PJM Generation Interconnection

#AC2-154 Davis Creek

TSS 86 Staley Solar I

138kV

and

#AD2-060 Davis Creek

TSS 86 Staley Solar 2

138kV

Facilities Study Report

Revision 0

March 2022

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A. FACILITIES STUDY INTRODUCTION

1. PROJECT DESCRIPTION

The developer, Staley Solar, LLC (Interconnection Customer, also referred to as IC), has proposed the construction and interconnection of a solar generating facility, with a total capacity of 70MW. These installations will be recognized as Staley Solar I & II.

Queue #	Maximum Facility Output	Capacity Interconnection Rights
AC2-154	50 MW	19 MW
AD2-060	20 MW	20 MW
Total	70 MW	39 MW

Ground mounted tracking solar photovoltaic facility to be located in Kankakee County, IL. The proposed Staley Solar I facility includes twenty-one (21) solar inverters with the uprate, Staley Solar II, adding an additional nine (9) solar inverters for a total of thirty (30) inverters.

The solar generating facility will be interconnected to the ComEd transmission system at 138kV at the Davis Creek TSS 86 Substation at the Bus 2 position. This interconnection would require one (1) 138kV circuit breaker, one dead-end structures and one set of revenue metering. The proposed generation interconnection is shown on the planning diagram in Attachment #1.

2. AMENDMENTS TO THE IMPACT STUDY DATA OR IMPACT STUDY RESULTS

2.1 Facility Name and In-Service Date

2.1.1 The IC's Facility name is TSS 902 Staley Solar

2.1.2 Queue AC2-154 and AD2-060 proposed in-service timeline is shown in Section 7, Milestone Schedule.

2.2 Stability Analysis Results

2.2.1 AC2-154 and AD2-060 are deficient in lagging power factor requirement by 8.33 MVAr. Reactive compensation is required to cure the deficiency.

3. INTERCONNECTION CUSTOMER SCHEDULE

The schedule which is based upon the assumption that a CPCN (Certificate of Public Convenience and Necessity), from the ICC (Illinois Commerce Commission) will not be required. Additionally, the customer schedule for the collector substation will need to be coordinated with the construction of the interconnection substation construction by ComEd (See Milestone Schedule page 8). The proposed in-service date is 665 days after the Interconnection Service Agreement (ISA) and Interconnection Construction Service Agreement (ISCA) are fully executed. ComEd will work with the IC in good faith to meet this date.

4. SCOPE OF WORK BY INTERCONNECTION CUSTOMER (IC)

4.1. The IC is responsible for construction of the additional 70MW solar generation, which includes twenty-one (21) 2.38MW DC inverters, nine (9) 2.364 MW DC inverters, one (1) 138kV circuit breaker, one (1) 138/34.5/13.2kV 30/40/50MVA generator step-up transformer (GSU), two (2) 138kV motor operated disconnect switches, and a 138kV generation lead line with associated structures terminating at TSS 86 Davis Creek.

4.2. The IC will be responsible to purchase real estate or obtain the necessary right-of-way easement to install the 138kV transmission line to TSS 86 Davis Creek substation.

4.3. IC will be responsible for Line 90201 Single Mode Fiber from IPP's Substation "TSS 902 Staley

Solar" to ComEd's Substation TSS 86 Davis Creek. This will be used for Primary Relay scheme using Direct-on-Fiber connections per the Relay Notes. If Fiber can be installed in OPGW, the minimum Fiber count is 48 Fibers and construction will be in adherence with ComEd Transmission Line standards. If Fiber cannot be installed in the Transmission path, the Fiber count and construction for this Fiber path will be determined by ComEd Standards ESP 5.8.1 and 5.8.2. The IC will own and maintain this Fiber cable up to the fiber distribution panel in TSS 86 Davis Creek.

