

Specialist substation design and consultancy.

Practical electrical engineering from concept to detailed design, across substations from 11kV to 400kV. Design at JB Substation Design is led by Jack Ball; when you speak to the practice you are speaking to the engineer who will do the work.

CAPABILITY

01 Primary design

The physical substation: how the plant is arranged, connected, earthed, labelled and specified.

- Substation layouts and elevations
- Earthing layouts, above and below ground
- Interlocking diagrams
- Busbar and connector layouts, schedules and force calculations
- HV plant equipment specifications
- Materials lists and bills of quantity

03 Cable design

Getting the circuit from A to B: routed, rated and installable without damaging the cable.

- Cable route layouts and sections
- Thermal rating calculations
- Thrust force and pulling calculations
- Winch location design
- Joint bay layouts and earthing
- Materials lists and bills of quantity

02 Protection & control

The secondary system: how the substation is protected, controlled, supplied and wired.

- Single line and protection block diagrams
- LVAC single line diagrams and loading calculations
- 110V DC single line diagrams and loading calculations
- Multicore, communications and control circuit diagrams
- Cable block diagrams, schedules and core sheets
- Materials lists and bills of quantity

04 Design management

A substation design goes wrong in the gaps between disciplines more often than inside any one of them. This is how those gaps get closed.

- Coordination across primary, protection and cable
- Scope management and change control
- Technical interface management and design reviews
- Designer duties under CDM 2015
- Designer's Risk Assessments
- Coordination with civil and structural partners

PROJECT LIFECYCLE

- | | |
|----|--|
| 01 | Concept — the electrical arrangement, the connection, and the layout and plant that follow. Enough to size the site and price it. |
| 02 | Feasibility — tested against real constraints: obstructions, clearances, access and buildability. |
| 03 | Detailed design — the full coordinated package, produced so the disciplines agree with each other. |

Work can start at any point in the sequence, or run the whole way through it. Single disciplines can be taken on their own.

VOLTAGE RANGE

- **11kV** Distribution substations, switchrooms, customer connections
- **33kV** Primary substations, switching stations, generation connections
- **66kV** Bulk supply points, collector substations
- **132kV** Grid supply points, transformer compounds, air and gas insulated bays
- **275–400kV** Transmission substations and connection infrastructure

Designed to the standards the asset will be adopted under.

Whoever adopts the asset governs the arrangement, the equipment and the documentation format. That gets established at the start rather than retrofitted at submission. Substation design produced to the standards of, among others:

- National Grid
- Scottish and Southern Electricity Networks
- Northern Powergrid
- Electricity North West
- Energy Networks Association

What sits outside this.

A specialist substation design consultancy, not a one-stop-shop. Being clear about the edges is more useful than claiming to cover everything.

- Civil and structural design — through trusted partners where required
- Earthing studies — soil resistivity, earth potential rise, step and touch — through trusted partners, coordinated into the earthing layouts
- Protection settings and grading studies — worked to rather than produced
- Construction, installation and commissioning works
- Supply or procurement of plant and materials
- Acting as the ICP or holding the connection agreement
- General building services and M&E design

Jack Ball, BEng (Hons)

Fifteen years in substation delivery and design. Started as an advanced apprentice at ABB in 2011 — the first intake onto the scheme — and stayed eight years, moving from primary systems layout design into technology engineering across air insulated, gas insulated and hybrid substations from 33kV to 400kV, working with National Grid, Scottish and Southern Electricity Networks, Northern Powergrid, Electricity North West and the Energy Networks Association on product approvals and technical standards.

Since then: cross-discipline design team lead from 11kV to 400kV at Hitachi ABB; primary design, earthing design and busbar calculations from LV to 400kV at Smith Brothers Contracting; battery storage delivery from acquisition to commissioning at Gore Street Capital; and design lead across DNO, ICP, generation and developer substation schemes at Primary Power Consulting, where he also built the design management processes behind a NERS accreditation.

BEng (Hons) Electrical Engineering, Staffordshire University. Member of the IET, working towards chartered engineer status. Has acted as principal designer representative on substation projects. IOSH Managing Safely. AutoCAD 2D and 3D.

Detailed design is normally a lump sum against an agreed deliverables list, so the scope is settled before the work starts. Reviews and early-stage input are day rate. Longer packages are staged against issue of the deliverables rather than against the calendar.

Happy to work under your NDA, or to sign one before anything commercially sensitive changes hands. Send the enquiry without the sensitive detail if that is easier, and the paperwork gets sorted before anything is attached.