KEENTEL ENGINEERING
An engineering company

SUBSTATION ENGINEERING

MV, HV & EHV · POI · PROTECTION & CONTROL · IFC PACKAGES

HIGH-VOLTAGE SUBSTATION ENGINEERING & DESIGN

Substation Design
from concept through IFC

Complete electrical engineering for utility, generation, BESS, data center and industrial substations — new stations, expansions, interconnection and collector substations, switching stations and brownfield upgrades.

A substation is where the interconnection stops being a study and starts being steel, copper and relay settings.

Keentel Engineering provides complete electrical engineering and design support for new substations, expansions, interconnection substations, collector substations, switching stations and brownfield upgrades — from conceptual engineering through detailed design and Issued-for-Construction packages. Because the same firm carries the interconnection studies, protection settings and grid-performance requirements, the drawings reflect what the system analysis actually demands.

30+	13.8–500 kV+	4	4
YEARS ACROSS TRANSMISSION, DISTRIBUTION & RENEWABLES	VOLTAGE CLASSES ENGINEERED	DESIGN STAGES — CONCEPT, 60%, 90%, IFC	U.S. OFFICES — TAMPA, AUSTIN, SACRAMENTO, BALTIMORE

MV · HV · EHV | 13.8 kV | 34.5 kV | 69 kV | 115 / 138 kV | 230 kV | 345 kV | 500 kV+

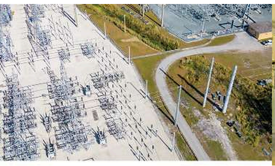
DESIGN STAGES WE DELIVER AGAINST

10–30%
Concept & Front End
Configuration, AIS/GIS evaluation, conceptual one-lines, preliminary sizing, design basis.

60%
Design Development
General arrangement, plans and elevations, protection one-lines, grounding, major specifications.

90%
Review Set
Full schematics and wiring, cable and conduit schedules, panel drawings, comment resolution.

100%
IFC Package
Issued-for-Construction drawings, bill of materials, construction details, P.E. review available.






START A SCOPE ›› Send your one-line, site plan and utility design criteria — we return a scoped fee and schedule, and can start from a partial data set.

NSPE | D·U·N·S REGISTERED | IEEE SENIOR MEMBER | BBB ACCREDITED A+

CONTACT 813-389-7871 · contact@keentelengineering.com · keentelengineering.com · Tampa · Austin · Sacramento · Baltimore

CAPABILITY — PART ONE

Concept, Front End & Physical Design

The decisions made in the first thirty percent of a substation design set the cost, the outage plan and the expansion path for the next thirty years.

Substation Concept & Front-End Engineering

- **Site & electrical configuration development.** Station siting constraints, yard geometry, phasing and the electrical configuration that supports them.
- **AIS versus GIS evaluation.** Footprint, environment, maintenance access, outage exposure and life-cycle comparison for the site in question.
- **Voltage level & bus configuration selection.** Breaker-and-a-half, ring bus, main-and-transfer, double-bus and radial arrangements evaluated against reliability, maintainability and expansion requirements.
- **Conceptual one-lines.** Preliminary single-line development sufficient to support budget, procurement and utility discussion.
- **Preliminary equipment sizing & station loading.** Transformer, breaker and station-service sizing against present and build-out load.
- **Expansion planning.** Future line and feeder positions, spare bays, bus extension provisions and phased build-out.
- **Constructability review.** Access, laydown, crane and construction sequencing reviewed while the layout can still change.
- **Utility / TSP design-criteria review.** Reading the transmission provider's standards early so the design is compliant by construction rather than by revision.
- **Interconnection interface definition.** A clear boundary of ownership, protection responsibility, metering and control between the project and the utility.
- **Equipment lead-time considerations.** Long-lead transformers, breakers and relay platforms accounted for in the design sequence.
- **Design-basis development.** A documented design basis the entire package is then engineered and reviewed against.