4.4. IC will be responsible for Line 90201 Single Mode Fiber from IPP's Substation "TSS 902 Staley Solar" to ComEd's Substation TSS 86 Davis Creek. This will be used for Secondary Relay scheme using Direct-on-Fiber connections per the Relay Notes. This Fiber must be built in a physically diverse path from the Fiber path used for the Primary Relay scheme. If Fiber can be installed in OPGW, the minimum Fiber count is 48 Fibers and construction will be in adherence with ComEd Transmission Line standards. If Fiber cannot be installed in the Transmission path, the Fiber count and construction for this Fiber path will be determined by ComEd Standards ESP 5.8.1 and 5.8.2. The IC will own and maintain this Fiber cable up to the fiber distribution panel in TSS 86 Davis Creek.

4.5. The demarcation of ownership for these Fiber cables will be in the Fiber Distribution Panel (FDP) in the ComEd Substation TSS 86 Davis Creek. The customer will own and maintain both Fiber cables from ComEd's TSS 86 Davis Creek FDP all of the way to their "TSS 902 Staley Solar" Substation.

4.6. The IC will be responsible to request and bear the cost of any outages required on existing transmission or distribution lines that may be required for the transport of any large equipment, i.e. turbines, rotors, turbine structures, etc.

5. DESCRIPTION OF FACILITIES INCLUDED IN THE FACILITIES STUDY

5.1 TSS 86 Davis Creek Substation Upgrades (N8052.1)

5.1.1 138kV switchyard installations to include one (1) new breaker with two (2) new motor-operated disconnect switches. New 138kV L90201 termination to be installed. Equipment additions include: (1) 138kV dead-end structure, (1) 138kV gas circuit breaker, (2) 138kV MODs, (1) set of CCVTs, (1) set of AMI metering equipment to meter 50MW capacity, and (1) set of surge arrestors.

5.1.2 Station upgrades will require updated lightning protection, expanded yard lighting, and a study of the DC battery system. Yard expansion will not be required.

5.2 TSS 86 Davis Creek Relaying Upgrades (N8052.2)

5.2.1 Primary and backup line and bus protection and communication systems to be modified and non-direct installed to accommodate the changes and additions to the station. Additions include (1) SEL-411L-1, (1) SEL-311L, (1) SEL-451-5, and associated LOR.

6. TOTAL COSTS OF TRANSMISSION OWNER FACILITIES INCLUDED IN FACILITY STUDY

The estimated total cost of AC2-154 project for network upgrades is $3,511,874. The developer is ultimately responsible for all ComEd costs incurred on the project.

NETWORK #	SITE LOCATION	TOTAL PROJECT COST	STUDY SECTION	TYPE
N8052.1	**TSS86 SUBSTATION UPGRADES**	$2,982,415	**B 4.1**	**Attachment Facilities**
N8052.2	**TSS86 SUBSTATION UPGRADES**	$529,459	**B 4.1, 4.2**	**Non-Direct Connection**
	Total Cost of ComEd Work	**$3,511,874**		

NOTE: Costs are based on 2022 rates and do not reflect potential increase of labor or material costs.

7. SUMMARY OF MILESTONE SCHEDULES FOR COMPLETION OF WORK INCLUDED IN FACILITY STUDY

Description	Schedule
Notice to Proceed (ISA and ICSA signed with security deposit)	Day 1
Construction complete and ready for testing	Day 600
Testing Complete and Back feed Power Available	Day 665
Facility Commercial Operation Date	Day 665

The above Milestone Schedule starting date is when the Interconnection Services Agreement and the Construction Services Agreement (if applicable) is executed and deposit received. The schedules are based upon the assumption that the CPCN from the ICC will not be required. The exact Milestone Schedule will be negotiated and determined upon the execution of the Interconnection Services Agreement and Construction Services Agreement.

