PSEG LONG ISLAND LLC

On Behalf of and as Agent for the

LONG ISLAND LIGHTING COMPANY d/b/a LIPA

Syosset to Oakwood Project

EXHIBIT E-3

UNDERGROUND CONSTRUCTION

Exhibit E-3 Underground Construction

The underground transmission line design is described in Exhibit E-1 Description of Proposed Transmission Facilities. This exhibit describes proposed underground cable design and installation methods. Final design will be described in the EM&CP[1].

E-3.1 Cable Design

The components of the cable include:

- Compacted, segmented copper conductor with water blocking compounds;
- Super smooth semi-conductive conductor shield;
- Super clean XLPE insulation;
- Super smooth semi-conductive insulation shield;
- Semi-conductive longitudinal water blocking tapes;
- Plain annealed copper metallic sheath or equivalent;
- Black LLDPE jacket; and
- Semi-conductive polyethylene over jacket.

E-3.2 Cable System Installation

The new transmission line will be primarily constructed underground within roadway ROW. A combination of different construction methods will be used to install the conduits. The installation will use open-cut trench and trenchless excavation methods. Figure 5-2 shows the profile of the Project centerline with an exaggerated vertical scale. The Project includes no oil pumping stations.

E-3.2.1 Open-Cut Trench Construction

Along the transmission line route, the general sequence of construction activities will include:

- Pavement saw-cutting;
- Trench excavation;
- Duct placement;
- Backfilling; and
- Pavement restoration.

In areas not under pavement or sidewalk, construction activities will also include vegetation clearing and grubbing and restoration.

E-3.2.2 Pavement Saw-cutting

[1] For clarity and consistency, the Application includes a Glossary that defines terms and acronyms used throughout the Application.

Most of the Project will be installed within roadway ROW and under either road pavement or sidewalk concrete. To begin trench excavation, the existing pavement will need to be saw-cut and removed. The standard duct bank configuration requires that existing pavement be saw-cut on both sides of the planned excavation to a width of approximately three feet. All pavement will be properly restored consistent with applicable municipal, county, or state requirements once construction is complete.

E-3.2.3 Trench Excavation

In general, the trench will be excavated to a depth-sufficient to provide a minimum of three feet and six inches of cover over the cable conduit. The construction contractor will shore the trenches as necessary to meet OSHA standards. The standard duct bank configuration will require an excavation at least three feet in width to a minimum depth of six feet. Greater trench depth and/or alternative duct bank configurations may be required to avoid existing subsurface obstructions.

To minimize construction risks and delays due to unforeseen conditions, subsurface utility engineering will be performed during detailed design to locate and identify potential conflicts with existing utilities. In certain situations, it may be necessary to relocate existing utilities to allow for placement of the duct bank or splice vaults. Specific measures for the relocation of any existing utilities will be governed by the requirements of each specific utility owner.

E-3.2.4 Cable Installation and Splicing

Each cable will be installed in a 10-inch SDR11 HDPE conduit. Additionally, each sub-circuit will include one four-inch SDR11 HDPE conduit for the ground continuity conductor. The three power conduits within each sub-circuit will be arranged in a trefoil (triangular) configuration.

Cable splices will be 138kV, 650kV BIL, pre-molded style and proven to be compatible with the cable construction via a prequalification test performed in accordance with ICEA S-108-720 and IEC 60840. Splices will have sheath insulators and connections for sheath bonding and be suitable for long-term underwater operation to a depth of 10 feet. Splices will be performed at vault locations only and will be tested in accordance with IEEE Standard 404.

Cable terminations installed at the substations will be 138kV, 650kV BIL, outdoor style and proven to be compatible with the cable construction via a Prequalification Test performed in accordance with ICEA Standard S-108-720 and IEC Standard 60840. Terminations will be ANSI 70 gray, composite polymer type filled with insulating fluid protected by composite polymer isolation insulators to allow testing of the cable jacket. Terminations will be furnished with a connecting stud and a NEMA four hole pad aerial lug. The aerial lug will be designed to carry the full emergency current without overheating. Terminations will be tested in accordance with IEEE Standard 48.