Primary / Physical Substation Design

- **General arrangement & equipment layout.** Yard layout with equipment positions, roads, access and future provisions coordinated.
- **Plan & elevation drawings.** Complete plan and section set defining the physical station.
- **Bus arrangement & conductor sizing.** Rigid and flexible bus engineering, conductor selection, ampacity and bus-support design criteria.
- **Major equipment layouts.** Transformers, breakers, disconnect switches, CTs, PT/CCVTs, surge arresters and station-service equipment.
- **Electrical clearances & phase spacing.** Phase-to-phase and phase-to-ground clearances, working clearances and safety envelope.
- **Access & maintenance clearances.** Equipment removal paths, crane access and switching access designed in rather than discovered later.
- **Cable trench & raceway coordination.** Trench routing, duct bank and raceway layout coordinated with civil and equipment positions.
- **Control-house interface.** Building location, entries, cable entry provisions and panel layout coordination.
- **Grounding & lightning-protection layout.** Grid layout, riser locations, mast and shield-wire placement integrated into the yard design.
- **Station-service AC/DC design.** Auxiliary power, battery and charger sizing, panel placement and distribution.
- **Yard lighting, conduit & cable routing.** Lighting layout, conduit plans and cable routing to the schedule level.

BUS CONFIGURATION — HOW WE CHOOSE

ARRANGEMENT	RELIABILITY & MAINTAINABILITY	TYPICAL APPLICATION	FOOTPRINT & COST
Breaker-and-a-half	Any breaker removable without dropping a circuit; bus fault does not lose the station	EHV transmission, large generation and BESS POI stations	Largest; highest breaker count
Ring bus	Good redundancy at low breaker count; expansion past four to six positions gets awkward	Compact POI and collector stations, early build-out phases	Compact; economical
Double bus, double breaker	Highest availability; every circuit fully duplicated	Critical load, high-value generation, utility hubs	Large; highest cost
Main and transfer	Breaker maintenance via transfer bus, with switching and protection complexity	Distribution and older utility standards	Moderate
Radial / single bus	Simplest and least redundant; bus work requires a station outage	Industrial service, small collector and tap stations	Smallest; lowest cost

APPLIES TO Greenfield substations · POI & interconnection substations · Collector substations · Switching stations · Brownfield expansions · AIS and GIS · 13.8 kV through 500 kV+

CAPABILITY — PART TWO

Protection, Control & Automation

Schematics, schemes and settings written to the utility's protection requirements — and to the fault currents the system study actually produces.

Protection & Control Engineering

- **Protection philosophy & zone development.** Zones of protection, redundancy, primary and backup strategy documented before drawings begin.
- **Transmission line protection.** Distance, directional and overcurrent protection coordinated with the adjacent utility terminals.
- **Transformer protection.** Differential with inrush and overexcitation restraint, backup overcurrent and thermal protection.
- **Bus differential & breaker failure.** Bus zone design, CT arrangement, breaker-failure initiation and timing.
- **Feeder, capacitor & reactor protection.** Distribution and collector feeder protection, and shunt device protection where applicable.
- **Relay one-lines & three-line diagrams.** Protection one-lines and three-lines defining every CT and PT circuit.
- **AC & DC schematics.** Elementary diagrams, trip and close circuits, interlocking, lockout logic and relay I/O.
- **Annunciation & panel drawings.** Alarm schemes, panel elevations, wiring diagrams and interconnection diagrams.
- **Communications-assisted schemes.** Transfer trip, DTT, POTT, DCB and DCUB schemes where the application calls for them.
- **Synch-check & autoreclosing.** Closing supervision, reclose logic and coordination with utility practice.
- **Relay setting development & coordination.** Settings developed or reviewed, coordinated, and issued in a form the utility can accept.

SCADA, Automation & Communications

- **RTU / SCADA point development.** Control and status mapping, metering signals and complete point lists.
- **SOE & event requirements.** Sequence-of-events, disturbance and fault record collection defined to the owner's requirement.
- **HMI interfaces & remote monitoring.** Local HMI design, remote access and diagnostic visibility.
- **Protection communications.** Fiber-optic architecture, channel design and telecom equipment interfaces.
- **IEC 61850 integration.** Station and process bus integration where project requirements call for it.
- **Gateway / RTU interface.** Protocol mapping, engineering access and cybersecurity-aware access design.
- **Multi-vendor IED coordination.** Making relays, meters, controllers and gateways from different vendors behave as one system.