B. TRANSMISSION OWNER (COMED) FACILITIES STUDY RESULTS

1. TRANSMISSION LINES -NEW

   1.1 Not Applicable

2. TRANSMISSION LINES – UPGRADES

   2.1 Not Applicable

3. NEW SUBSTATION / SWITCHYARD FACILITES

   3.1 Not Applicable

4. UPGRADES TO EXISTING SUBSTATION / SWITCHYARD FACILITIES

ComEd will be responsible for performing the design, procurement, construction, and commissioning of substation/switchyard facility upgrades at IC cost.

4.1 Substation Upgrades at TSS 86 Davis Creek (N8052.1)

Substation to be expanded with one (1) new gas 138kV circuit breaker on Bus 2 on the high bus position. Breaker to be rated for 3000A and 63kA, with 2x2000:5 CTs per bushing. Two (2) new 138kV motor-operated disconnect switches, rated for 2000A, to be installed on each side of the breaker. New 138kV 1200:1 CCVTs to be installed at L90201 exit to Staley Solar Farm. New L90201 terminal to be installed at this structure, tapping into new Bus 2 with new surge arrestors.

Site additions to require the shifting of roadway inside the site nearer to the spare transformer pads to make room for the line entrance. New station lightning protection and expanded lighting to be evaluated by studies, designed, and installed. New DC study to be performed to evaluate existing DC loads and new DC loads being installed.

4.2 Relaying Upgrades at TSS 86 Davis Creek (N8052.2)

A SEL-411L-1 and SEL-311L-1 are to be installed as Primary protection and Secondary protection, respectively, for new L90201.

A 50BF/79 SEL-451-5 relay and associated LOR to be installed per GDD1930. All Bus Ties must have sync check for Manual close, SCADA close, and automatic reclosing.

New Gas Circuit breaker control for loss of SF6 gas condition should be as follows (see Engineering practice EP-5206E and relay specifications):

- For an open circuit breaker, when SF6 gas drops to the critical level, the close circuit of breaker shall be opened and motor operated disconnects on both sides of CB shall be opened.
- For a closed SF6 gas circuit breaker, when SF6 gas drops to the critical level, the circuit breaker shall be opened and motor operated disconnects on both sides of CB shall be opened and the close of the circuit breaker shall be opened.

5. METERING

5.1 For PJM:
Necessary equipment will be installed to provide Revenue Metering (MWH, MVARH) and real time data (MW, MVAR, circuit breaker status and 138kV voltage) for interconnection customer's generating resource. See PJM Manuals M-01 & M-14D, and PJM tariff. ComEd shall be provided full access to metering equipment.

5.2 For ComEd:
Necessary equipment will be installed to provide bi-directional revenue metering (MWH, MVARH) and real time data (MW, MVAR, circuit breaker status and 138kV voltage) for

IC's generating resource. See ComEd applicable standards available on the PJM website (TO Standards).

5.3 ComEd, at IC cost, will procure, install, own, and maintain the AMI meter including 138kV CT/PT on ComEd side of the point-of-interconnection at TSS 86 Davis Creek substation for retail metering.

6. ENVIRONMENTAL, REAL ESTATE, AND PERMITING ISSUES

6.1 Environmental approvals required for the installation and construction of new equipment at 138kV TSS 86 Davis Creek to be acquired at IC cost.

6.2 It is assumed that all necessary permits will be obtained in a timely manner to allow engineering and construction to proceed according to the Milestone Schedule.

7. SUMMARY OF RESULTS OF STUDY

7.1 Cost Estimate:

The following estimate is a breakdown of the costs of the ComEd work for AC2-154 and AD2-060 installations.

NETWORK #	SITE LOCATION	Direct Material	Material Indirect	Direct Labor	Labor Indirect	TOTAL PROJECT COST	TYPE
N8052.1	**TSS86 SUBSTATION UPGRADES**	$737,485	$50,075	$1,636,681	$558,174	**$2,982,415**	**Attachment Facilities**
N8052.2	**TSS86 SUBSTATION UPGRADES**	$106,402	$7,224	$310,083	$105,751	**$529,459**	**Non-Direct Connection**
	Total Cost	**$843,887**	**$57,300**	**$1,946,763**	**$663,924**	**$3,511,874**	

Note:

Costs are based on 2022 rates and do not reflect potential increase of labor or material costs.

