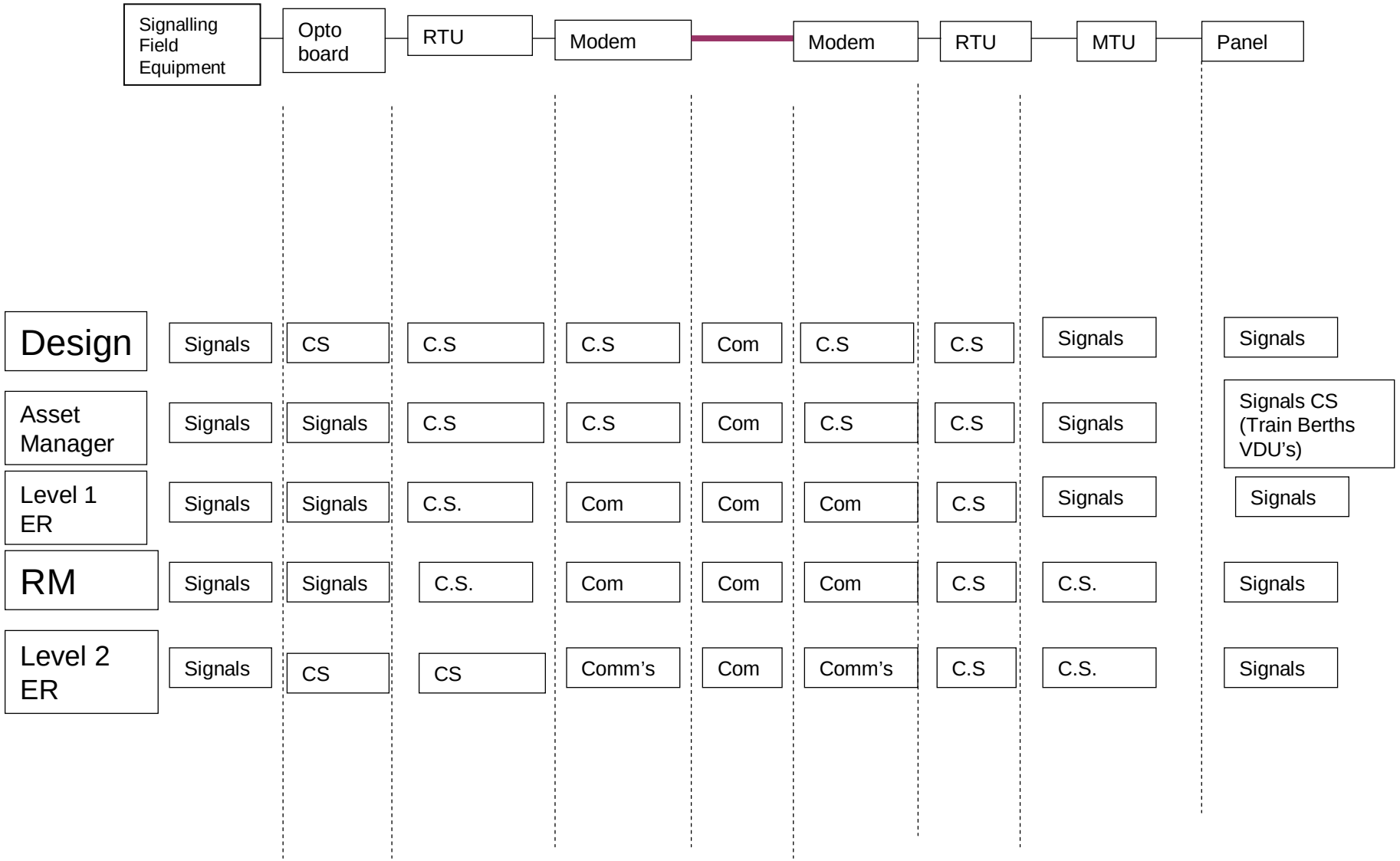

Figure 18: Telemetry Ashfield - Lidcombe

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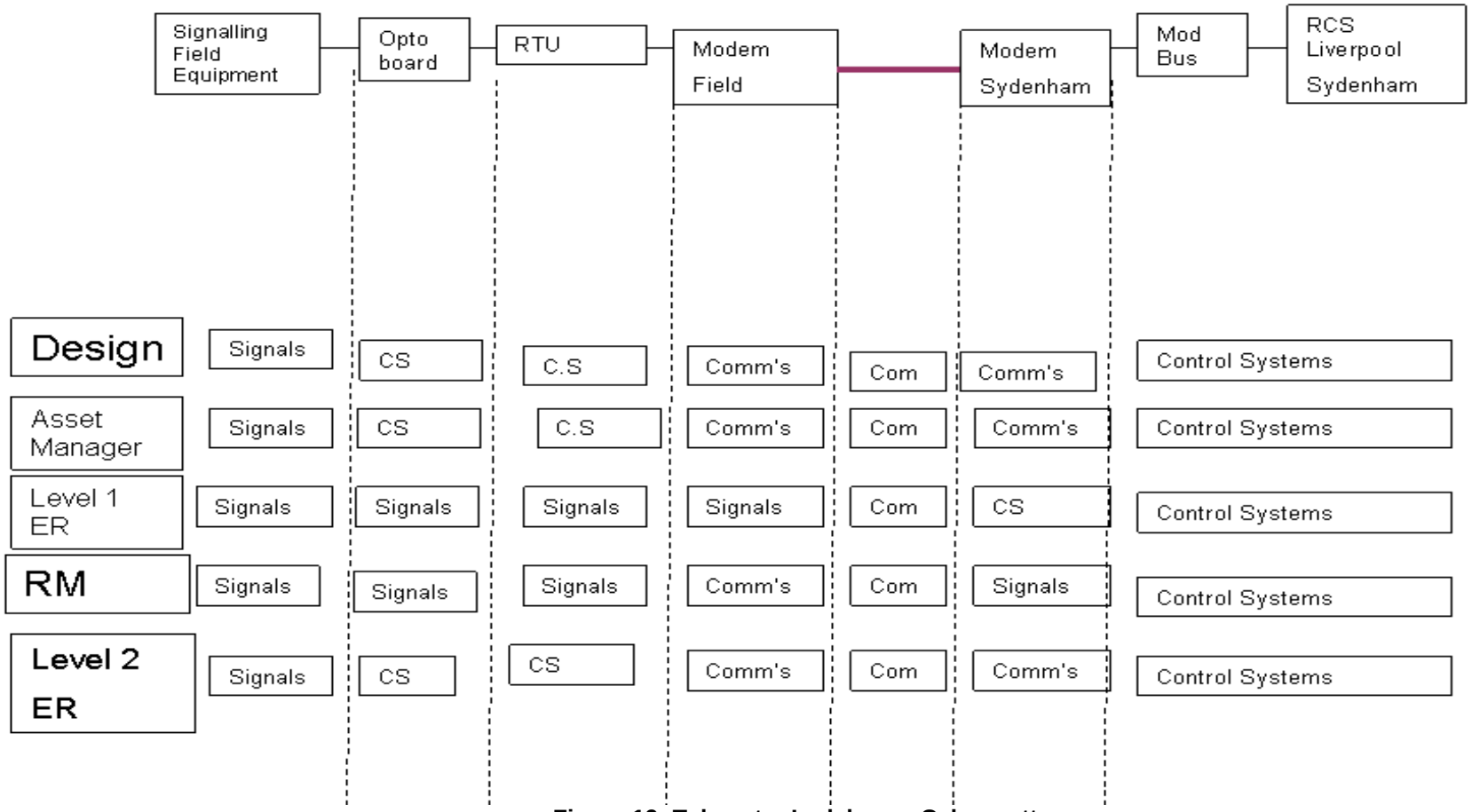

Figure 19: Telemetry Ingleburn - Cabramatta

Reference material - for information only

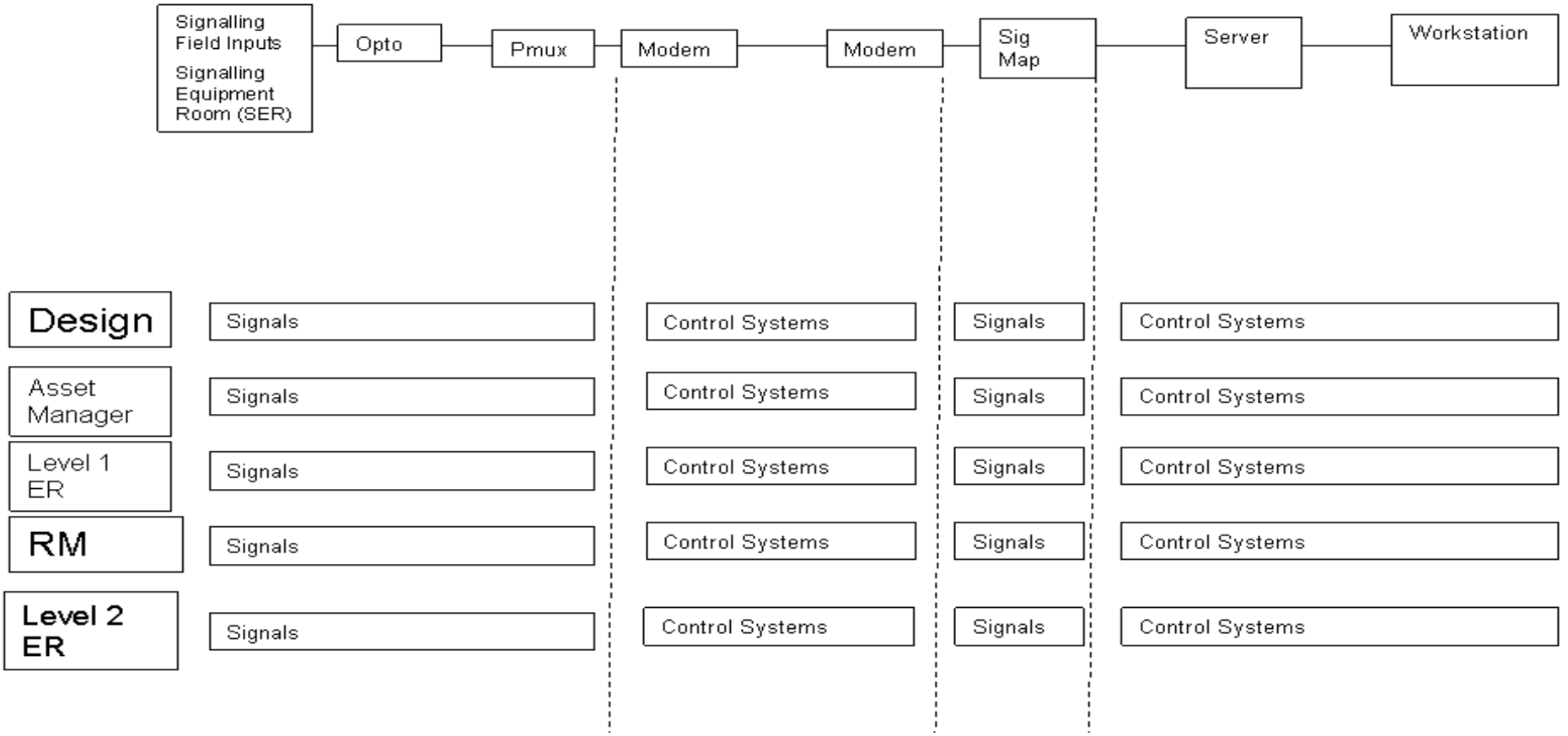

Figure 20: Telemetry Mulgrave, Riverstone, Clarendon, Richmond and Blacktown

Reference material - for information only

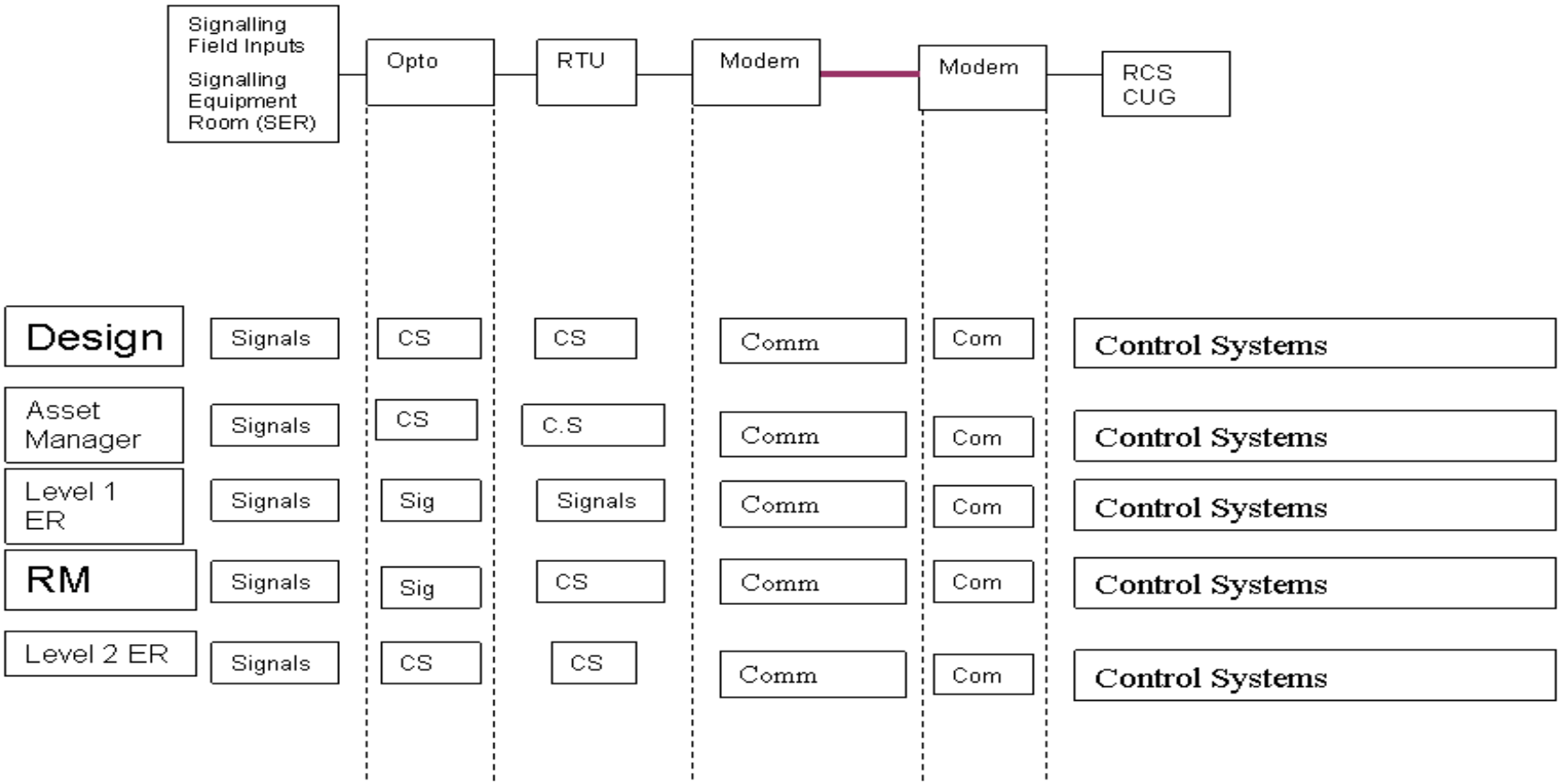

Figure 21: Telemetry City Underground, Circular Quay, Goulburn St, Wynyard, Museum, St James, Sydney Box