Why the automation scope matters

Modern substation automation combines IED-based protection and control with centralized HMI and SCADA over digital communications, rather than extensive conventional hardwiring. That gives scalability and remote diagnostics — but it moves a large part of the design risk into point lists, protocol mapping and settings files, where it has to be engineered and documented just as carefully as copper.

CONTROL HOUSE, DC SYSTEM & PANEL DESIGN

- **Control building layout.** Panel arrangement, aisle and access clearances, cable entry, HVAC and lighting interface.
- **Relay & control panel design.** Panel elevations, device layout, nameplates, terminal blocks and internal wiring.
- **DC system design.** Battery and charger sizing to the duty cycle, distribution panels, breaker coordination and ground detection.
- **DC voltage drop to the trip coil.** Verified at the far end of the longest run, at end-of-life battery voltage.
- **Station-service AC.** Source selection, transfer scheme, panel schedules and critical-load segregation.
- **Cable entry & grounding.** Entry provisions, shield grounding practice and transient control at the building.
- **Telecom & SCADA cabinets.** Rack layout, fiber management, power and grounding for communications equipment.
- **Spare capacity.** Panel space, DC capacity and I/O provisioned for the expansion the station is planned for.

P · C · SCADA Line protection · Transformer differential · Bus differential · Breaker failure · Feeder protection · Transfer trip · Synch-check & reclosing · Relay settings & coordination · RTU / SCADA integration · Fiber & protection communications · IEC 61850 · SOE / DFR · Control house & relay panel design

CAPABILITY — PART THREE

Grounding, Lightning & Electrical Studies

The analysis that decides conductor sizes, clearing times and whether the yard is safe to stand in during a fault.

Grounding & Lightning Protection

- **IEEE 80 grounding-grid analysis.** Grid performance evaluated against the fault current and clearing time the protection design actually delivers.
- **Soil resistivity evaluation.** Wenner data interpretation, two-layer and multi-layer soil modeling.
- **Ground-grid design & conductor sizing.** Grid geometry, rod placement and conductor sizing for fault duty and corrosion allowance.
- **Touch & step potential assessment.** Tolerable limits established, hazardous areas identified and mitigated by design.
- **Equipment, fence & building grounding.** Equipment risers, fence grounding and control-building grounding and bonding.
- **Transferred-potential considerations.** Communication, water, rail and remote-metallic paths reviewed for transferred voltage.
- **Ground-mat drawings & details.** Complete grounding plan, sections and connection details.
- **Lightning protection layout.** Mast and shield-wire placement with rolling-sphere or equivalent shielding assessment.
- **Surge arrester application.** Arrester selection, placement and coordination with insulation levels and bonding practice.

Electrical Studies

- **Short circuit.** Momentary, interrupting and 30-cycle duty with equipment rating verification.
- **Load flow & voltage drop.** Station and auxiliary system performance across operating cases.
- **Transformer loading & bus ampacity.** Loading cases, emergency ratings and bus and conductor ampacity verification.
- **Station-service & AC/DC auxiliary studies.** Auxiliary loading, distribution sizing and voltage drop to the trip coil.
- **Battery sizing.** Duty cycle development and sizing to IEEE 485 / 1115 with charger sizing.
- **Protection coordination.** TCC and time coordination with margin, plus relay loadability where applicable.
- **Arc flash assessment.** IEEE 1584 incident energy, boundaries, labels and mitigation by settings or configuration.
- **Grounding study & cable ampacity.** Grid performance and cable sizing, derating and thermal verification.
- **Insulation coordination support.** BIL selection, arrester margin and clearance verification.
- **Transient & switching evaluation.** TRV, energization, capacitor switching and overvoltage assessment where required.
- **Harmonics & IBR studies.** Distortion at the point of common coupling and inverter-based resource behavior where applicable.