[1] IL sales taxes not reflected in this cost estimate.

[2] Carrying charges are anticipated to be zero

7.2 Milestone Schedule

Description	Schedule
Notice to Proceed (ISA and ICSA signed with security deposit)	Day 1
Construction complete and ready for testing	Day 600
Testing Complete and Back feed Power Available	Day 665
Facility Commercial Operation Date	Day 665

8. ASSUMPTIONS IN DEVELOPING COSTS AND SCHEDULES

8.1 The schedule is based on ISA/CSA contract being executed by all parties and deposit received.

8.2 ComEd cost estimates assume that work will be performed during normal weekdays and with no overtime.

8.3 Transmission line outages for the tap construction have not been identified, but generally are available in spring (March to May) and fall (September to November). These outages are controlled by PJM.

8.4 Foundation design assumes typical soil conditions at locations and will be subject to change after soil boring tests.

8.5 The IC will be responsible to request and bear the cost for relocation of existing transmission or distribution lines (including structures) that may be required for transmission line crossings, the transport of any large equipment, such as cranes, etc.

8.6 Backfeed date identified in earlier sections is not yet approved. Formal submittal of this request to ComEd's TSO for ultimate review by PJM can be made 7 months prior to back feed request date.

8.7 Customer to upload as-built drawings to ComEd drawing system (Meridian).

8.8 Single fiber routing has not been included in this study.

8.9 This report does not include the evaluation of how Customer Facilities (including generator lead lines) may interfere with TO facilities outside the substation yard.

8.10 This study assumes that there will be no additional right-of-way and/or easement work required.

8.11 This Facility Study is time dependent. If the project is not into construction within one year of the issuance, the FS will be void and the project re-studied, requiring completion of a new FS.

8.12 It is assumed that ComEd facilities included in this document will not require a sound study or flood mitigation.

8.13 Facility needs to be designed and constructed according to ComEd standard.

C. APPENDIX

Attachment #1: High Level Planning Diagram Depicting Interconnection Facilities and Points of Ownership/Demarcation for AC2-154 Addition