Reference material - for information only

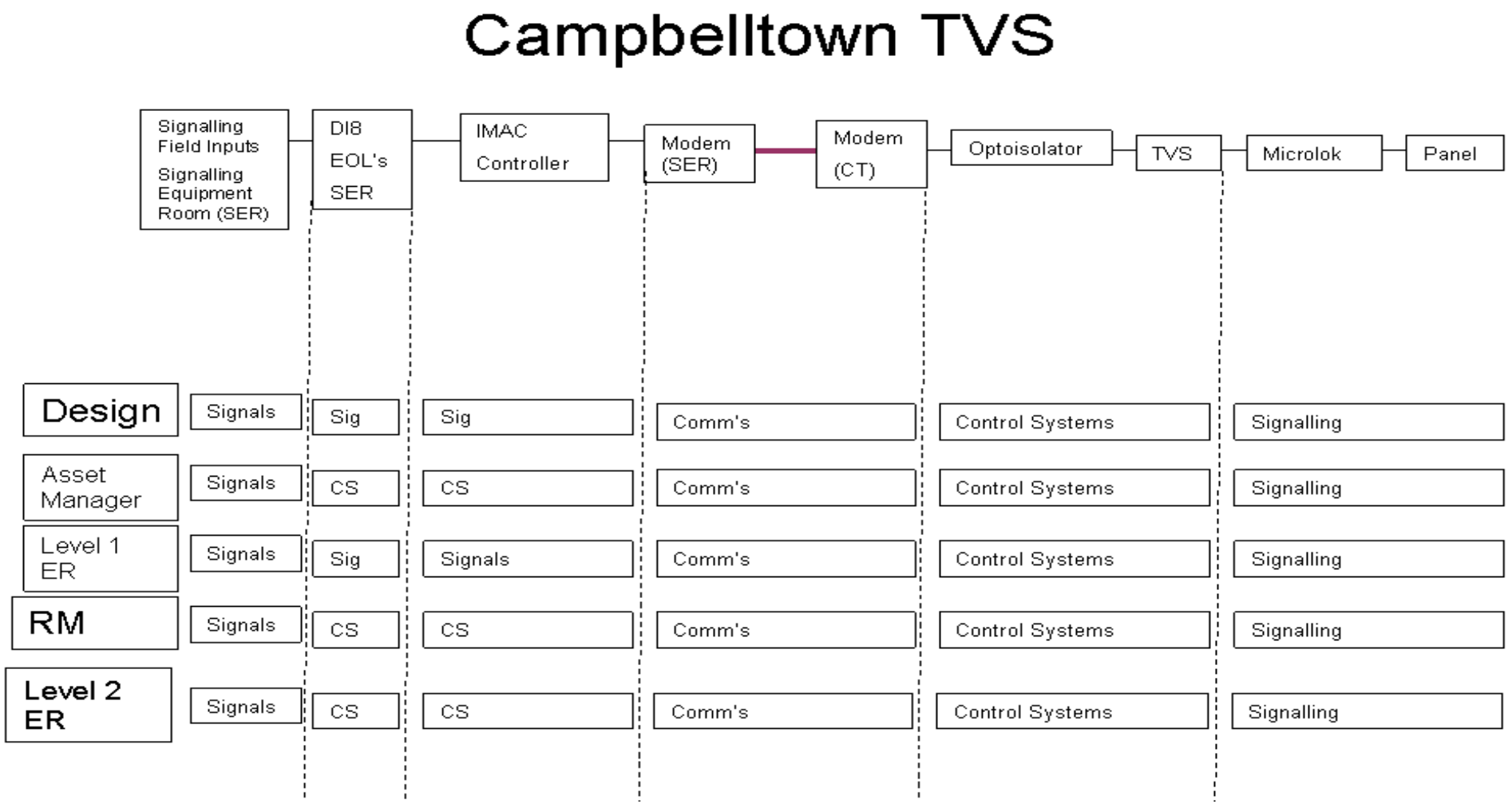

Figure 22: TVS Campbelltown

Reference material - for information only

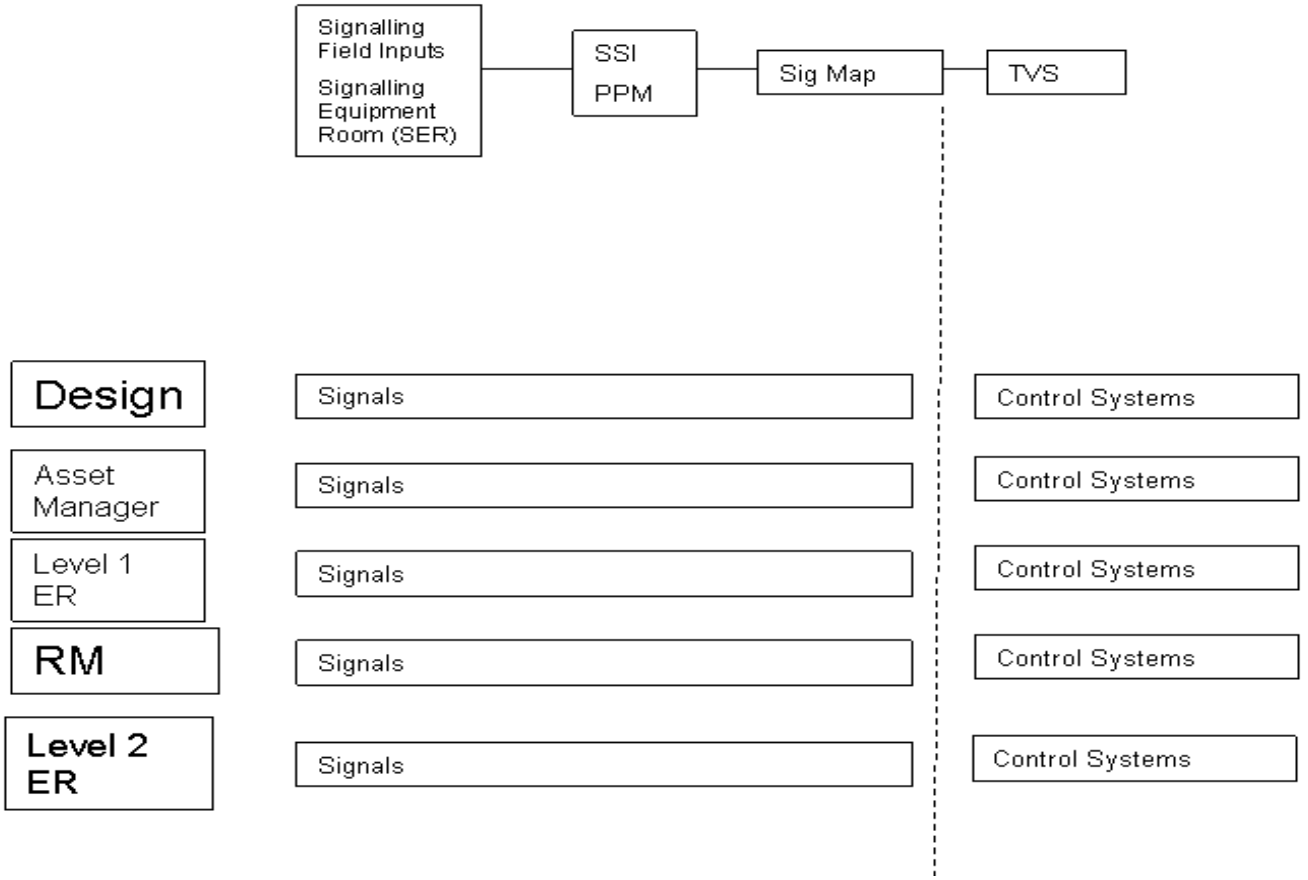

Figure 23: TVS Granville

Reference material - for information only

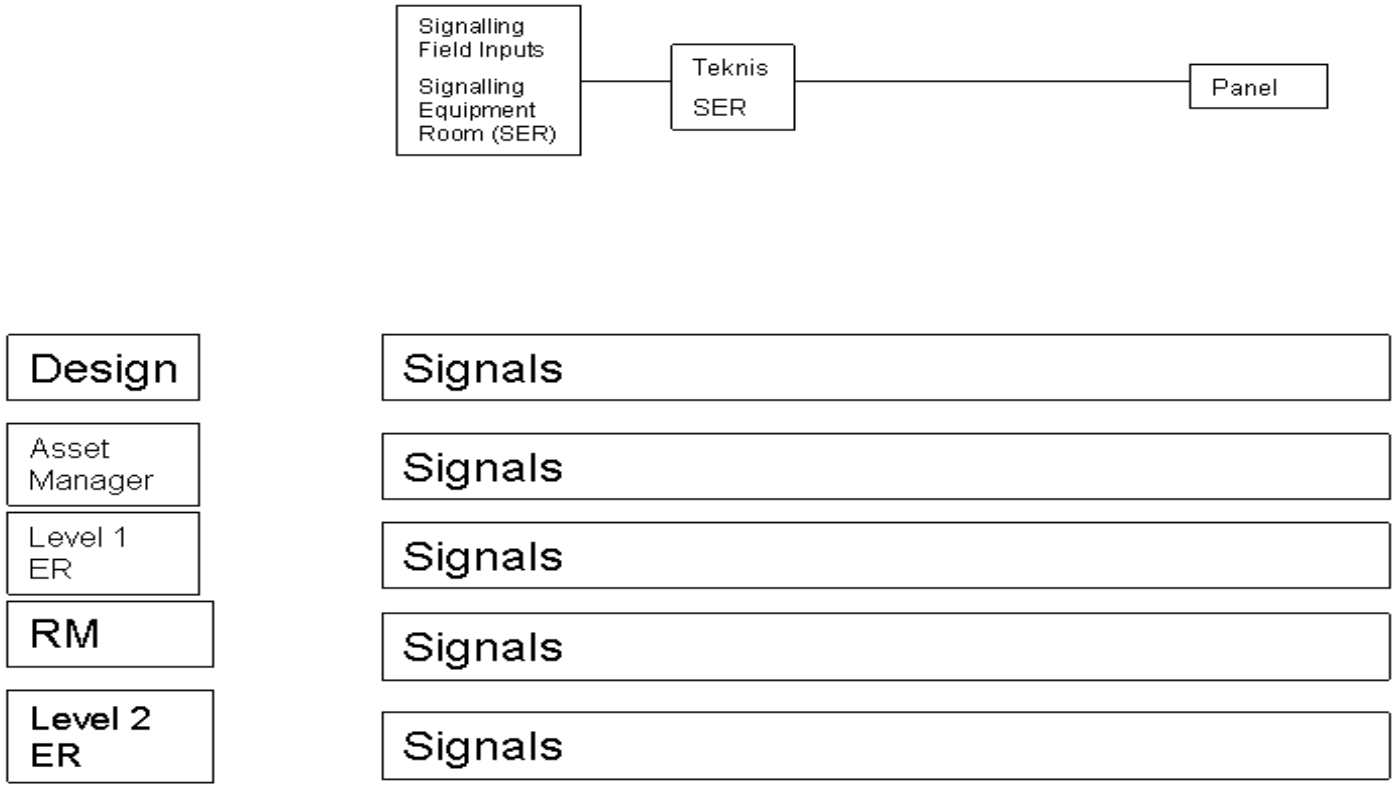

Figure 24: Teknis Inner West Sydney Box

Reference material - for information only

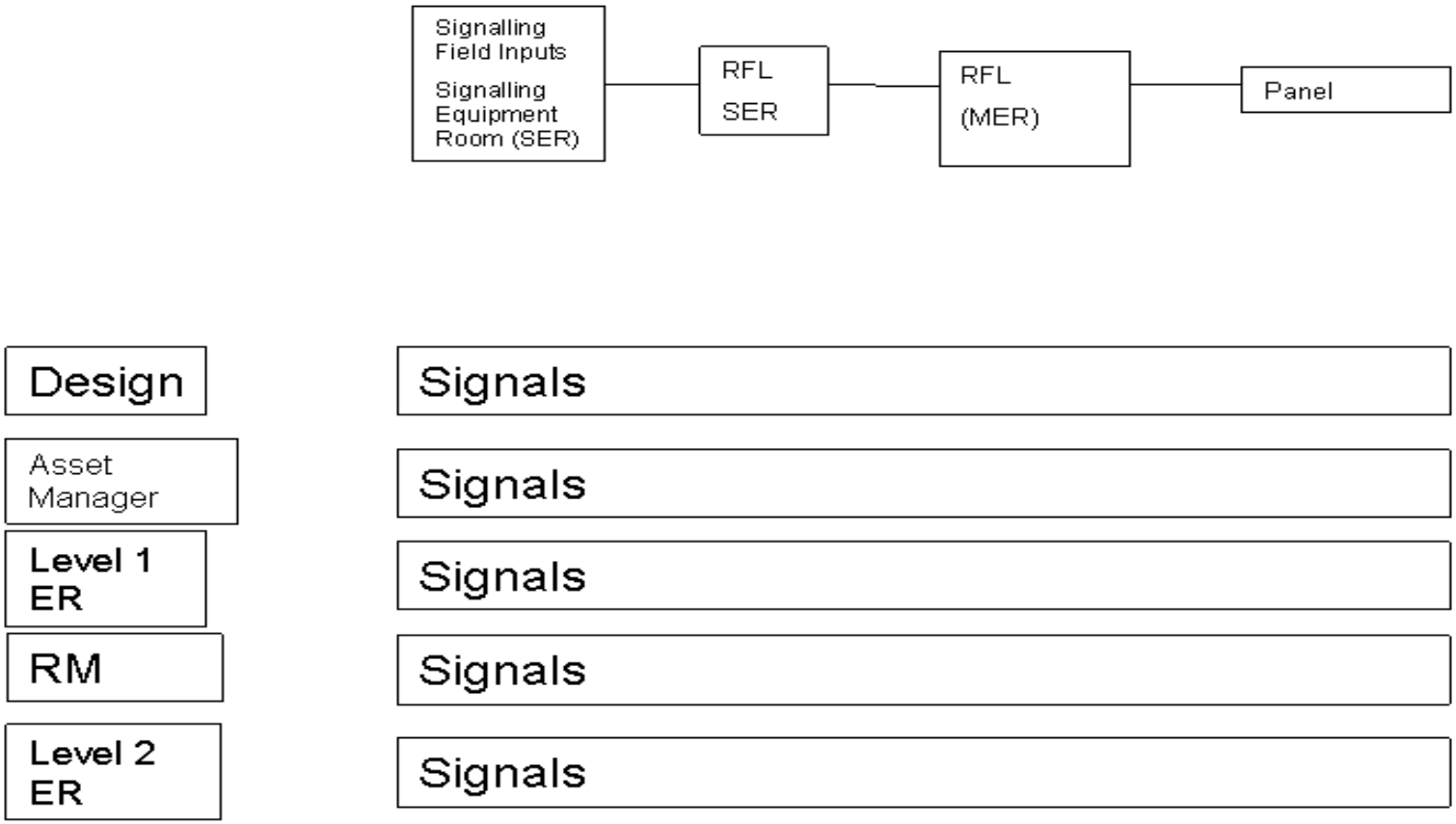

Figure 25: RFL Inner West Indication System

Reference material - for information only

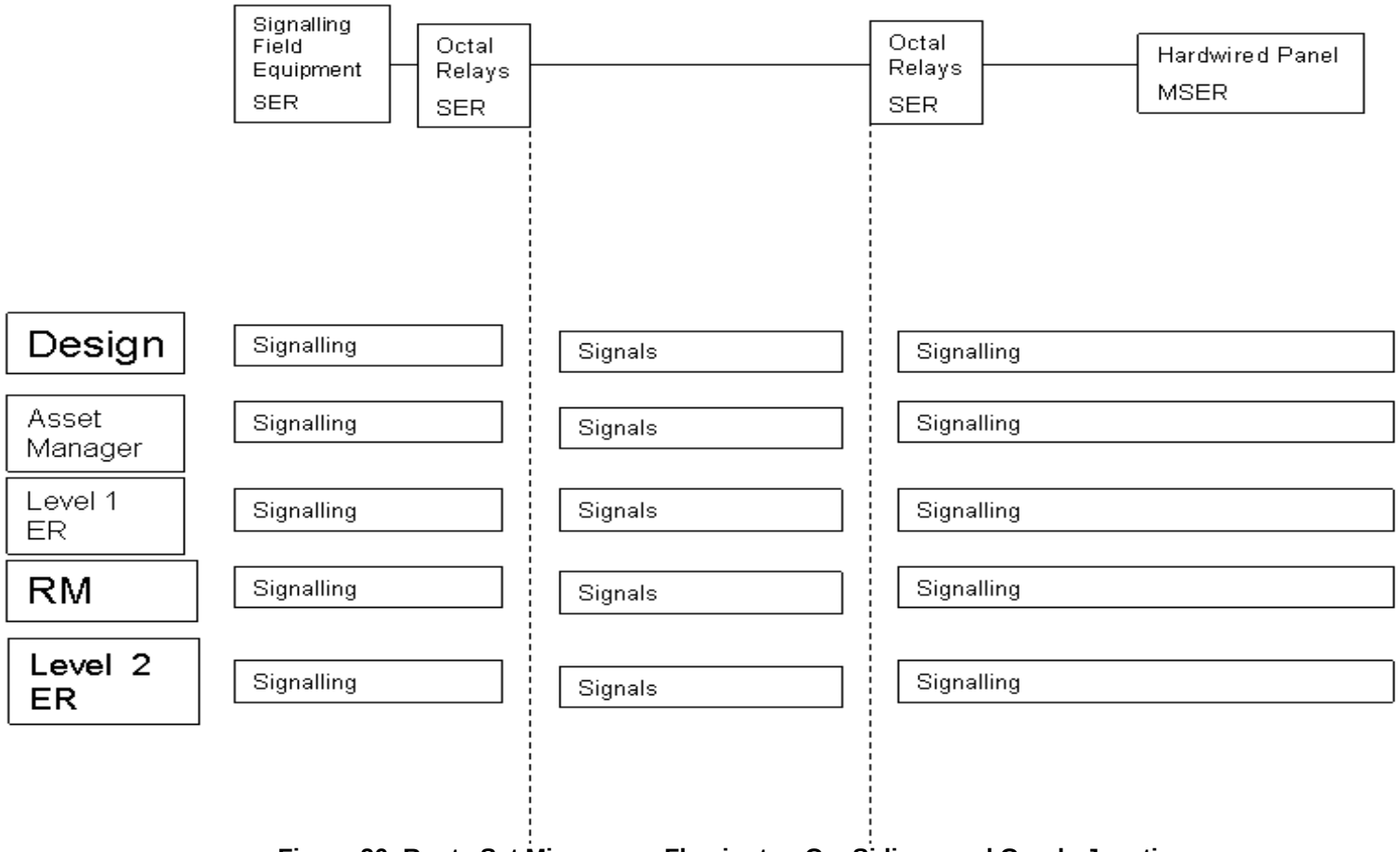

Figure 26: Route Set Microcores Flemington Car Sidings and Goods Junction