WHAT A STUDY REPORT CONTAINS

- Stated scope, standards applied and the revision of each input document used
- Model description, one-line reference and every assumption written down rather than implied
- Source data provenance — utility short-circuit data, equipment nameplates, soil test reports
- Case list with base case, contingency cases and sensitivity cases identified
- Result tables with the pass/fail criterion stated next to each number
- Plots — TCC curves, incident energy, ground potential contours, waveform evidence
- Equipment rating verification against the calculated duty, item by item
- Findings, exceptions and any equipment or setting that does not pass
- Mitigation options with sizing and the technical justification for each
- Calculation records and native model files delivered with the report

Arc flash label program | Maintenance-mode settings | Equipment SCCR verification | Re-study after equipment change

STUDIED TO IEEE 80 · IEEE 81 · IEEE 1584 · IEEE 485 / 1115 / 1187 · IEEE 519 · IEEE C37.010 / C37.011 · IEEE 399 · IEC 60909 · IEC 60287 · NEC · NESC

CAPABILITY — PART FOUR

Equipment Engineering & the Drawing Package

Specifications a vendor can bid without a clarification round, and a drawing set a contractor can build from.

Equipment Engineering & Specifications

- **Power transformers & autotransformers.** Rating, impedance, tap range, cooling, bushing and accessory specification.
- **GSU transformers.** Generator and BESS step-up specification coordinated with the interconnection study.
- **Circuit breakers & disconnect switches.** Interrupting duty, operating mechanism, control voltage and switch type selection.
- **Instrument transformers & CCVTs.** Ratio, accuracy class, burden and transient performance for protection and metering.
- **Surge arresters.** MCOV, energy class and placement coordinated with insulation coordination.
- **Station-service & grounding transformers.** Sizing, connection and neutral treatment.
- **Reactors & capacitor banks.** Application, protection and switching provisions.
- **Battery systems, chargers & switchgear.** DC system equipment specified to the duty cycle developed in the study.
- **Panels & enclosures.** Control, relay, telecom and SCADA/RTU panels and outdoor enclosures.
- **Cable systems.** Power, control and instrumentation cable specification and accessories.
- **Vendor & interface coordination.** Vendor drawing review, equipment data review and design-interface coordination through fabrication.

Detailed Electrical Deliverables

- **Design criteria & design-basis documents.** The controlling document the rest of the package is engineered against.
- **Single-line & three-line diagrams.** Station one-lines, protection one-lines and complete three-lines.
- **General arrangements, plans & elevations.** The physical definition of the station.
- **Grounding & lightning-protection plans.** Grid layout, details and shielding plan.
- **Conduit plans & cable-trench layouts.** Routing coordinated with civil and equipment.
- **Cable, conduit & equipment schedules.** Complete schedules with sizing and destinations.
- **Bill of materials.** Quantified material take-off issued with the package.
- **AC & DC schematics and wiring diagrams.** Elementary, wiring and interconnection diagrams.
- **Panel elevations.** Relay, control, SCADA and telecom panel layouts.
- **SCADA point lists.** Control, status, analog and alarm points mapped end to end.
- **Relay-setting documentation.** Settings, calculation records and native settings files.
- **Equipment specifications & construction details.** Technical specifications and standard details.
- **Demolition drawings.** Removal and phasing drawings for brownfield work.
- **IFC drawing packages.** Issued-for-Construction package, revision controlled through construction.

THE DRAWING REGISTER AT A GLANCE

Design criteria & basis	Single-line diagrams	Three-line diagrams	General arrangement
Plans & elevations	Grounding plan & details	Lightning protection plan	Conduit plans
Cable trench layouts	Cable & conduit schedules	Equipment schedules	Bill of materials
Protection one-lines	AC & DC schematics	Wiring diagrams	Panel elevations
Interconnection diagrams	SCADA point lists	Relay settings	Construction details

DELIVERABLE FORMATS Native CAD · Sealed PDF drawing sets · Schedules and BOM · Specifications · SCADA point lists · Relay settings and native settings files · Calculation records · Revision-controlled IFC package