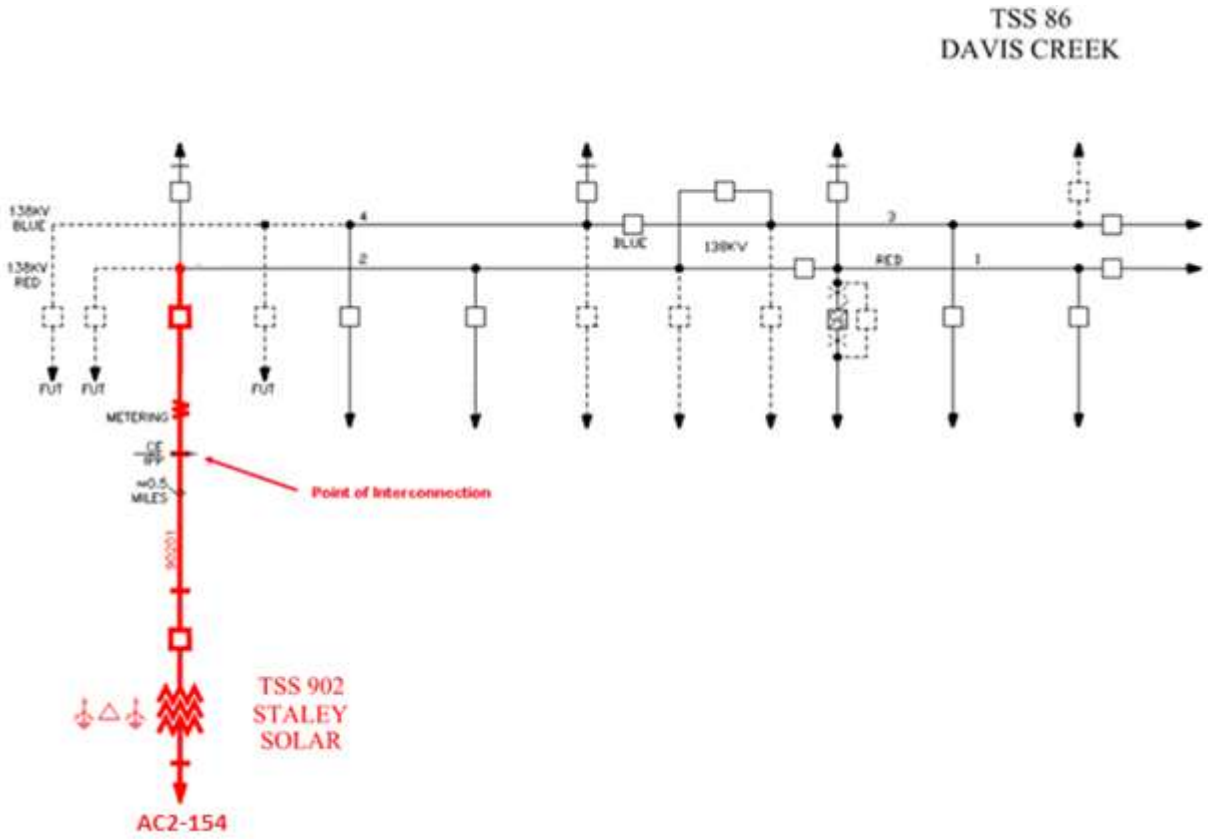
Attachment #2: High Level Planning Diagram Depicting Interconnection Facilities and Points of Ownership/Demarcation for AD2-060 Addition