Reference material - for information only

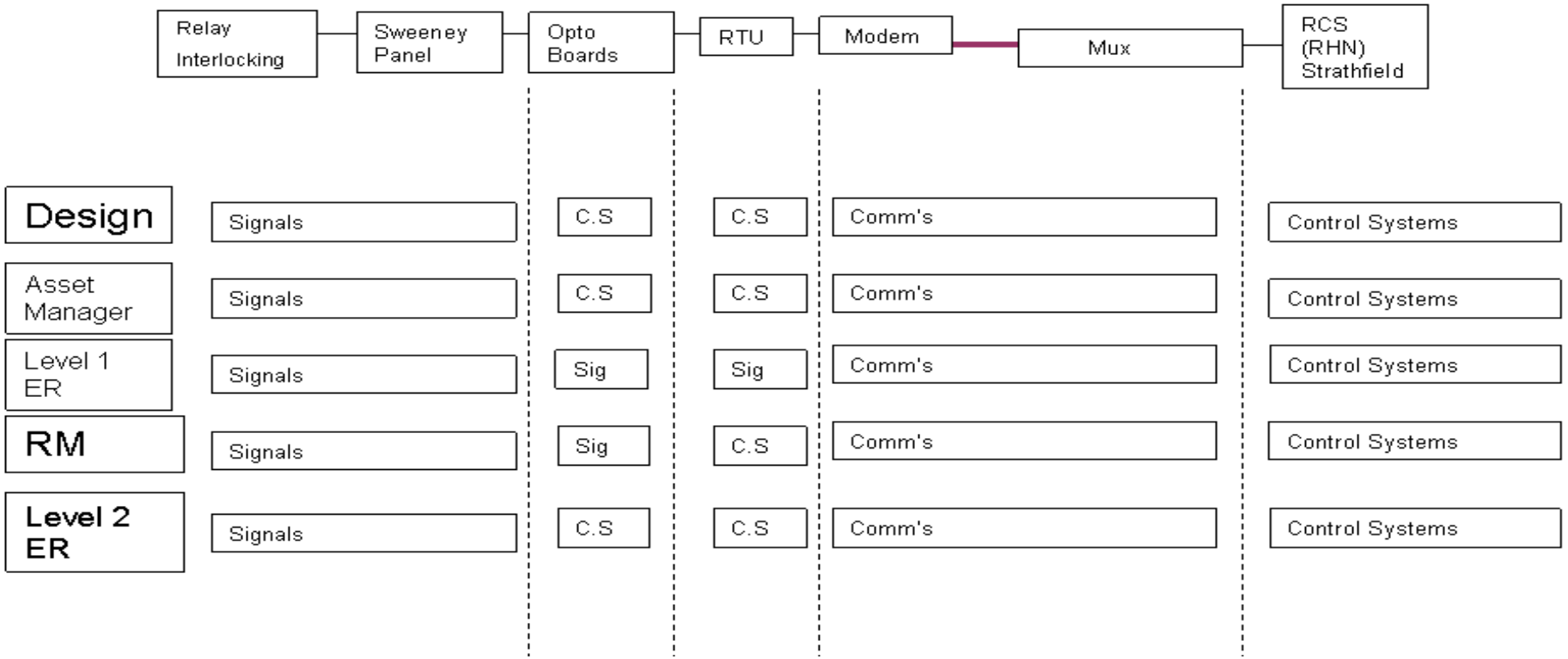

Figure 27: Relay Route Set Nx – ATRICS Rhodes, West Ryde, Thornleigh

Reference material - for information only

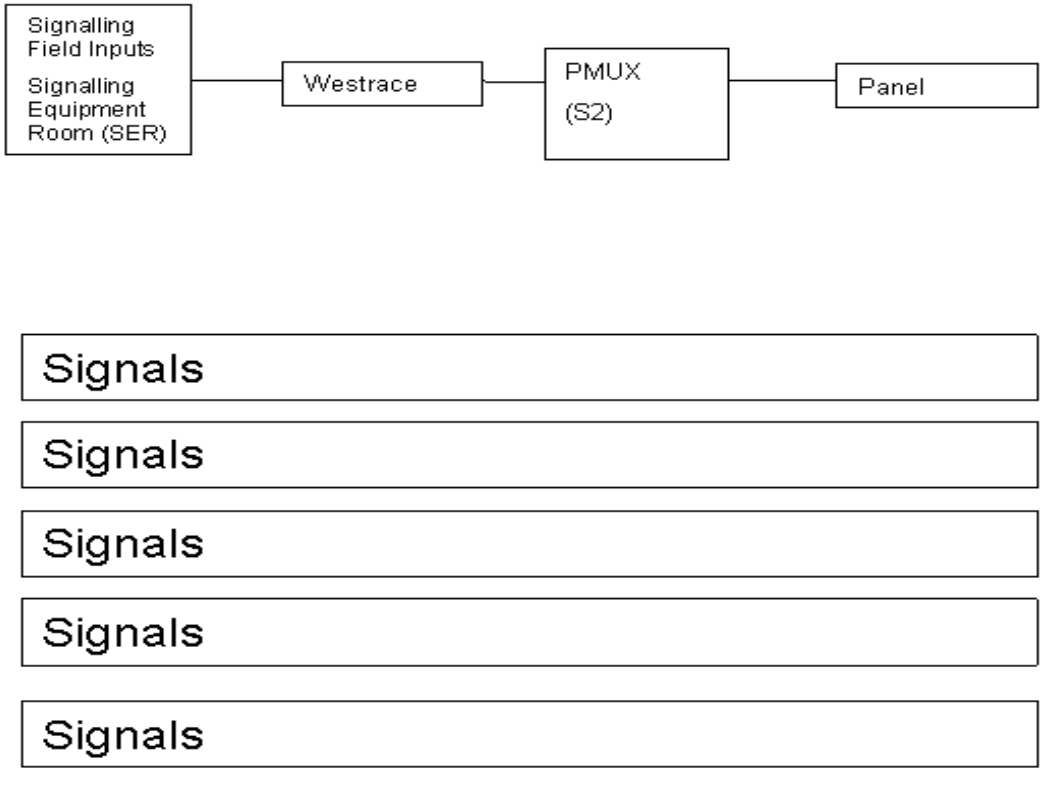

Figure 28: Westrace – S2 - Wyong

Reference material - for information only

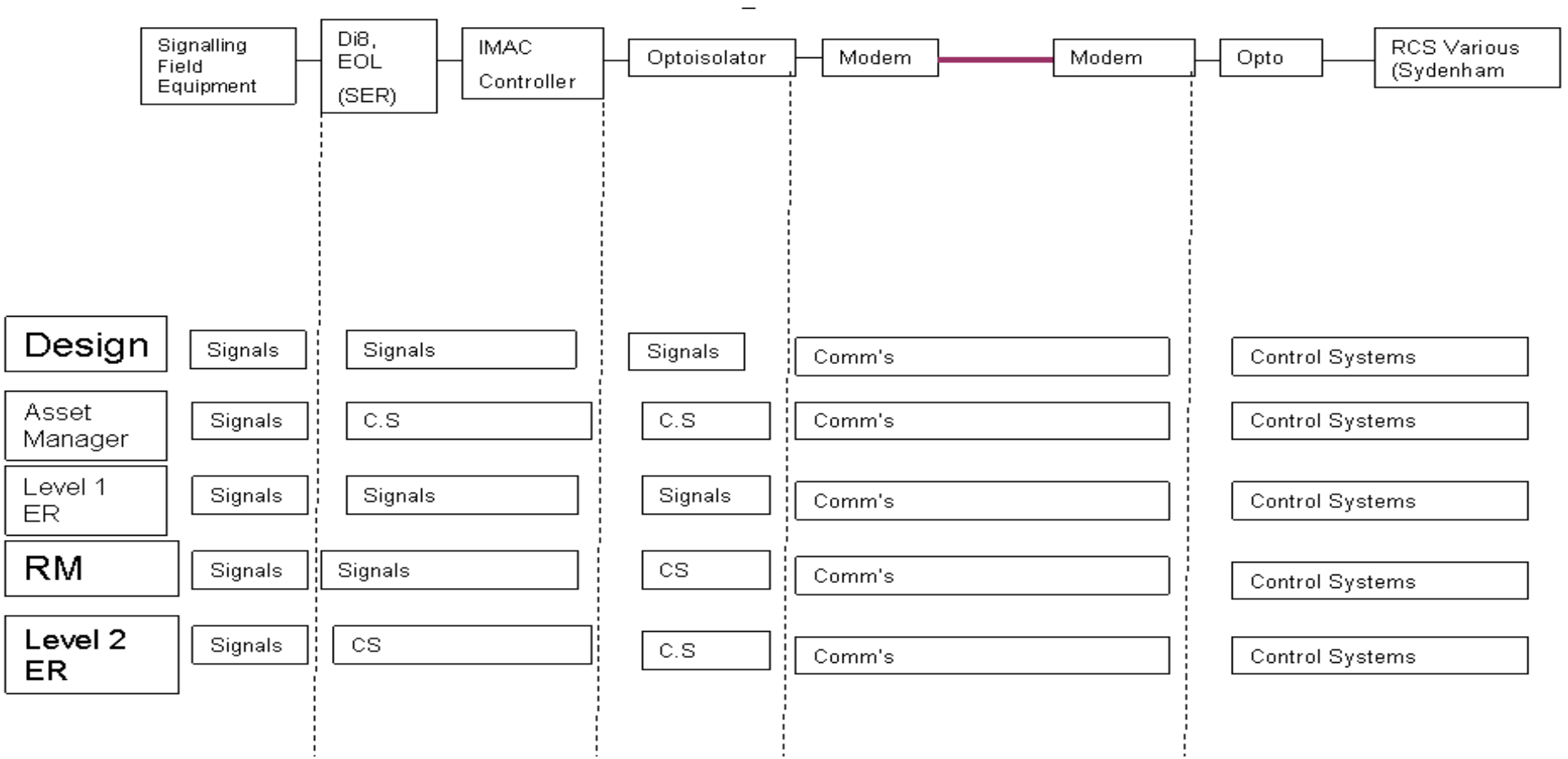

Figure 29: IMAC Glenfield – East Hills, Liverpool – Glenfield, Ingleburn - Minto

Reference material - for information only

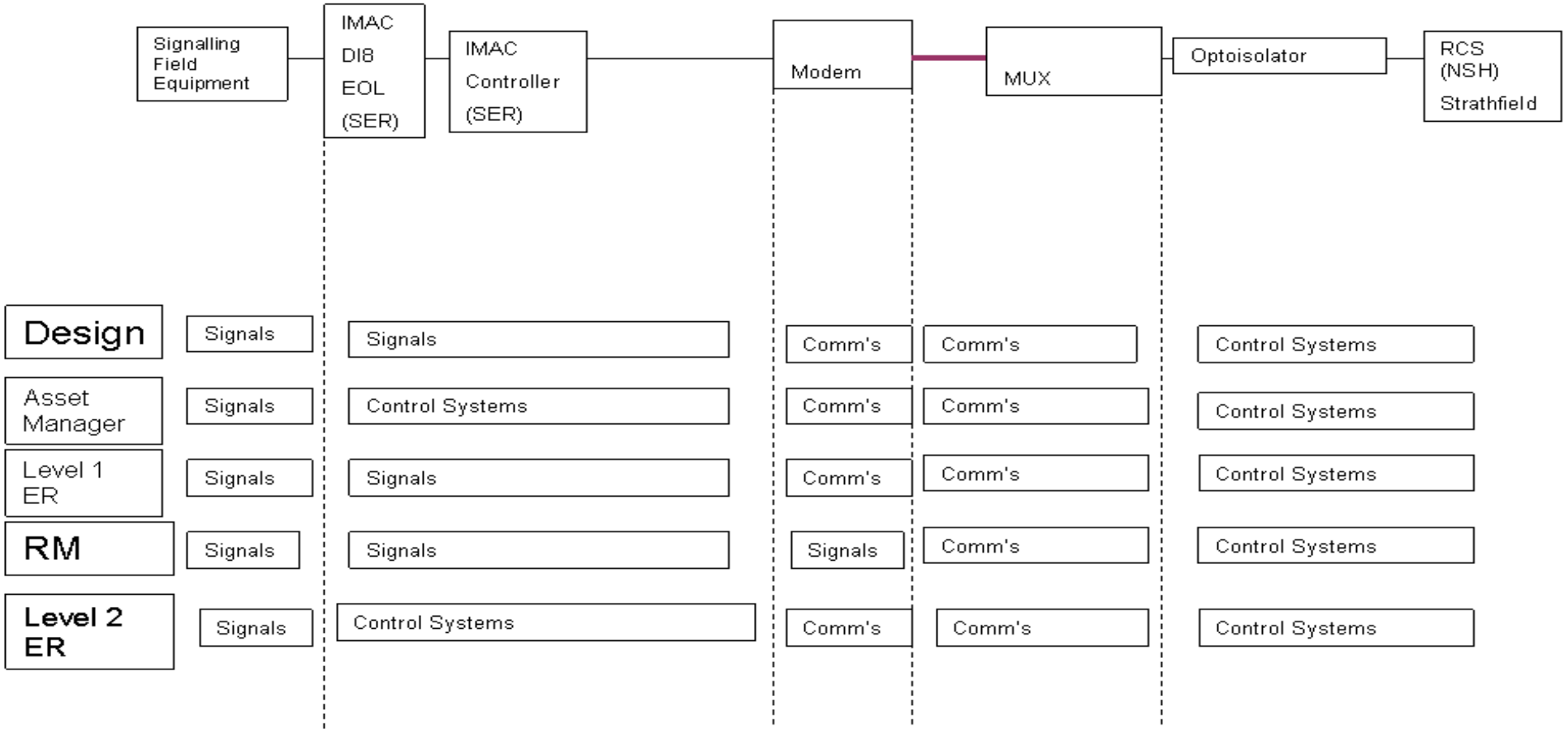

Figure 30: IMAC North Shore and Main North

Reference material - for information only