CONTROLLED DELIVERABLES AND THE UTILITY INTERFACE

Design Stages & POI Engineering

WHAT EACH STAGE CONTAINS

STAGE	TYPICAL CONTENT	WHAT IT IS USED FOR
Concept — 10–30%	Design basis, configuration and AIS/GIS selection, conceptual one-line, preliminary equipment sizing, station loading, preliminary general arrangement	Budgeting, long-lead procurement decisions, utility and interconnection discussion
60% Design	General arrangement, plans and elevations, bus and clearance design, grounding plan, protection one-lines, major equipment specifications	Owner and utility review, equipment purchase, civil and structural interface release
90% Design	Complete AC/DC schematics and wiring, panel drawings, cable and conduit schedules, SCADA point lists, relay settings, BOM	Formal review-comment cycle, constructability review, bid package
IFC — 100%	Issued-for-Construction drawing package, construction details, demolition drawings, final specifications and schedules	Construction, procurement close-out, commissioning and as-built basis

P.E. review & professional engineering oversight available

Keentel is a Florida-registered engineering firm (Reg. No. 36853) with multi-state licensure. Professional engineering review and sealed deliverables are available where required and within applicable licensure — tell us the jurisdiction and we will confirm before we scope.

THE DIFFERENTIATOR

POI & Grid Interconnection Engineering

Most substation designers stop at the fence. Because Keentel also carries the interconnection studies and models, the POI substation is engineered with both sides of that fence in view.

- Utility / TSP design coordination
- Transformer & breaker sizing
- Protection & transfer-trip requirements
- Generator / BESS / large-load interface
- NERC / regional reliability support
- POI substation configuration
- Reactive power requirements
- SCADA / telemetry interfaces
- PSS®E / PSCAD model coordination
- Affected-system & cluster study review
- Interconnection one-line development
- Metering & revenue metering interfaces
- Utility design-criteria compliance
- Interconnection study support
- As-built model and settings handover

One boundary, agreed early

Ownership, protection responsibility, metering and control are defined at the front end, so the utility review is a confirmation rather than a redesign.

Settings that match the model

Relay settings are derived from the same short-circuit case the transmission owner's database produces, not from a standalone model nobody else can reproduce.

Handover that closes out

As-built drawings, settings files and model updates delivered together, so compliance and commissioning records agree with what was installed.

APPLIES TO Generator and BESS POI substations · Large-load and data center service · Collector substations · Switching stations · Merchant and surplus interconnection service

DESIGN AND ANALYSIS IN ONE SCOPE

Substation + Power System Studies

Under one roof — so the drawings reflect the study, and the study reflects what is actually being built.

Load flow	Short circuit	Protection coordination	Arc flash
Grounding	Cable ampacity	Transient / dynamic studies	Harmonic studies
Reactive power	PSS®E modeling	PSCAD / EMT studies	IBR modeling & validation

INDUSTRY-STANDARD ENGINEERING PLATFORMS

PSCAD · PSS®E · ASPEN · PSLF · DIgSILENT · etap

BROWNFIELD EXPANSION & RETROFIT

Many firms can design a clean-sheet station. The harder work is adding to an energized one — where the existing drawings are wrong, the outage window is fixed, and the new protection has to live alongside relays installed decades apart.

- **Existing drawing review & field verification.** Reconciling the record set against what is actually installed before anything is designed.
- **Existing protection integration.** New schemes made to coexist with legacy relays, CT circuits and lockout logic.
- **Breaker replacement.** Duty re-verification, footprint and control circuit changes.
- **Transformer addition or replacement.** Foundation, bus, protection and station-service impacts.
- **Bus expansion & new positions.** New line, feeder and bay positions tied into the existing bus.
- **Relay modernization.** Electromechanical to microprocessor conversion with settings and scheme translation.
- **SCADA upgrades.** Point list migration, RTU replacement and protocol changes without losing visibility.
- **Control-house modifications.** Panel additions, cable entry, DC system and space constraints.
- **Phased construction & cutover planning support.** Sequencing designed around the outages the operator can actually grant.
- **Demolition drawings.** Explicit removal scope so the contractor is not deciding in the field.
- **Existing-to-new interface design.** The seam between old and new drawn, not assumed.
- **Construction RFI support.** Fast answers during the outage window, when they are worth the most.

FIELD VERIFICATION & CUTOVER PLANNING

Verify before you draw

Record drawings on an older station are frequently wrong. Field verification of CT circuits, cable routing, panel space and DC capacity happens before design, not during construction.

Design to the outage you can get

The sequence is built around the outages the operator will actually grant, with temporary protection and interim configurations drawn explicitly.