Attachment #3: Plan View of AC2-154 Addition

Attachment #4: One Line Bus Diagram of AC2-154

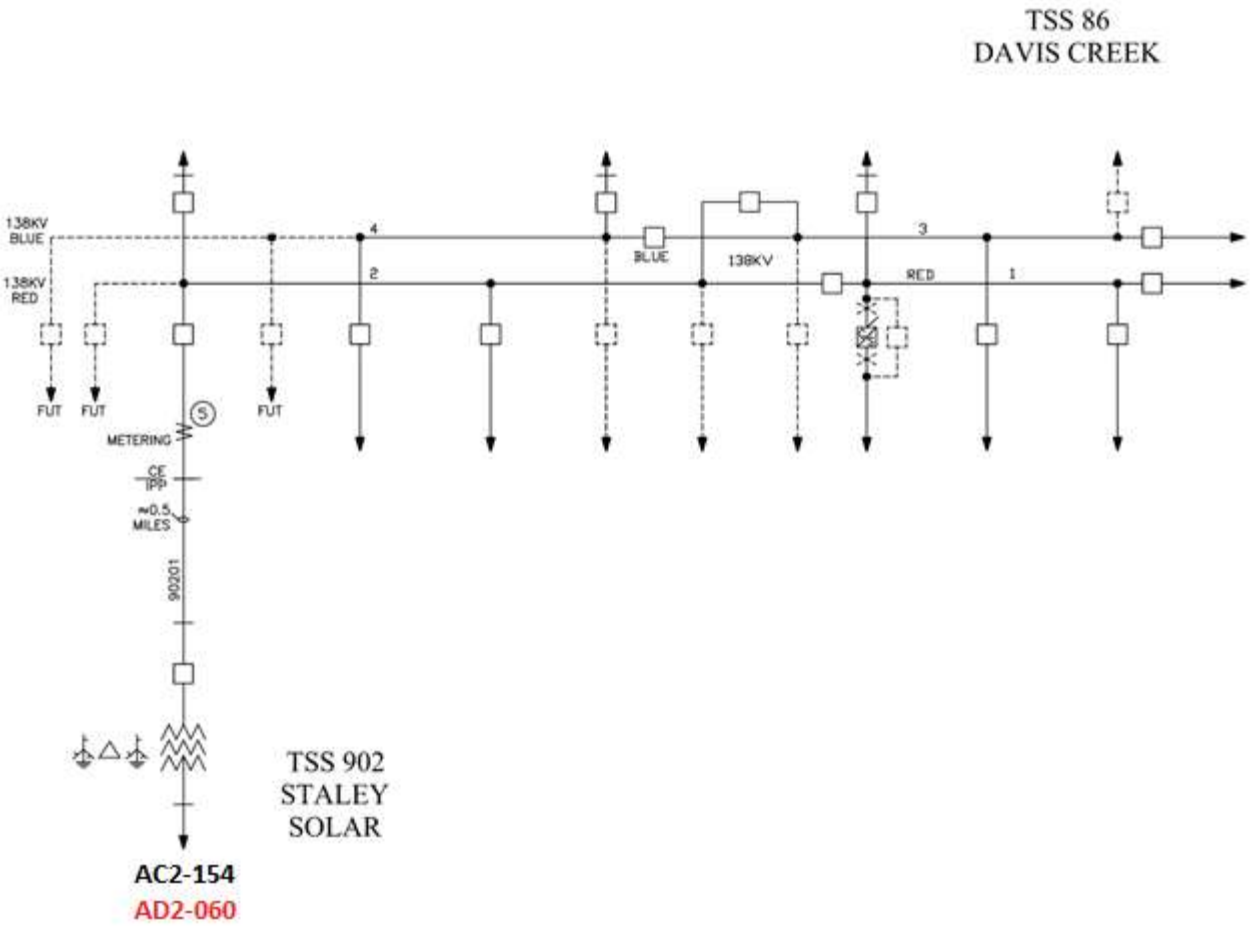
Attachment #1:

High Level Planning Diagram Depicting Interconnection Facilities and Points of Ownership/Demarcation for AC2-154 Addition