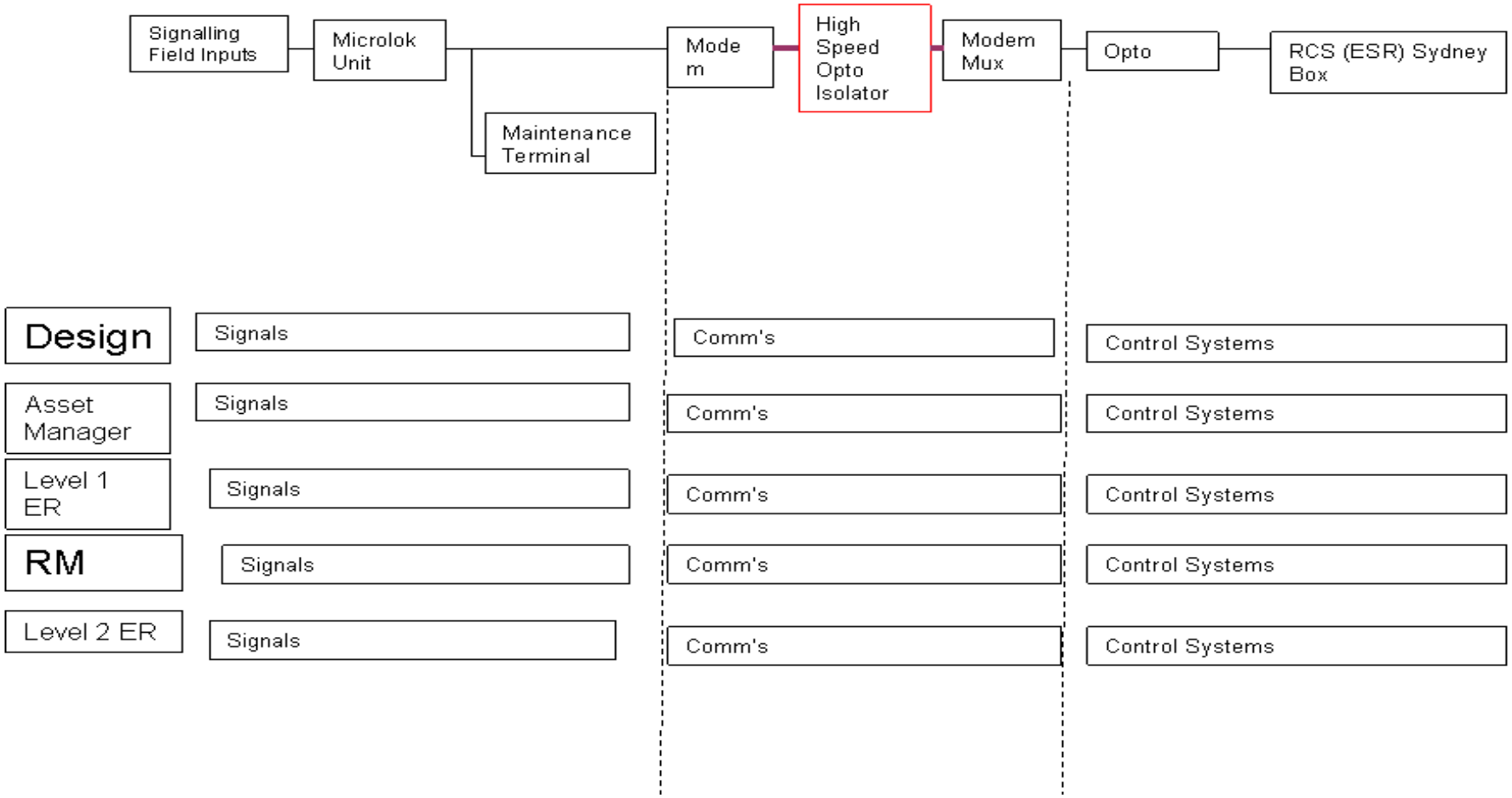

Figure 31: Microlok Bondi Edgecliff

Reference material - for information only

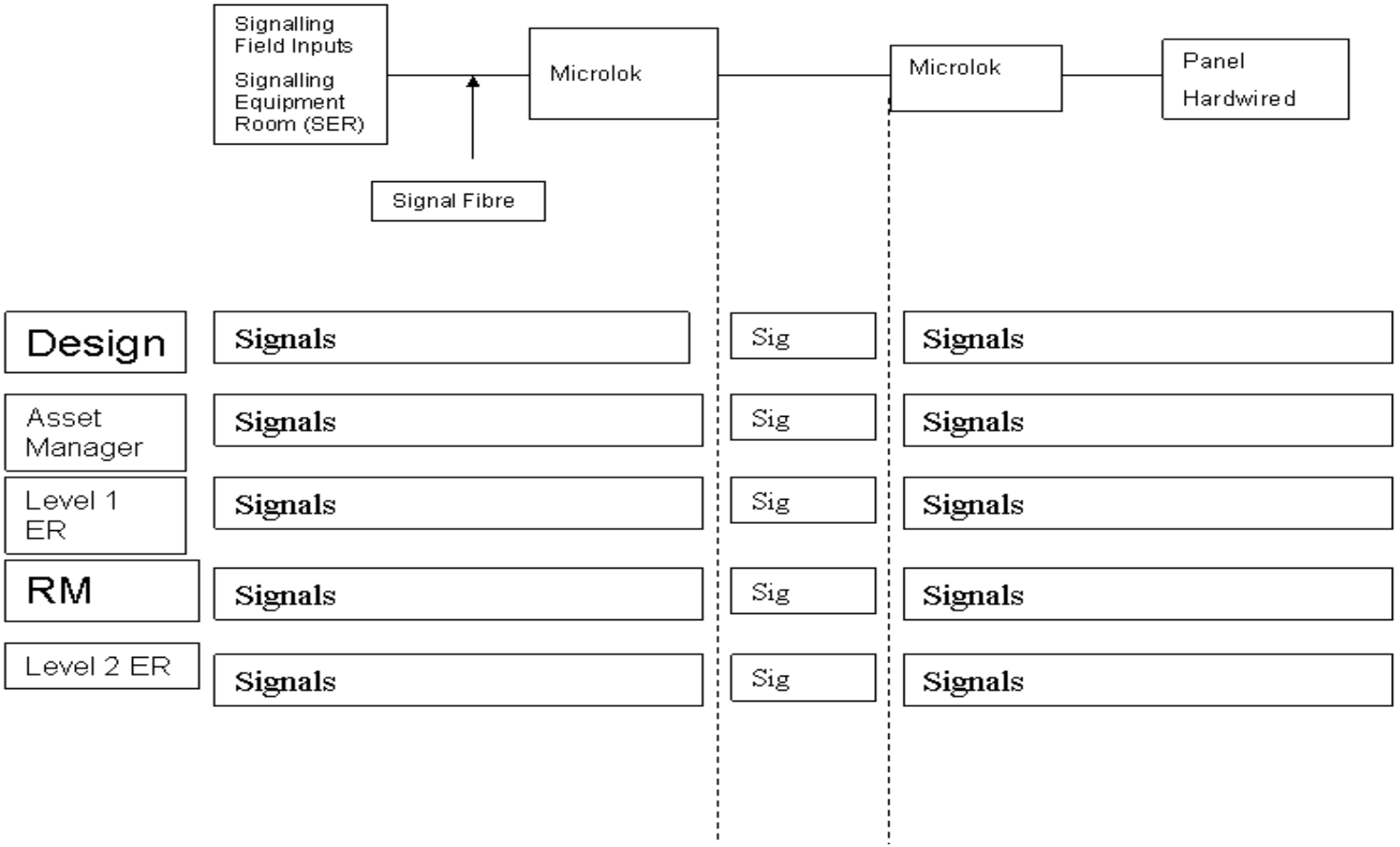

Figure 32: Microlok Fassifern

Reference material - for information only

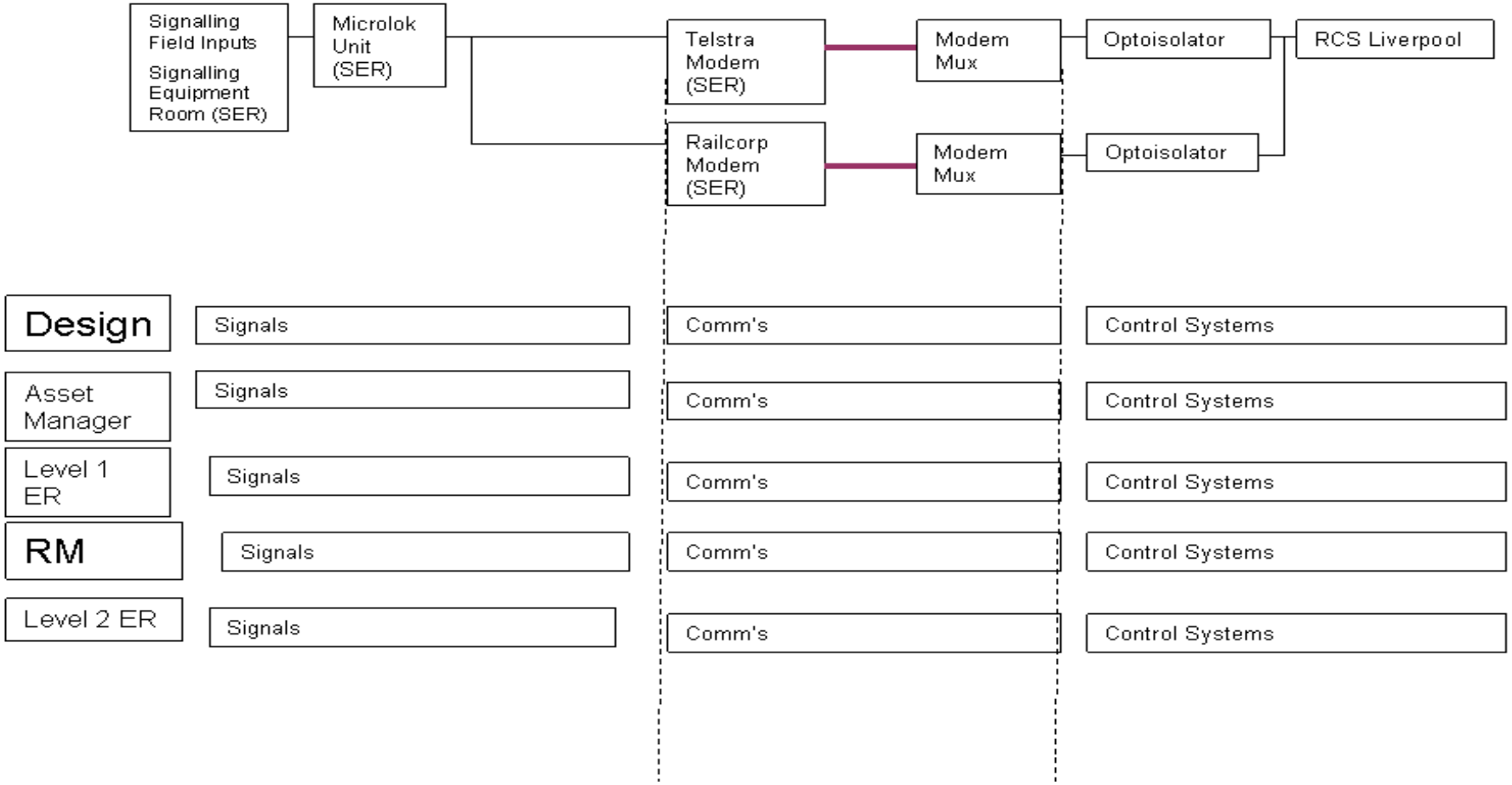

Figure 33: Microlok Minto Yennora and Fairfield

Reference material - for information only

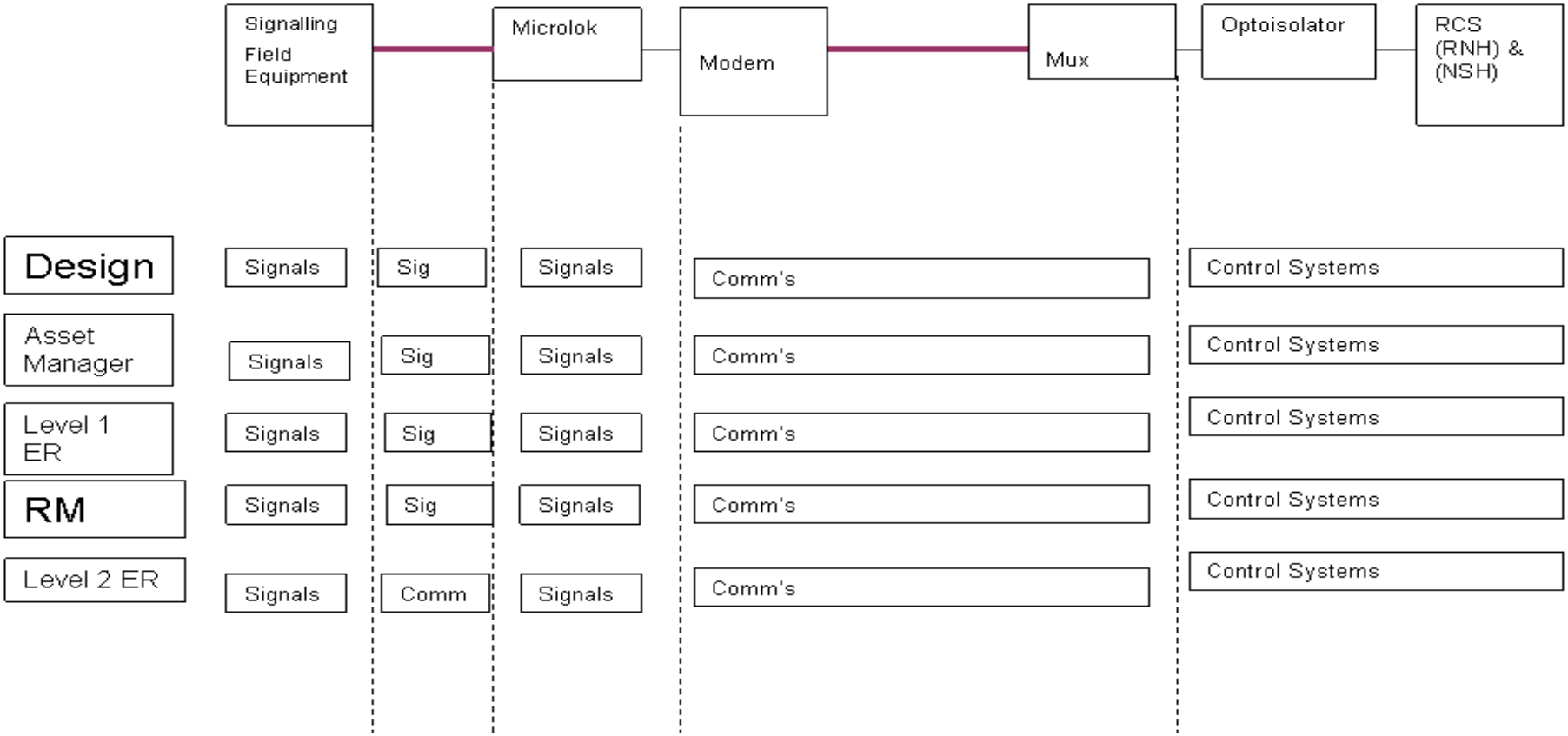

Figure 34: Microlok ECRL, Epping, Eastwood, Chatswood

Reference material - for information only

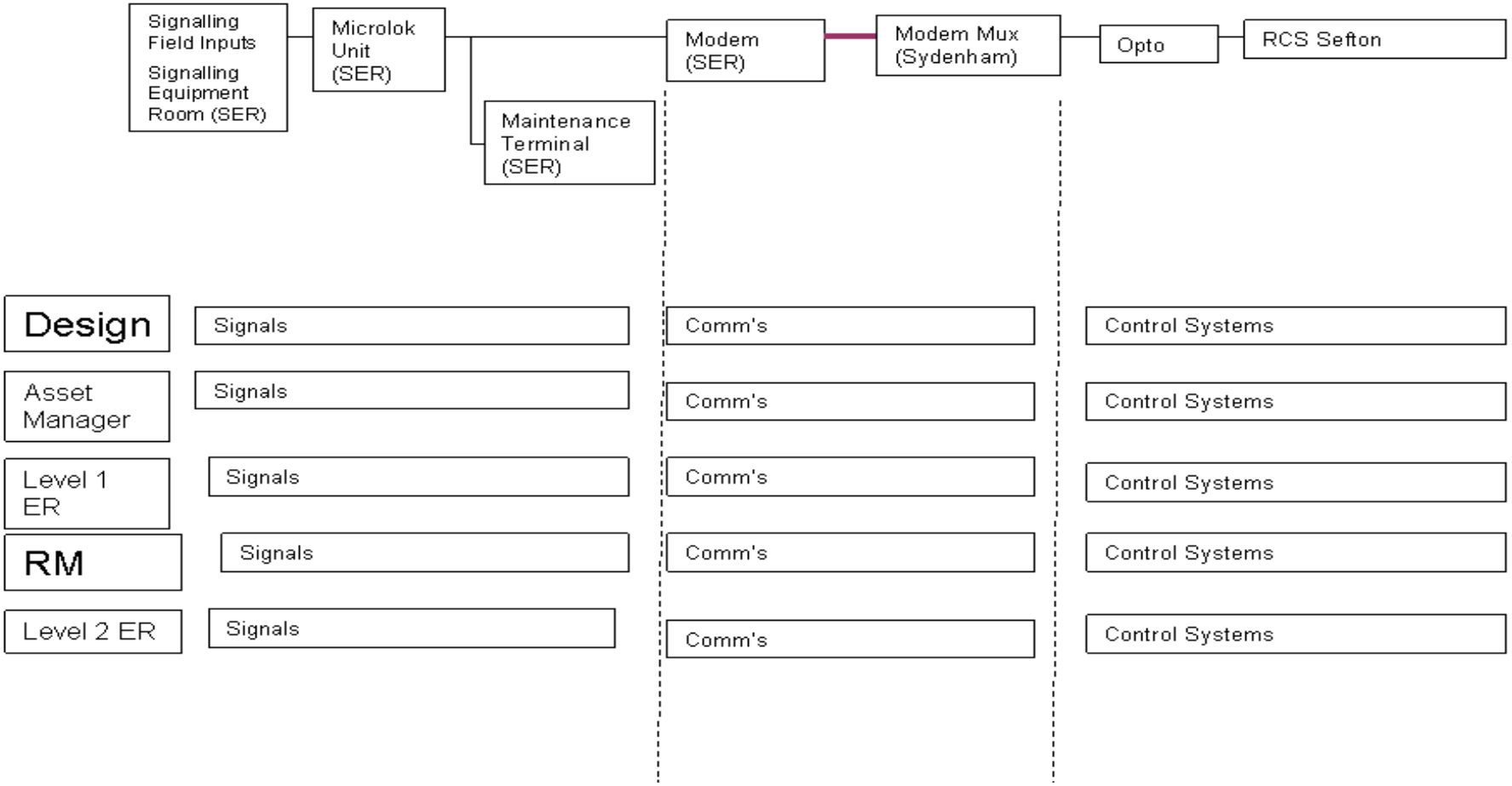

Figure 35: Microlok Sefton Hot Standby

Reference material - for information only