Draw the seam

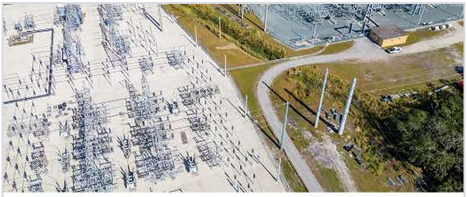
The existing-to-new interface, demolition scope and cutover steps are on the drawings, so nobody is making that call in the field at 2 a.m.

NOTE Where a project requires civil, structural or geotechnical engineering, Keentel provides design coordination and interface management with the responsible discipline rather than self-performing that work.

WHERE THE SUBSTATIONS ARE

Substations For

- POI / Interconnection Facilities
- Battery Energy Storage Systems
- Renewable Generation
- Data Centers & Large Loads
- Utility Transmission & Distribution
- Solar & Wind Collector Systems
- Natural Gas / Conventional Generation
- Industrial Facilities
- Microgrids
- Switching Stations
- Greenfield Substations
- Brownfield Expansions & Retrofits



POI & Interconnection Substations

Generator, BESS and large-load points of interconnection engineered with the utility interface, metering, transfer trip and telemetry defined from the start.

AIS & GIS Stations

Air-insulated and gas-insulated arrangements evaluated on footprint, environment, maintenance access and life-cycle cost for the specific site.

Protection & Control Houses

Relay and control panel design, DC systems, SCADA integration and the complete schematic and wiring package behind them.

MULTIDISCIPLINE DESIGN COORDINATION

- Electrical primary design
- Protection & control
- Civil / structural coordination
- Geotechnical coordination
- Telecommunications
- Utility / TSP coordination
- OEM & equipment vendor coordination
- EPC coordination
- Construction RFI support
- Commissioning interface
- Procurement & long-lead tracking
- As-built and turnover documentation

MV · HV · EHV | 13.8 kV | 34.5 kV | 69 kV | 115 / 138 kV | 230 kV | 345 kV | 500 kV+

TYPICAL STATION SCOPE BY PROJECT TYPE

PROJECT TYPE	USUAL STATION SCOPE	WHAT TENDS TO DRIVE THE SCHEDULE
Solar / wind POI	Collector substation, GSU or main transformer, POI bay, revenue metering, transfer trip, SCADA to the utility	Utility design-criteria review and long-lead transformer
BESS	MV collection, step-up, POI protection with IBR-adapted settings, station service sized for auxiliary and HVAC load	Interconnection model approval and inverter vendor data
Data center / large load	Utility service substation, redundant transformers and bus, harmonics at the PCC, ride-through-aware design, arc flash program	Utility service agreement and commissioning sequence
Brownfield expansion	Field verification, new bay or position, protection integration with legacy relays, SCADA migration, demolition and cutover	Outage windows and record-drawing accuracy

SCOPE NOTE Electrical primary, protection and control, studies and SCADA are Keentel's engineering scope. Civil, structural and geotechnical items above are coordination and interface management with the responsible discipline.

CODES, COVERAGE AND THE FIRMS WE WORK FOR

Standards, Footprint & Clients

STANDARDS WE DESIGN AND REPORT TO

IEEE 80 / 81 — grounding	**IEEE 1584** — arc flash	**IEEE C37 series** — breakers, relays	**IEEE 605 / 1527** — bus design
IEEE 485 / 1115 / 1187 — DC	**IEEE 519** — harmonics	**IEEE 399** — system analysis	**IEEE 2800** — IBR interconnection
IEC 61850 — substation automation	**IEC 60909 / 61363** — short circuit	**IEC 60287** — cable ampacity	**IEC 62271** — HV switchgear
NERC PRC / MOD / FAC	**NEC / NESC** — code compliance	**NFPA 70E** — electrical safety	**Utility / TSP standards**

REGIONAL COVERAGE

- **PJM** — interconnection & EIT
- **CAISO** — IPE, New Resource Impl.
- **SERC / TVA** — LGIP cluster
- **MISO** — cluster and DPP
- **NYISO** — load interconnection
- **BPA** — model requirements
- **ERCOT** — large load, NOGRR282
- **ISO-NE** — model submittal
- **Vertically integrated utilities**
- **SPP** — HILL / Attachment AQ–AX
- **WECC** — DPM, MDF, pre-COD
- **Municipal & cooperative**