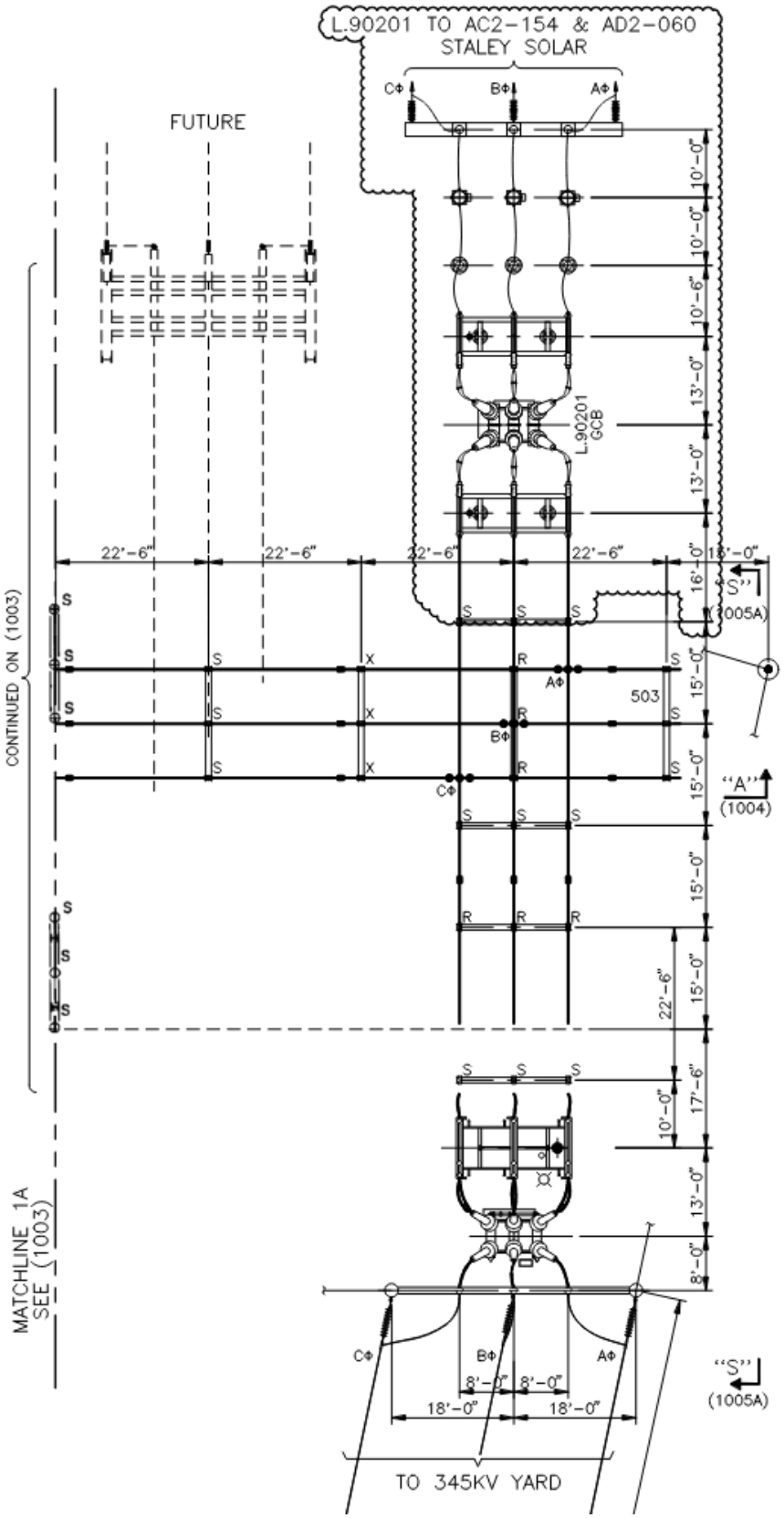


CE – Commonwealth Edison
IPP – Independent Power Producer, or Interconnection Customer
Point of Interconnection: Interconnected Transmission Owner Dead-End Structure