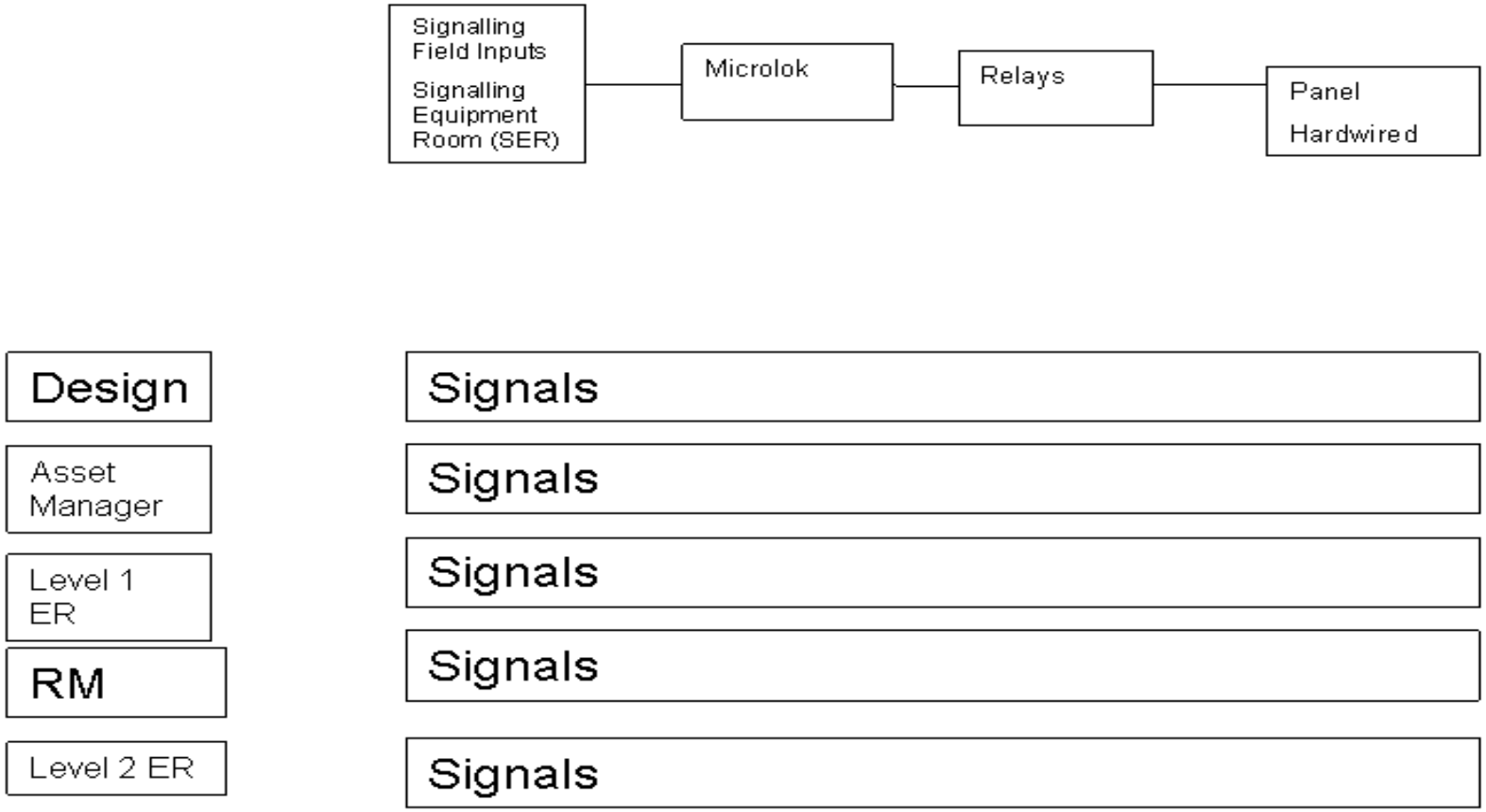

Figure 36: Microlok Gosford Frame F

Reference material - for information only

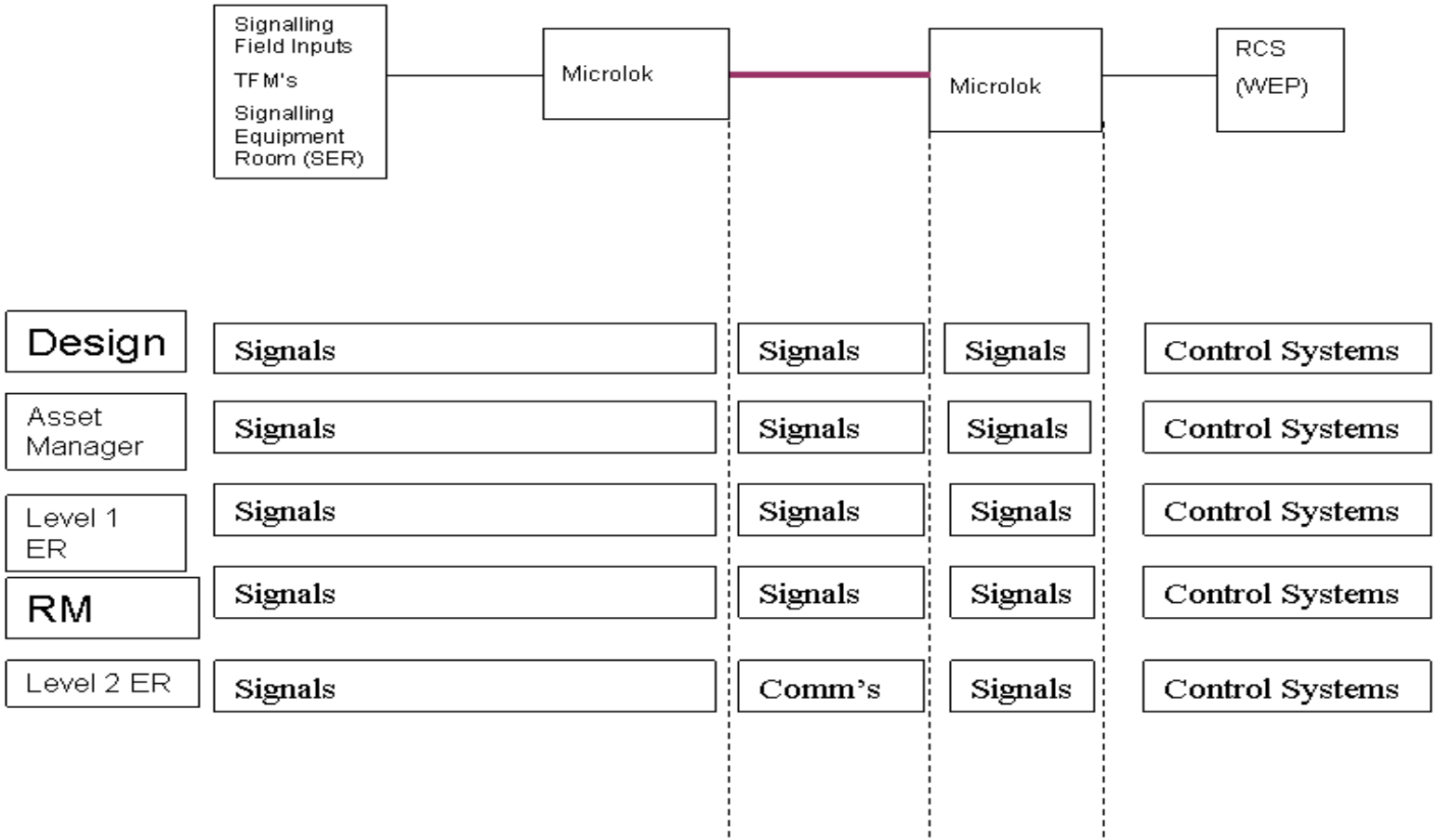

Figure 37: Microlok Cooks River

Reference material - for information only

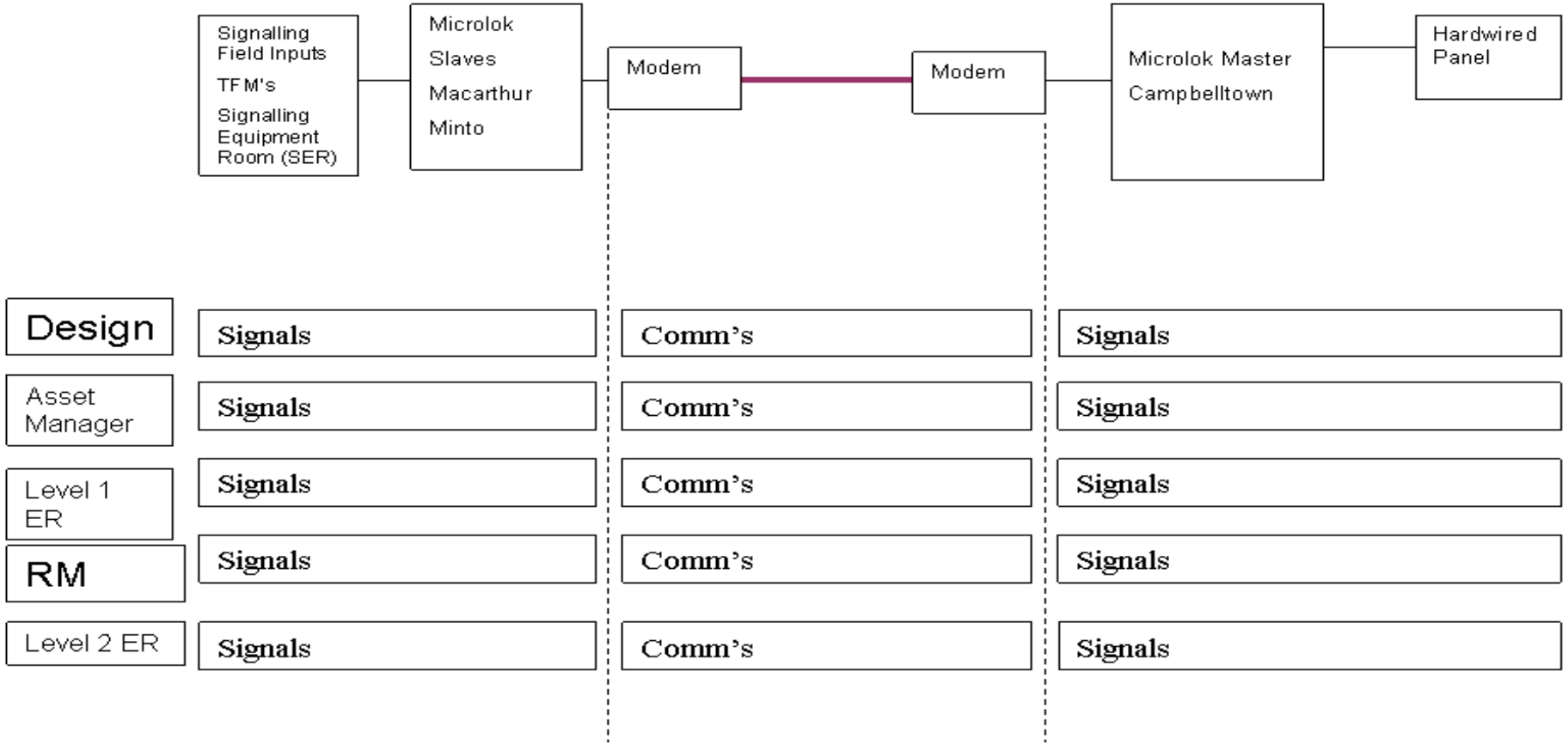

Figure 38: Microlok Macarthur

Reference material - for information only

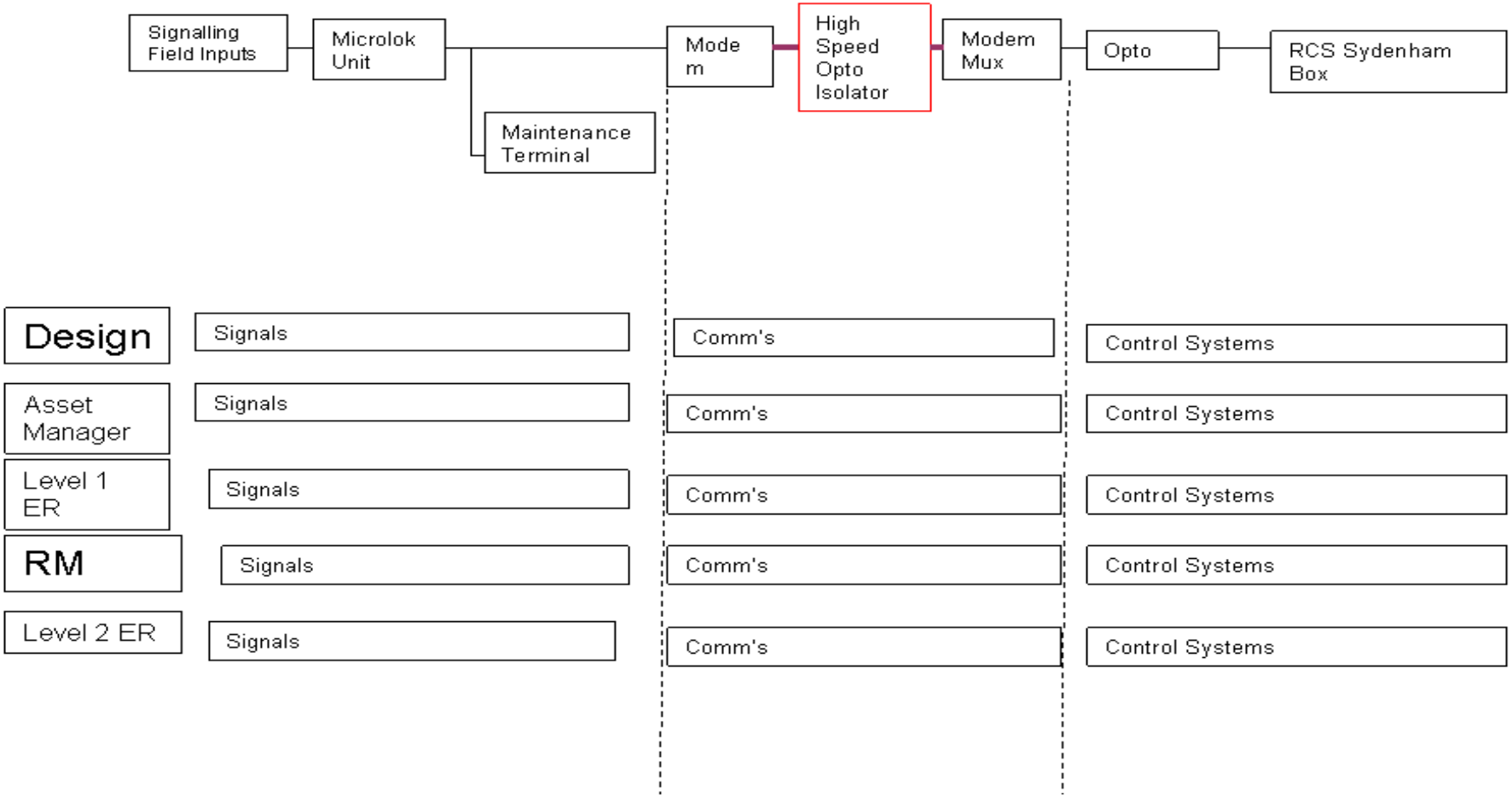

Figure 39: Microlok Revesby

Reference material - for information only

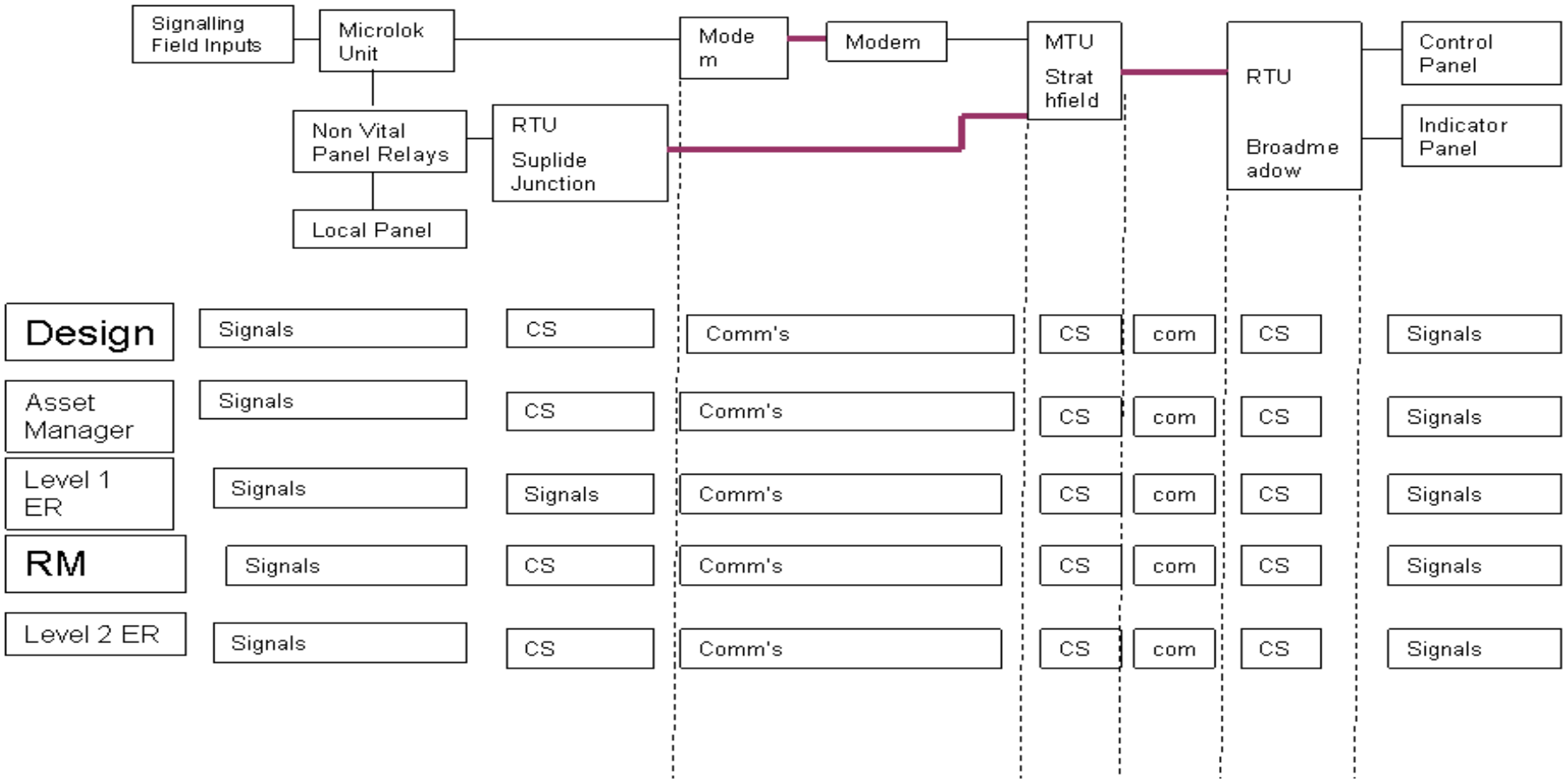

Figure 40: Microlok Sulphide Junction

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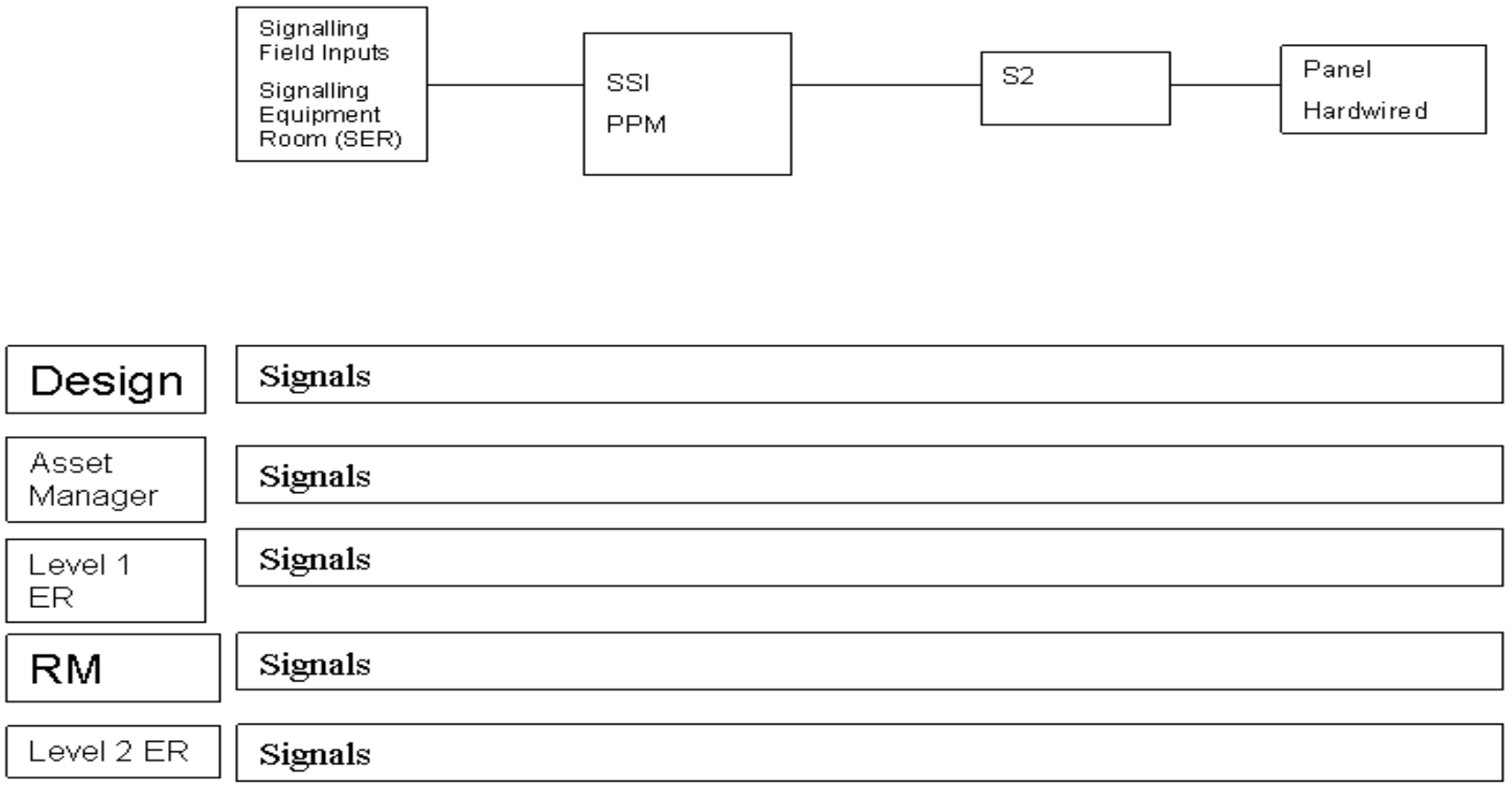