OUR CLIENTS

entergy · EDF power solutions · aps · AVANGRID · aypa (A Blackstone Portfolio Company) · SIEMENS energy · octa Data Center · PIKE Engineering · RRC · FISHER Associates · BRASSWATER · RISK WORK

ENGAGEMENT MODELS

Full design package

Concept through IFC as one scope, with the studies and settings carried in the same package and one revision-controlled deliverable set.

Discipline support to an EPC

Electrical primary, protection and control, or studies delivered into an existing EPC or owner's engineering team on their drawing standard.

Review & recovery

Independent review of a package in progress, or picking up a stalled design — verified and reconciled first, then carried to IFC.

HOW THE PACKAGE STAYS COORDINATED

One design basis governs

Every drawing, schedule and specification is checked back to the design-basis document, so the schematics, the layout and the settings cannot quietly disagree.

Studies and drawings move together

A change in equipment rating, impedance or configuration triggers the affected study, not just the affected sheet.

Revision control through construction

The IFC set is revision controlled and RFI responses are tracked back into the drawings, so the as-built package reflects what was actually installed.

Keentel Engineering
An engineering company

SUBSTATION ENGINEERING
MV, HV & EHV · POI · PROTECTION & CONTROL · IFC PACKAGES

START HERE

Three Things and We Can Scope It

1 The one-line

Station one-line at whatever stage it exists — concept, 30% or an existing record set for a brownfield job.

2 The site & criteria

Site plan or survey, voltage and MVA, and the utility or TSP design criteria the station has to satisfy.

3 The stage & date

Which deliverable you need — 30%, 60%, 90% or IFC — and the milestone date driving it.

WHY KEENTEL ENGINEERING

01 Power-system engineers, not just designers
Substation design is integrated with protection, studies, interconnection, modeling and grid-performance requirements — not drawn in isolation from them.

02 Utility-to-project perspective
Engineering support across transmission, generation, BESS, data center and large-load applications, on both sides of the point of interconnection.

03 Advanced modeling capability
PSS® E, PSCAD/EMTDC, ETAP, PowerFactory, ASPEN, PSLF and other industry-standard engineering platforms behind the drawings.

04 P.E. oversight
Professional engineering review and sealed deliverables where required and within applicable licensure — Florida Reg. No. 36853 with multi-state licensure.

05 From POI to plant
Engineering support from the transmission interconnection through the substation, the MV collection system and the facility electrical interface.

06 Nationwide project support
Supporting utility, developer, EPC and asset-owner projects across major U.S. power markets from four U.S. offices.

ASKED AT KICKOFF

Can you pick up a design another firm started?

Yes. We review and field-verify the existing set first rather than inheriting assumptions, then carry it forward under our own review.

Do you do the studies too, or just the drawings?

Both. Short circuit, coordination, arc flash, grounding and the interconnection modeling can sit in the same scope as the design package.

Do you handle civil and structural?

We coordinate and manage the interface with the responsible discipline. Electrical primary, protection and control, studies and SCADA are our engineering scope.

Can you work to our utility's standards?

Yes — send the design criteria with the RFP. We review the TSP standard up front so the package is compliant by construction, not by revision.

START A SCOPE ›› contact@keentelengineering.com · 813-389-7871 · keentelengineering.com

NSPE | D·U·N·S REGISTERED | IEEE SENIOR MEMBER | BBB ACCREDITED A+

TAMPA — HQ
400 N Ashley Dr, Ste 2600
Tampa, FL 33602
813-389-7871

AUSTIN
5900 Balcones Dr, Ste 100
Austin, TX 78731
512-591-0752

SACRAMENTO
1401 21st St, Ste R
Sacramento, CA 95811
916-913-4524

BALTIMORE
306 W Redwood St, Ste 200
Baltimore, MD 21201
410-225-2181

contact@keentelengineering.com · keentelengineering.com · 813-389-7871 · Florida Firm Reg. No. 36853