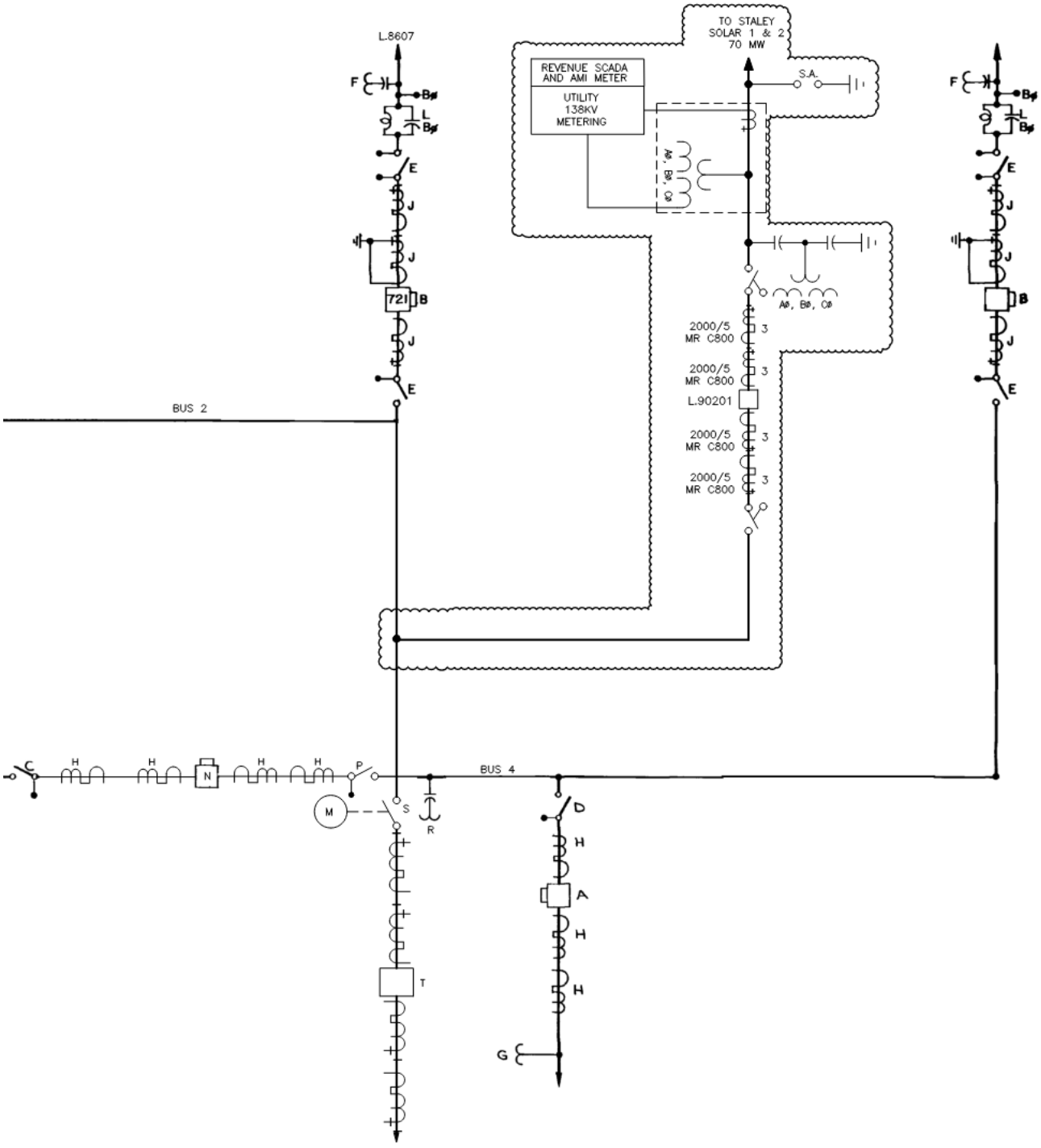
Attachment #2:
High Level Planning Diagram Depicting Interconnection Facilities and Points of Ownership/Demarcation for AD2-060 Addition


TSS 86
DAVIS CREEK
138KV
BLUE
138KV
RED
4
2
BLUE
138KV
3
RED
1
FUT
FUT
FUT
METERING
≈0.5
MILES
90201
TSS 902
STALEY
SOLAR
AC2-154
AD2-060

Attachment #3:
Plan view of AC2-154 and AD2-060 Addition


L.90201 TO AC2-154 & AD2-060
STALEY SOLAR
FUTURE
CΦ
BΦ
AΦ
L.90201
GCB
22'-6"
22'-6"
22'-6"
22'-6"
10'-0"
10'-0"
10'-6"
13'-0"
13'-0"
16'-0"
16'-0"
15'-0"
15'-0"
15'-0"
15'-0"
22'-6"
15'-0"
10'-0"
17'-6"
13'-0"
8'-0"
503
"S"
(1005A)
"A"
(1004)
CONTINUED ON (1003)
MATCHLINE 1A
SEE (1003)
8'-0"
8'-0"
18'-0"
18'-0"
TO 345KV YARD

Attachment #3:
One Line Bus Diagram of AC2-154 and AD2-060 Addition


L.8607
TO STALEY
SOLAR 1 & 2
70 MW
REVENUE SCADA
AND AMI METER
UTILITY
138KV
METERING
S.A.
2000/5
MR C800
L.90201
BUS 2
BUS 4
721