Figure 41: SSI Enfield

Reference material - for information only

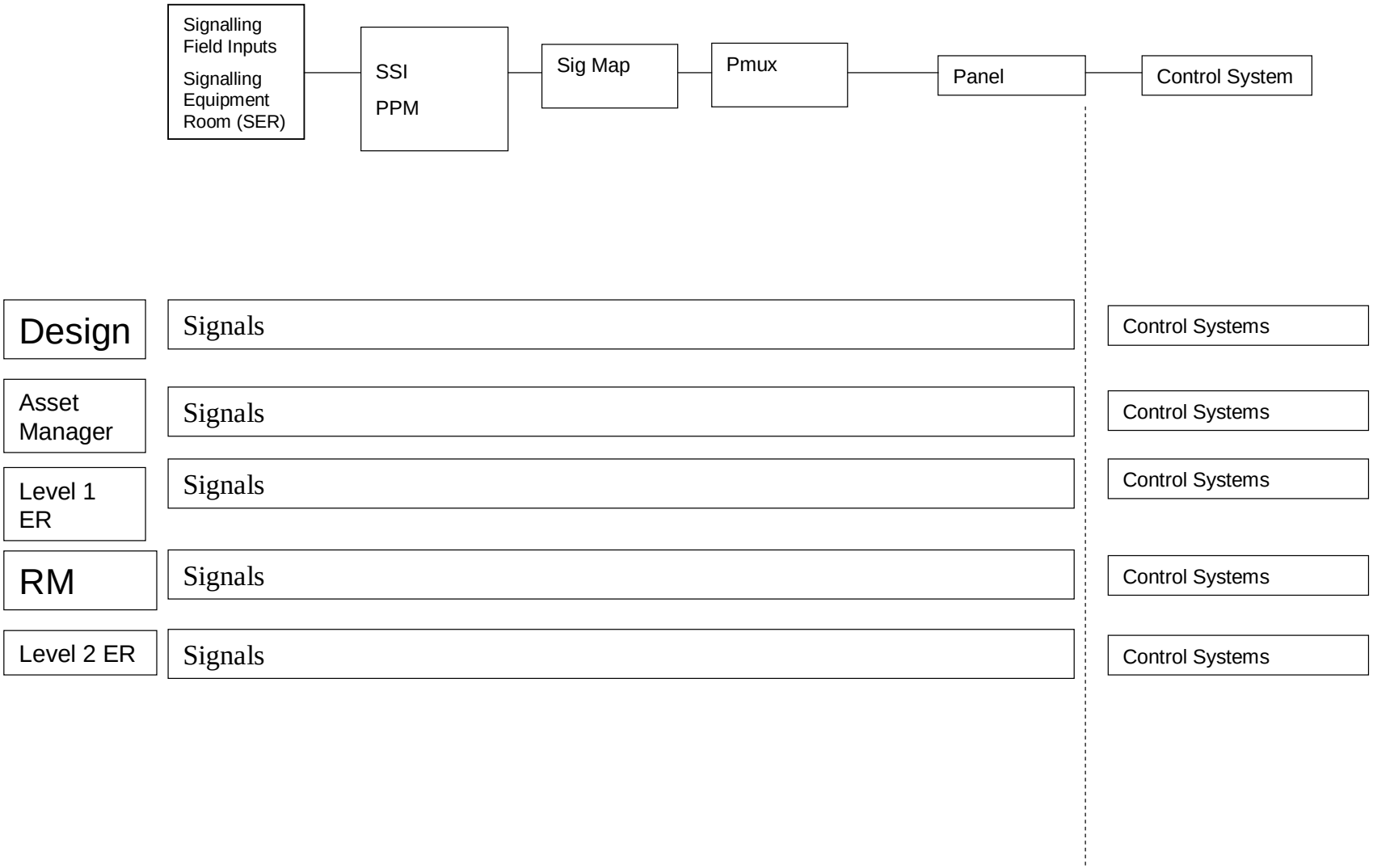

Figure 42: SSI Granville

Reference material - for information only

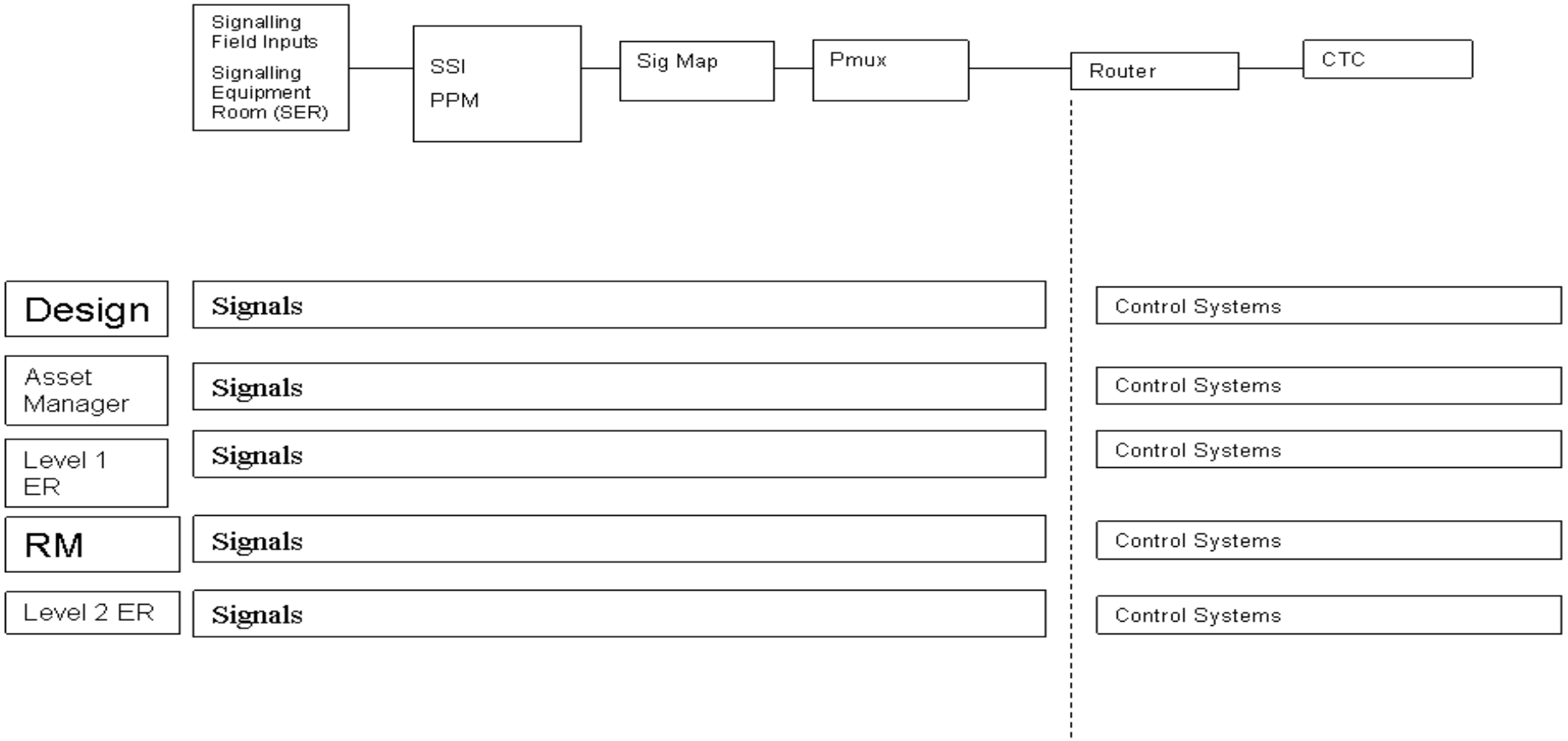

Figure 43: SSI Blacktown

Reference material - for information only

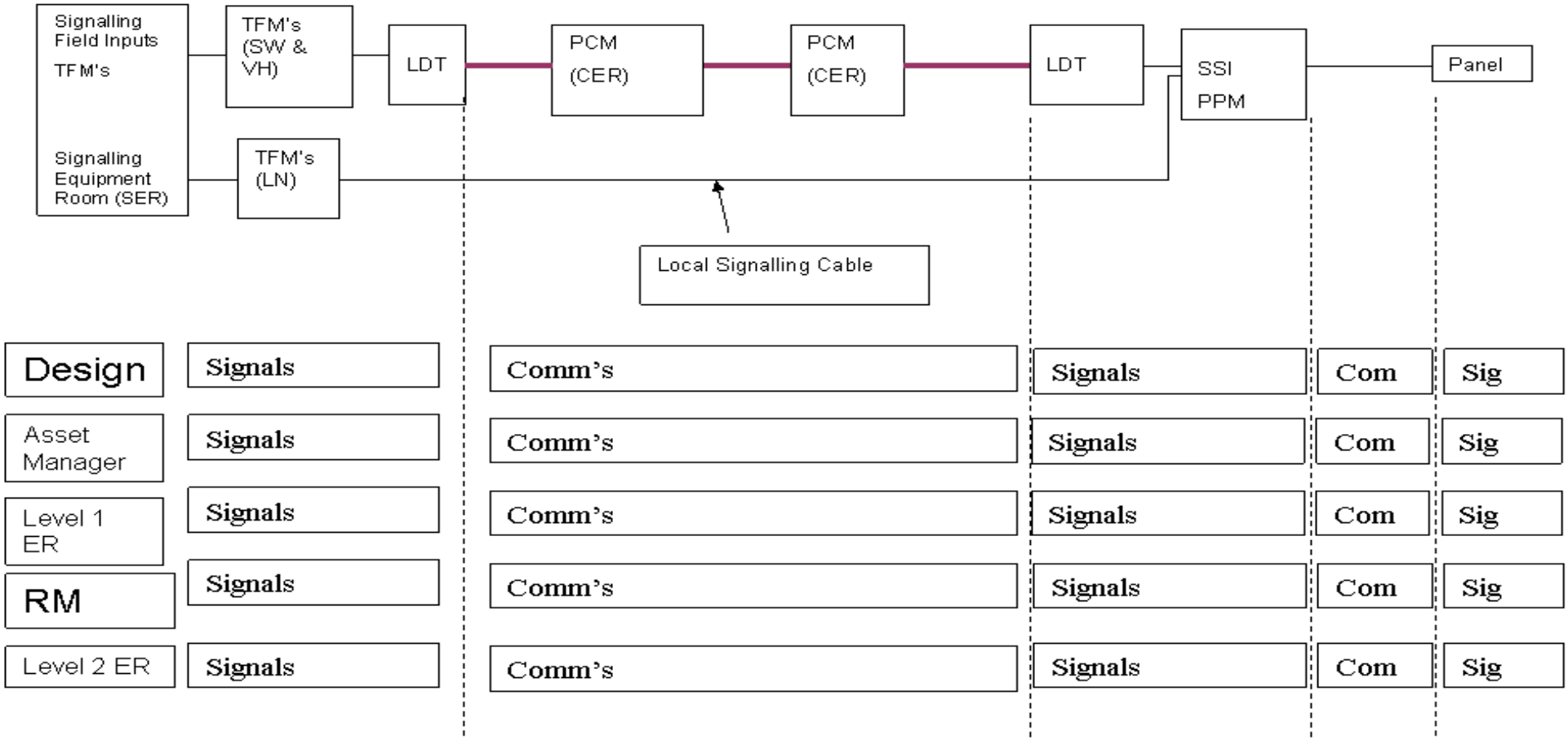

Figure 44: SSI Lawson, Springwood and Valley Heights

Reference material - for information only

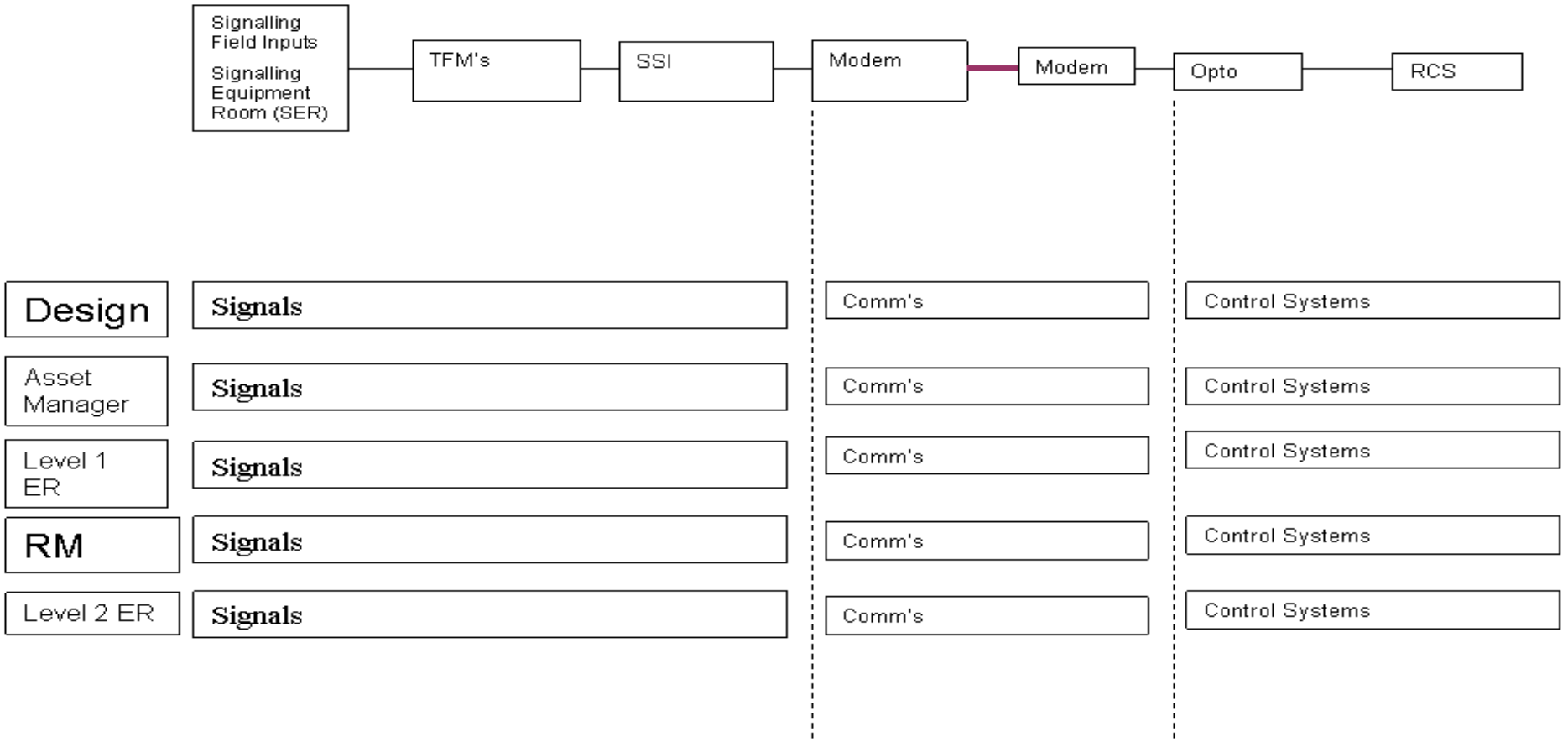

Figure 45: SSI Liverpool

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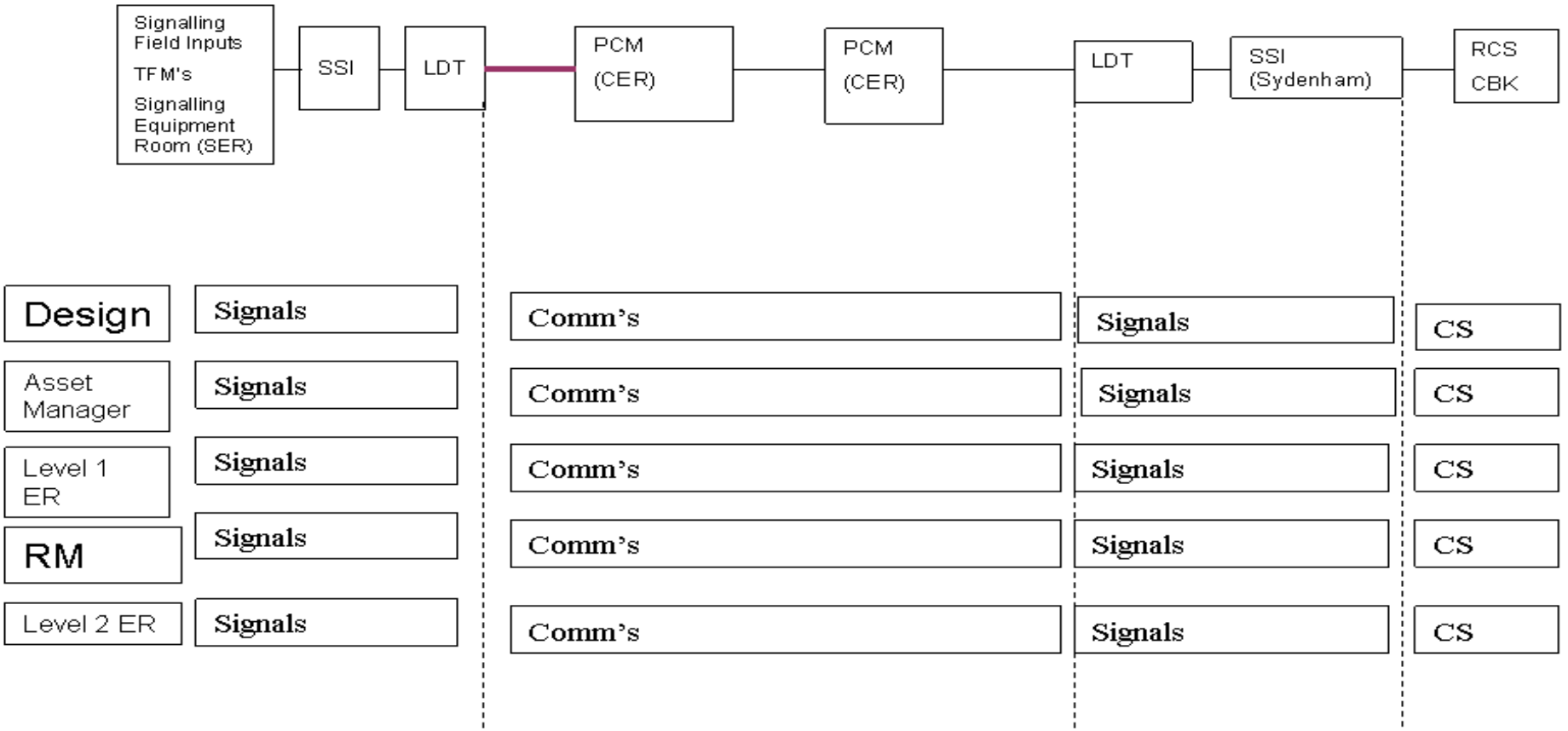