Sheath bonding will be multiple single-point with a maximum standing sheath voltage of 200 volts at rated steady-state loading. The 6kV SVL will be the zinc oxide type. SVLs will be suitable for continuous operation with an applied voltage under either normal or emergency load and able to withstand over-voltages resulting from both single-phase to ground or three-phase system faults.

The bundle of conduits, as depicted in Figure 5-3, will be strapped together to prevent movement during backfilling operations. To accommodate cable pulling, the minimum horizontal bend radius will be maintained, except in special circumstances where limits are imposed by constraints such as above or below-grade obstructions. Additionally, minimum vertical bend radius will be maintained, except at the cable termination sweeps, which will use a lesser bend radius to accommodate cable clamping and cable termination at the substation and riser pole. In no case will the cable be bent to a radius less than that recommended by the manufacturer.

E-3.2.5 Temporary Pavement Restoration

The pavement may be temporarily restored upon completion of the trenching, duct placement, and backfilling to re-establish normal traffic operation. Temporary pavement restoration of hot-patch asphalt will be used until final pavement restoration occurs. The temporary hot-patch asphalt will be installed to the width of the saw-cut and match the existing roadway grade. Final restoration activities are further described below.

E-3.3 Splice Vault Installation

Splice vaults serve to install (pull) and connect (splice) successive lengths of cable. Each vault houses three cable splices, one splice for each phase of the circuits. Pre-cast one-piece concrete splicing vaults, measuring approximately 18 feet in length, 10 feet in width, and 11 feet in height (outside dimensions) will be installed at approximate intervals of 2,000 – 2,500 feet along the underground route. Additionally, a two-piece precast concrete splice vault may be used as necessary, with exterior dimensions approximately 16 feet in length, 18 feet and 10 inches in width, and eight feet and 11 inches in height.

Vault excavations will be to an average depth of 12 feet with over excavations of two feet on each side for workspace. Each vault has two 36-inch diameter entry vaults. A cross section of a typical one-piece splice vault is shown in Figure 5-4 and a cross section of a typical two-piece splice vault is shown in Figure 5-5. Splice vaults will be designed for HS-25 loading and designed to limit water ingress.

The exact location of splice vaults will be identified in the EM&CP and determined based on factors such as the number and severity of bends in the route, cable pulling tension and sidewall bearing pressure calculations, physical obstructions, topographic features, access requirements, and reel length limitations. Splice vaults will be sited in locations selected to minimize construction impacts to traffic, businesses, and residences, while also allowing adequate access for construction activities.

E-3.4 Final Restoration

Final restoration activities will be detailed in the EM&CP.

E-3.5 Trenchless Crossings

This Project will include one trenchless crossing, which will be completed using the Auger Bore method. This method was selected based on factors such as technological limitations, suitability of the soil conditions, location of existing structure foundations, and the availability of workspace. Figure E-3-1 depicts a typical Auger Bore trenchless crossing cross section.