Figure 46: SSI Bankstown, Campsie

Reference material - for information only

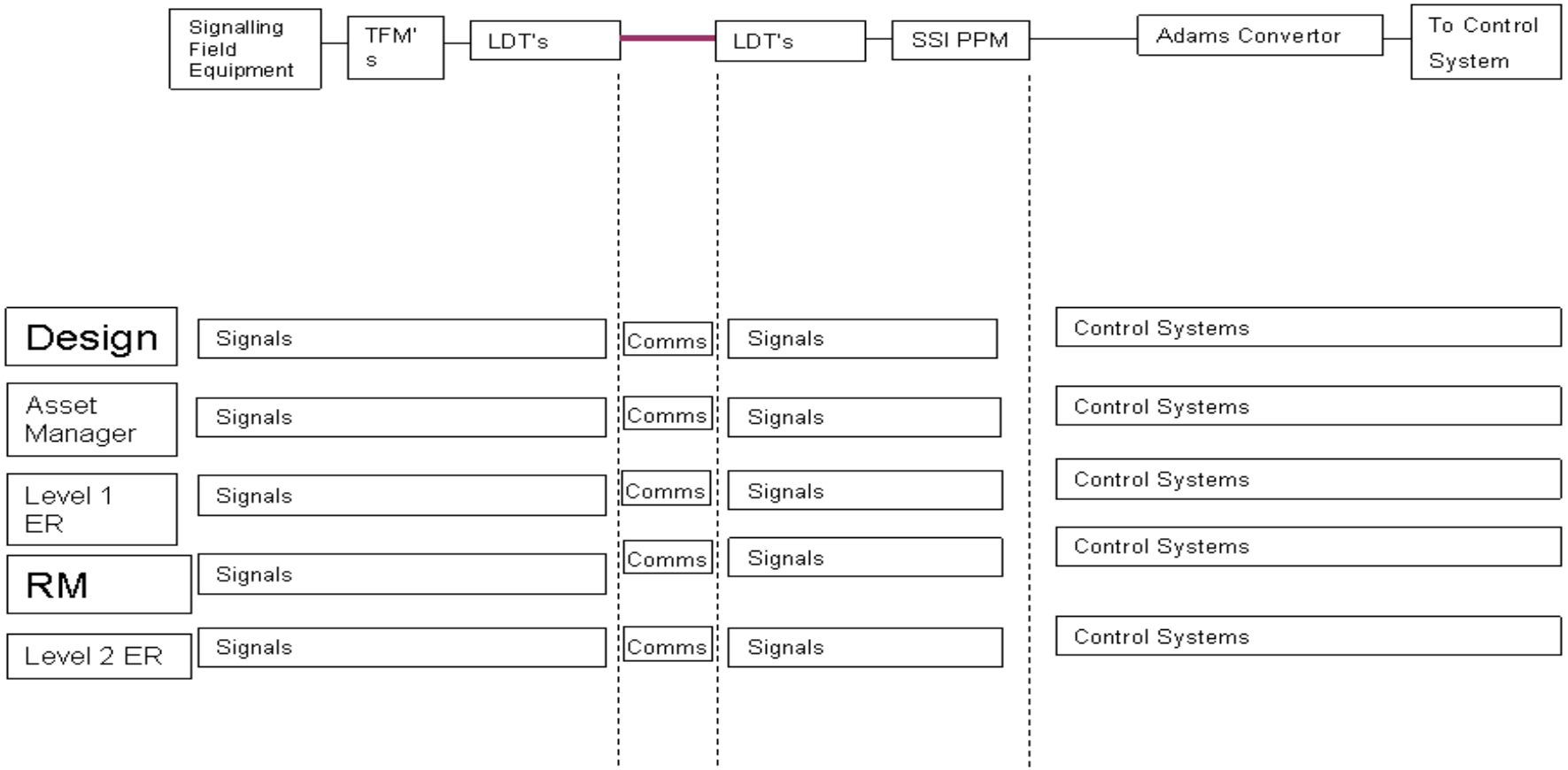

Figure 47: SSI Illawarra

Reference material - for information only

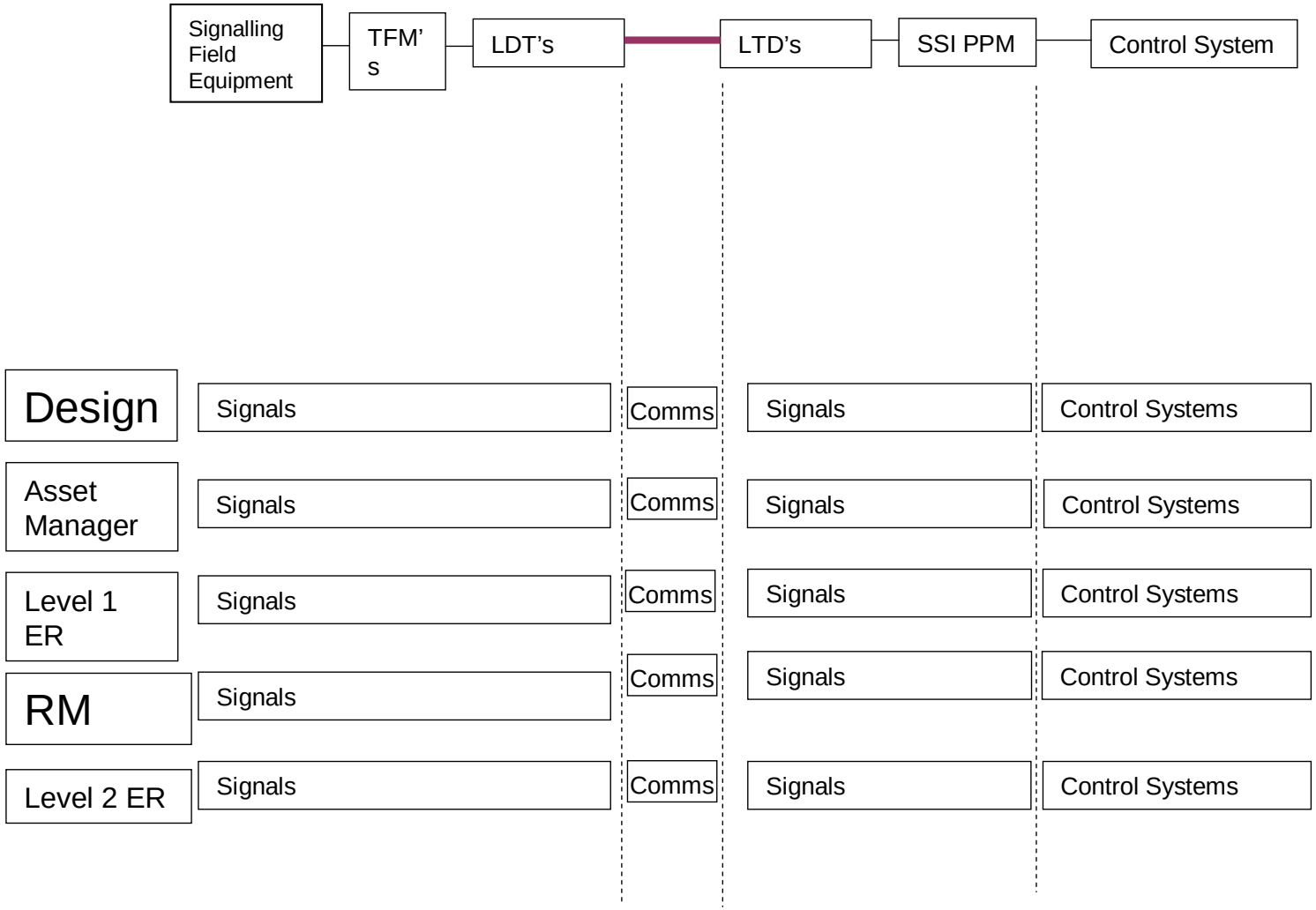

Figure 48: SSI Hawksbury River

Reference material - for information only

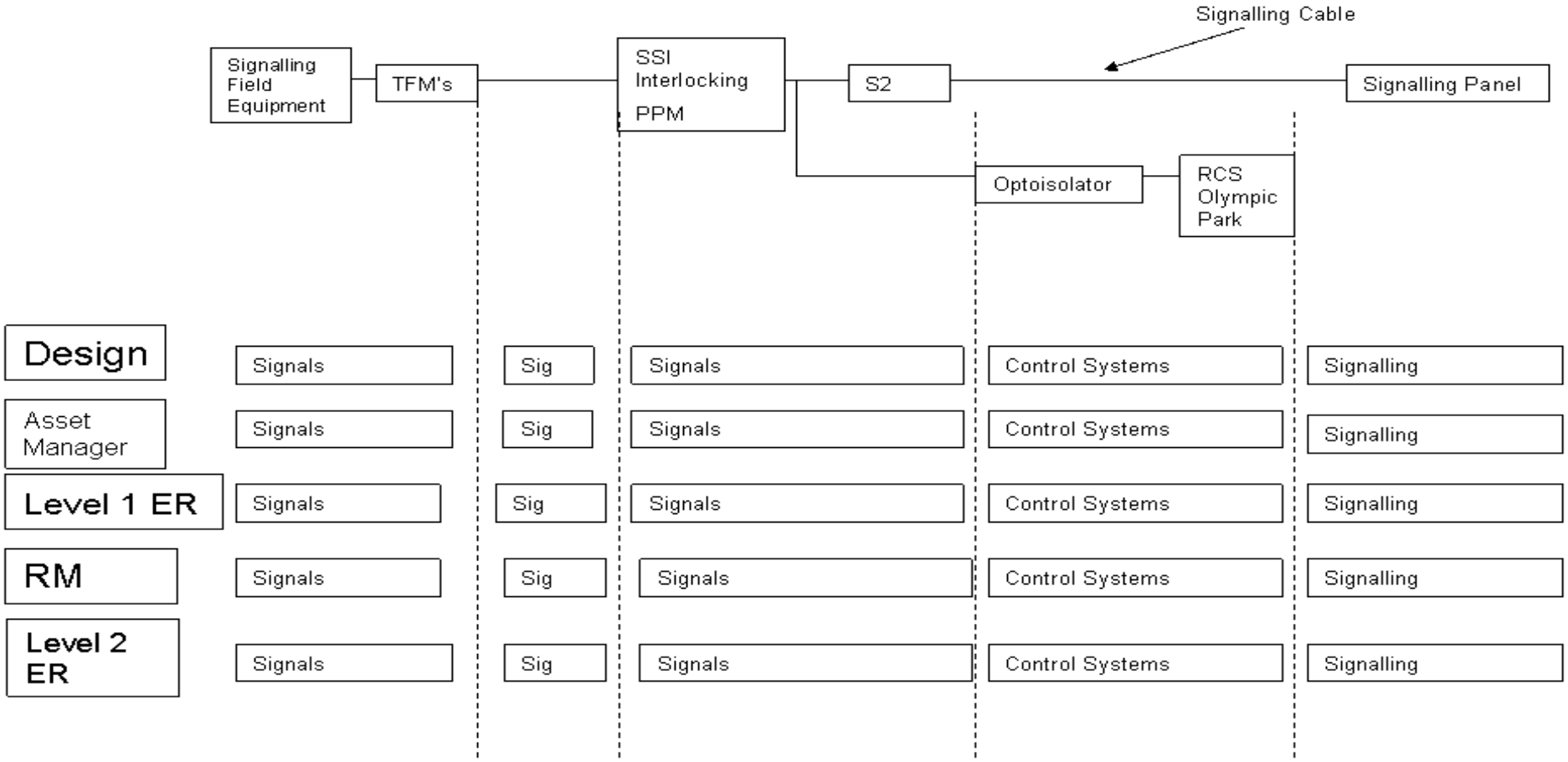

Figure 49: SSI Olympic Park

Reference material - for information only

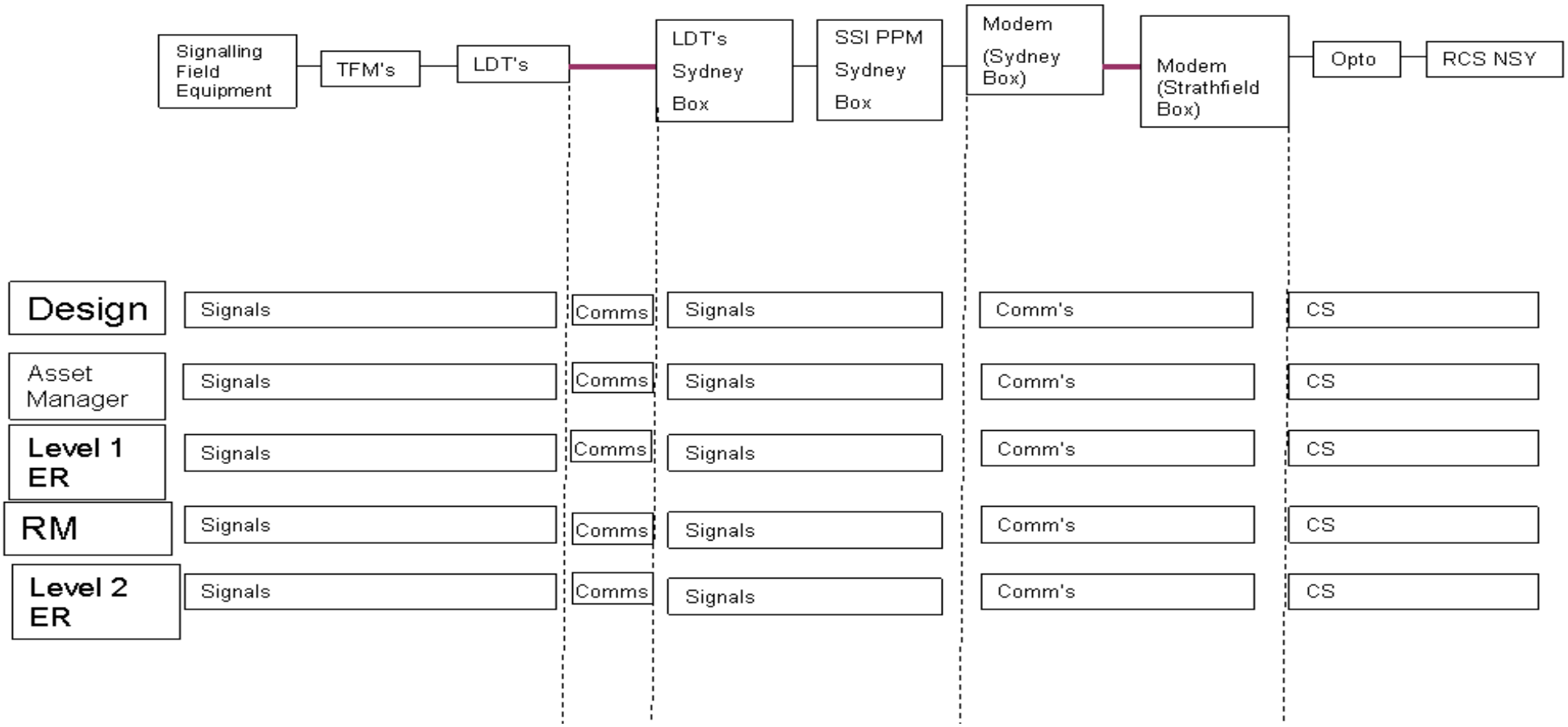

Figure 50: SSI North Sydney

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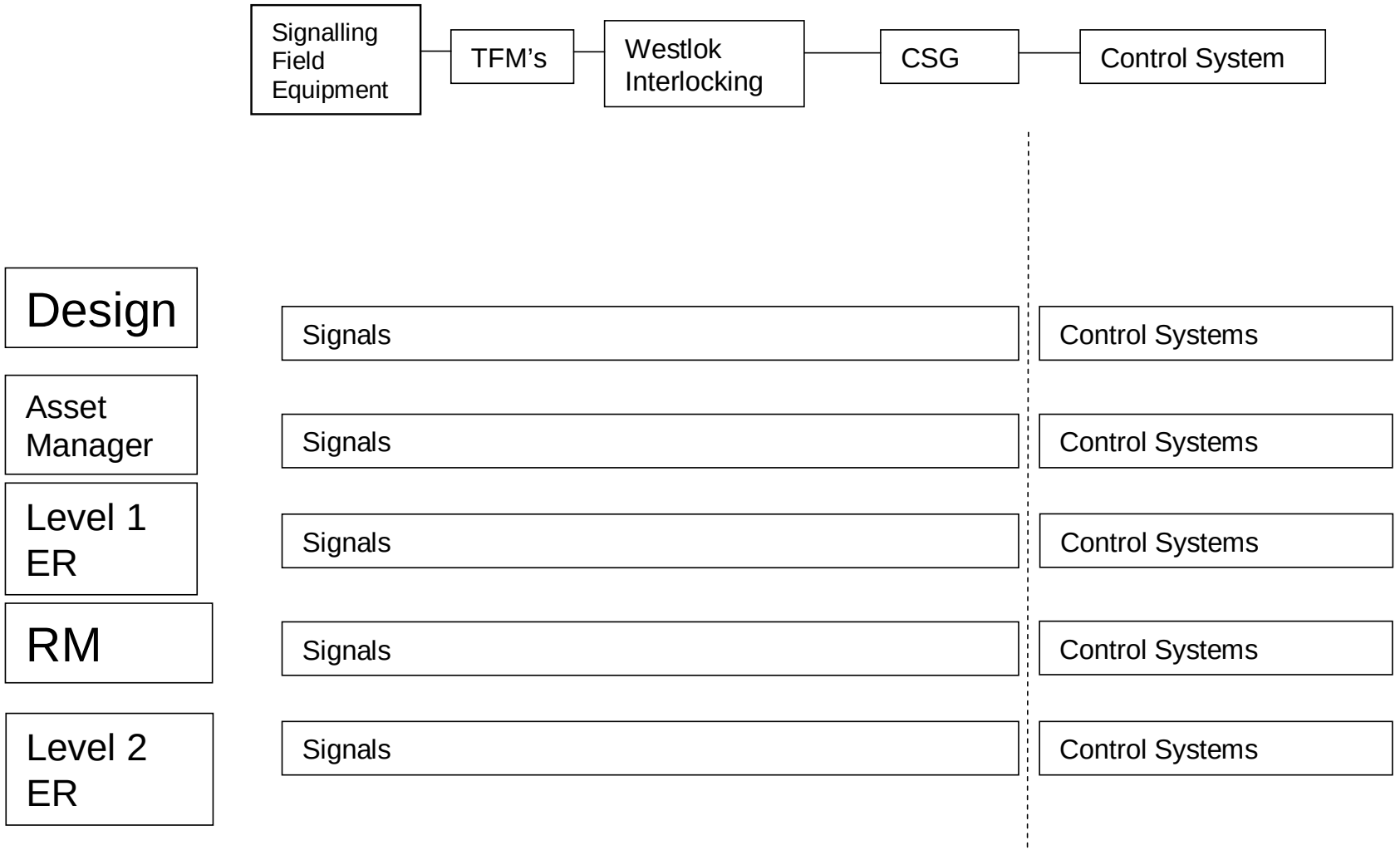

Figure 51: Westlock Hornsby

Reference material - for information only

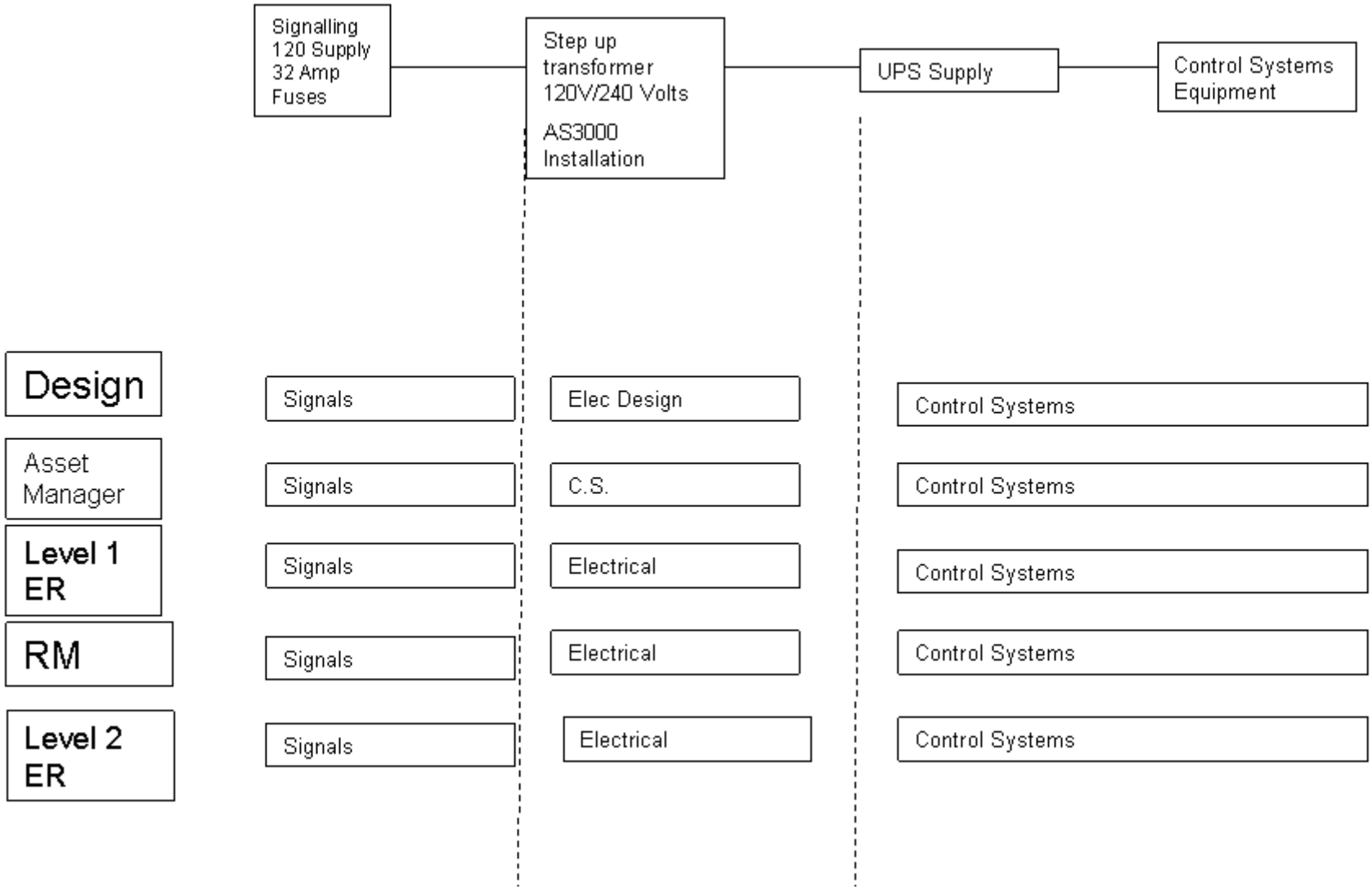

Figure 52: Control Systems Power Supply Granville

Reference material - for information only

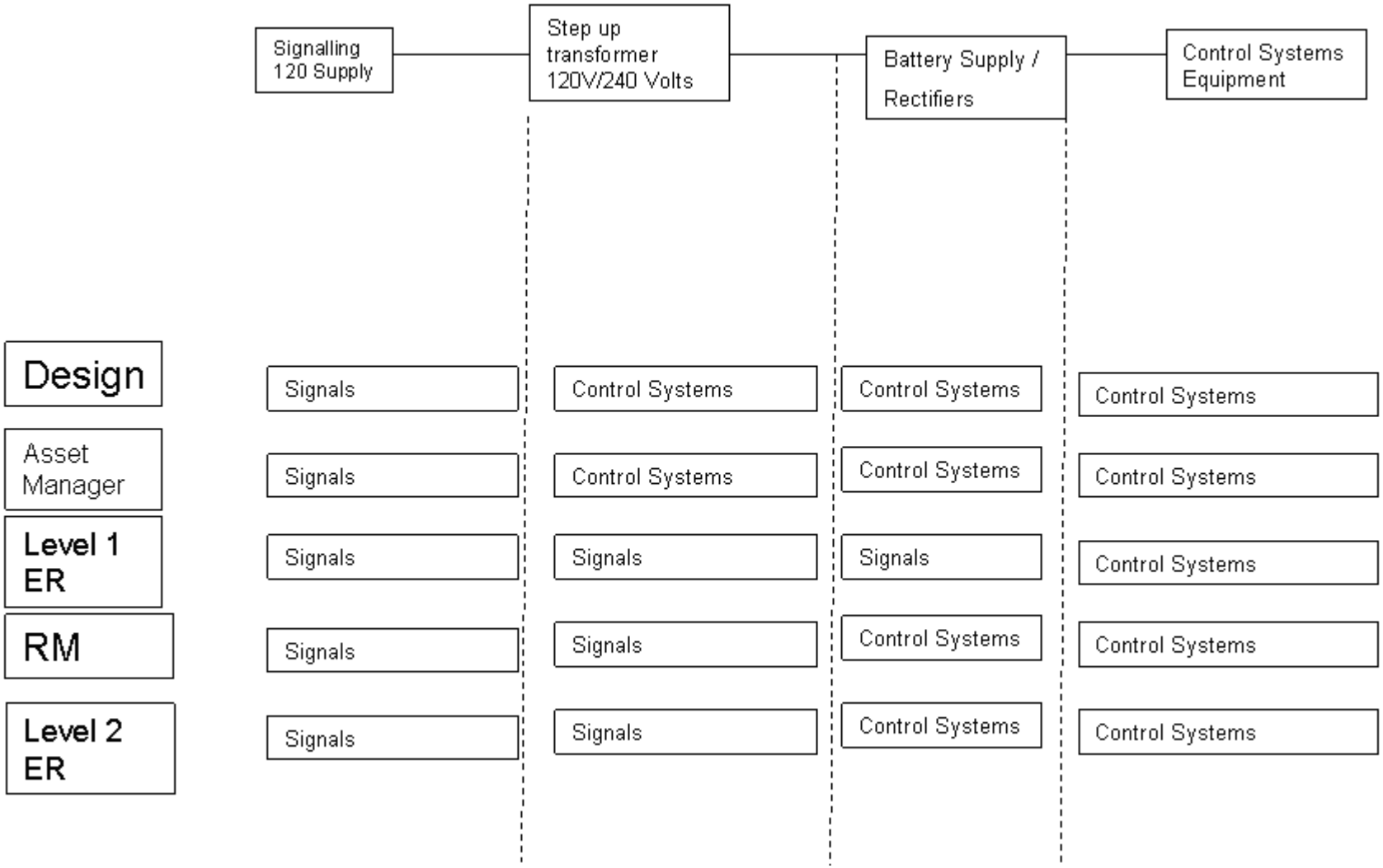

Figure 53: Control Systems Power Supply Ashfield, Lidcombe Telemetry Room

Reference material - for information only

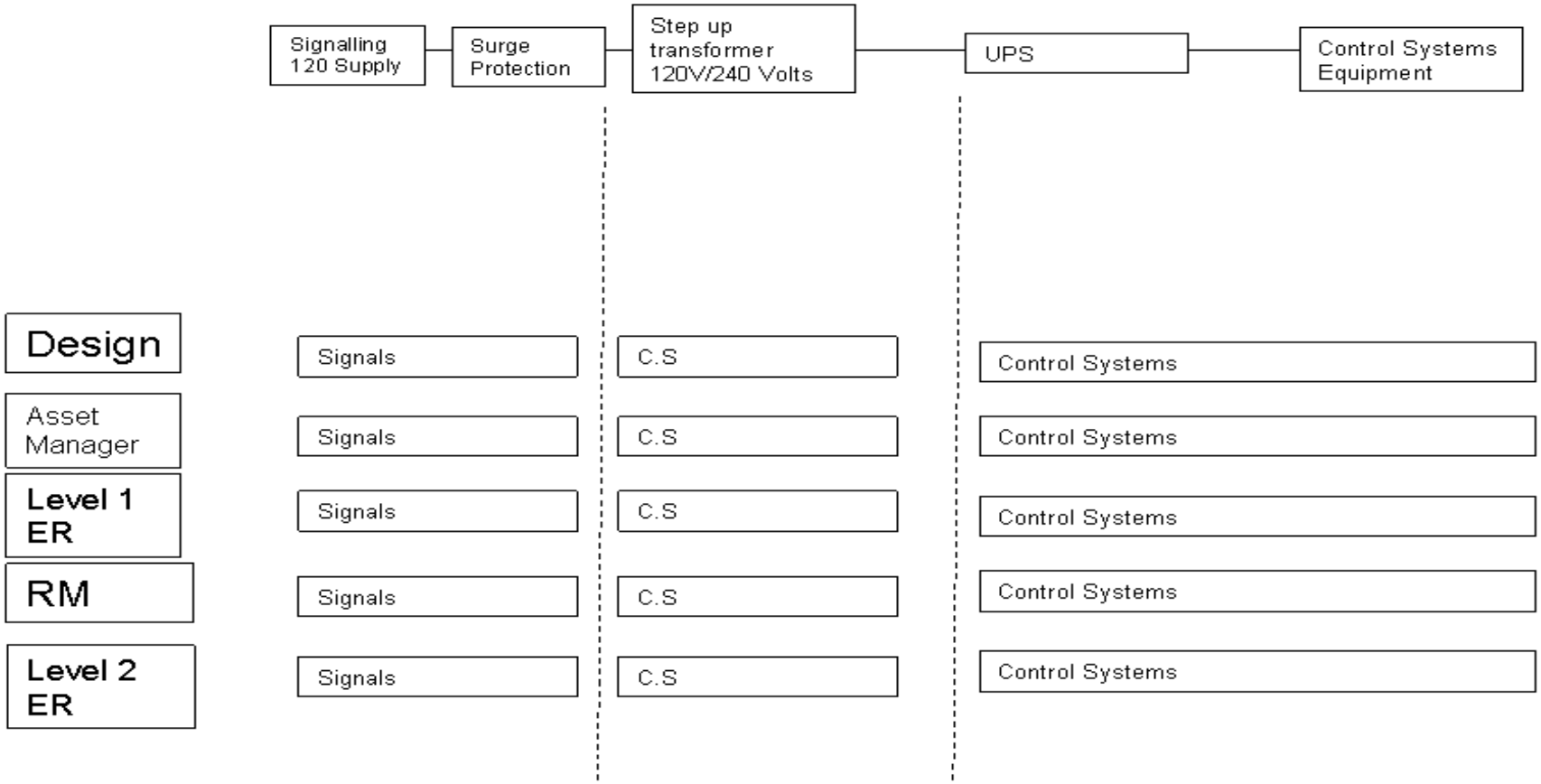

Figure 54: Telemetry Room Beverly Hills

Reference material - for information only

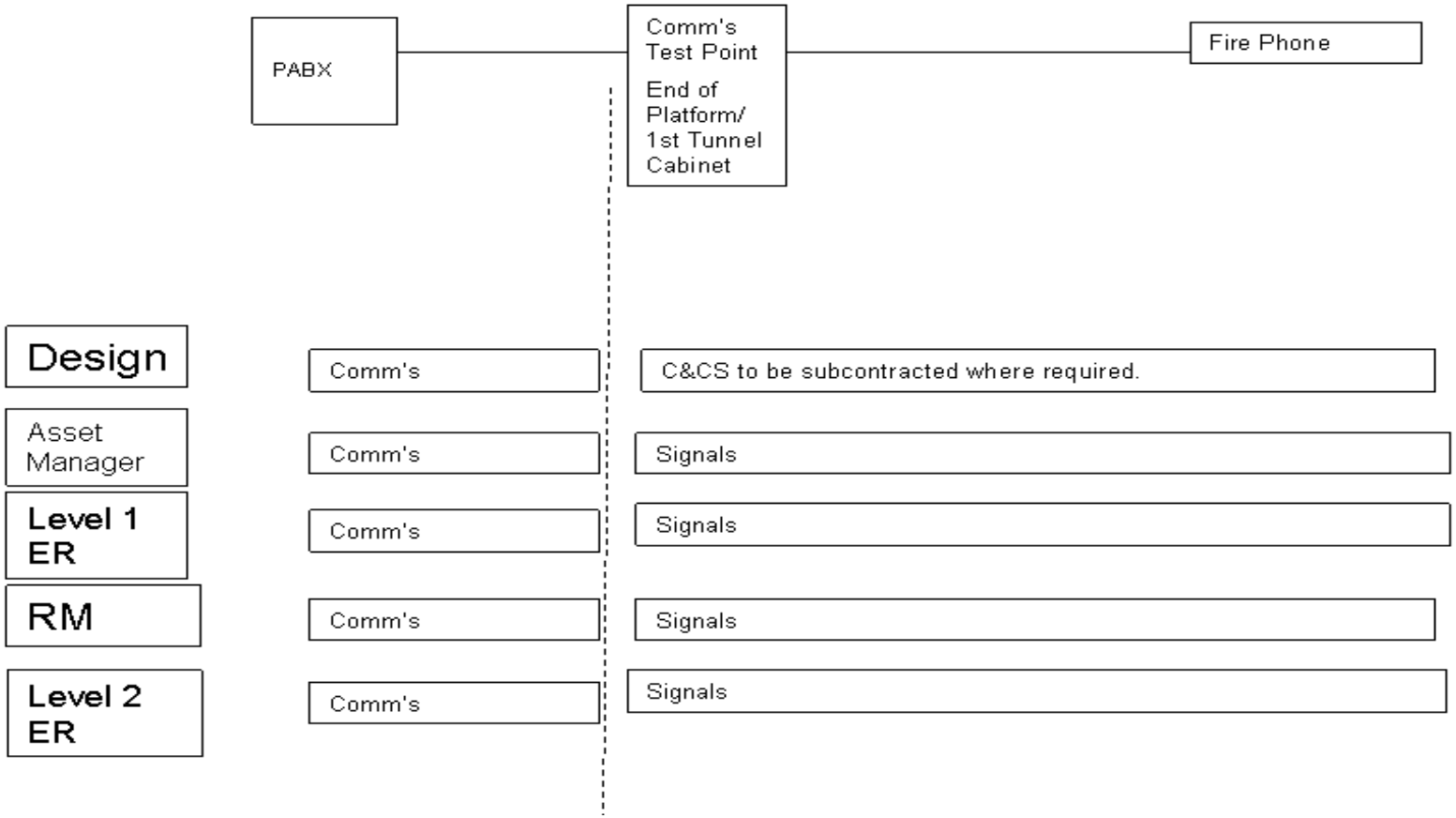

Figure 55: Emergency Fire Telephone System City Underground

Reference material - for information only

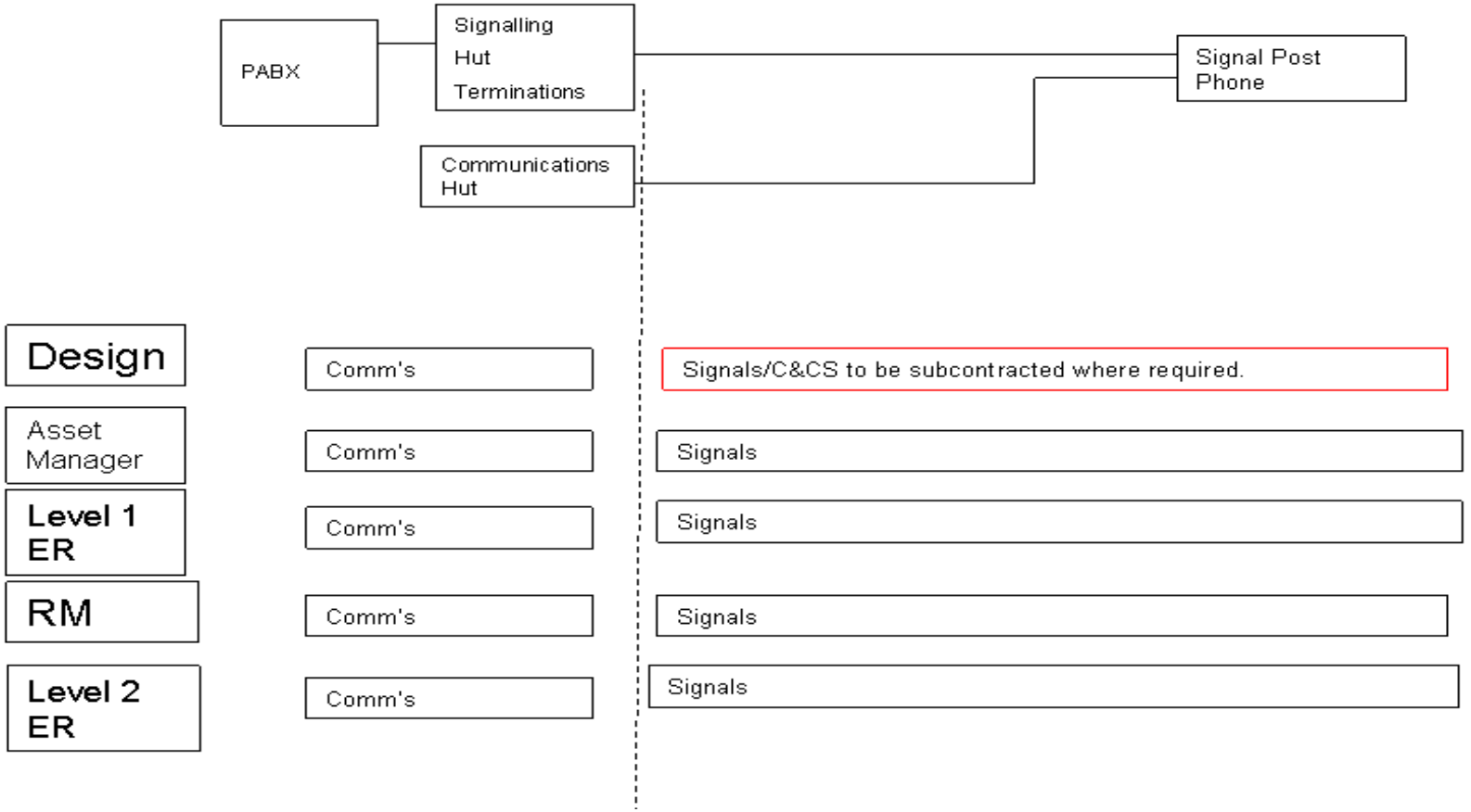

Figure 56: CB Phones Waterfall – Wollongong Broadmeadow Yard

Reference material - for information only

4 Appendix A - Agreement on Project Milestones

The minimum set of milestones to be included within the project schedule and agreed to by Telecommunications, Signalling and/or Control Systems are:

1. All items within the Functional Specification (Refer to *Projects* section)
2. Documents for approval from various authorities.
3. Delivery date of design, reviewed, verified and approved versions of (where applicable):
    i. Signalling plans,
    ii. Control tables,
    iii. Circuit designs,
    iv. Simulator,
    v. IO correspondence testing,
    vi. Other documents or items.
4. Commissioning:
5. Dates,
6. Stages,
7. Scopes,
8. Resources.
9. Regular project specific meetings.
    i. Frequency of these will be decided by agreement of both parties based on the complexity of the project to ensure a good design outcome.

If the project scope dictates, more documents, milestones or other items could be included with agreement of both parties.

If any items are not applicable for a specific project, it should be denoted as “Not Applicable” within the agreed schedule.

There should be an approved process for the escalation and resolution of project issues which may compromise either side’s delivery commitments.

Configuration control and approval of any proposal is covered under the Configuration Management Process. This management process may need review to control the overall direction of the policy and project initiation and is not part of this document.

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