E-3.5.1 Auger Bore Installation Method

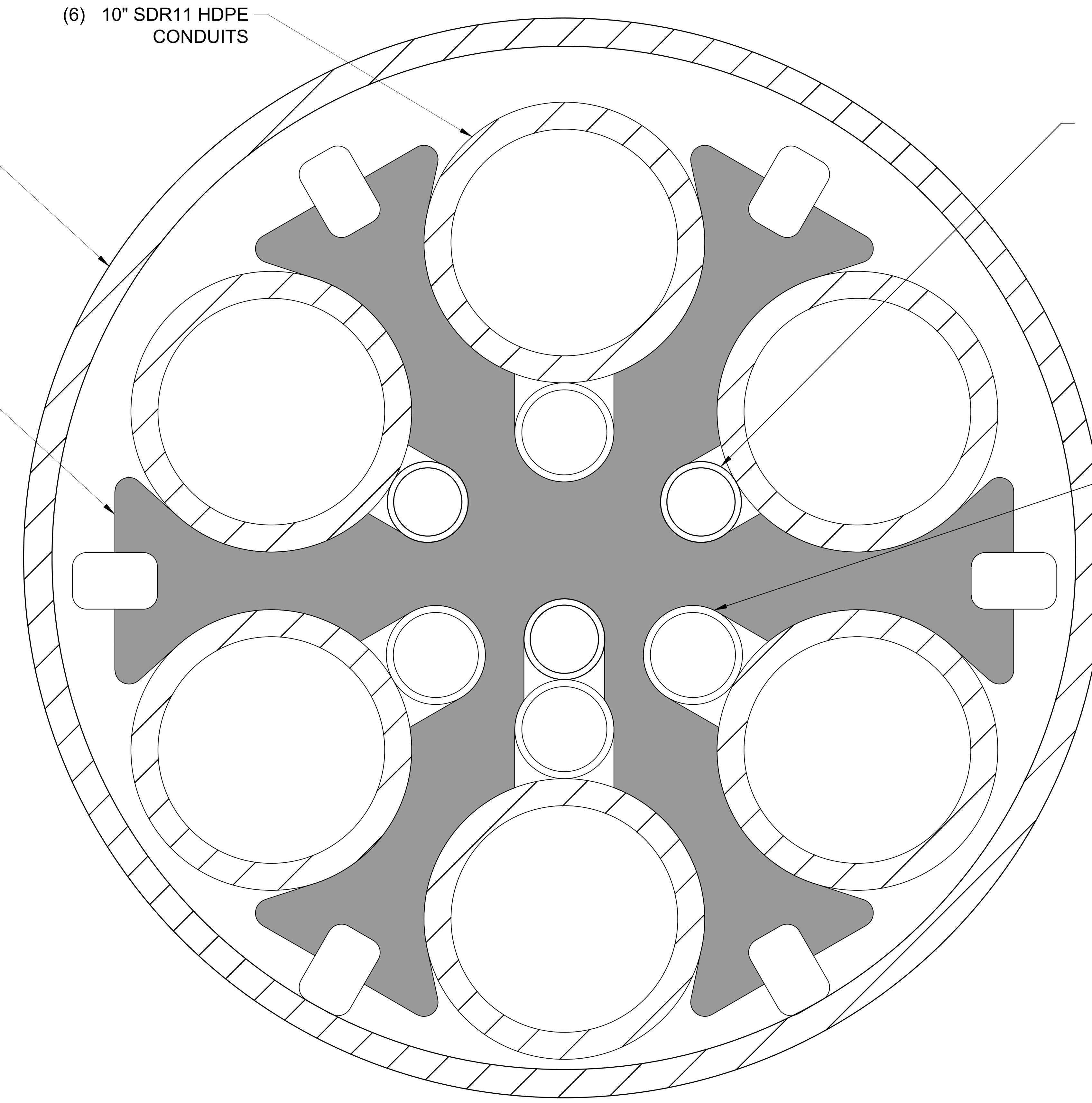
Installation of an Auger Bore is typically ideal for shorter installations such as rail crossings and short road crossings. An Auger Bore installation consists of excavating and shoring two shafts, a sending shaft and receiving shaft, one on either side of the crossing. A receiving shaft is typically approximately 12 feet in length, 12 feet in width, and approximately 15 feet deep. A sending shaft is typically larger, approximately 15 feet in length, 40 feet in width, and approximately 15 feet deep to accommodate additional installation equipment and working space needed in the shaft. Both shafts are excavated to approximately the same depth. Project-specific requirements associated with railroad or roadway restrictions and soil conditions usually dictate the depth required. Once the shafts are completed, equipment and material are lowered into the sending shaft.

Once the casing is in place, the conduit bundle can be installed and grouted into place. The conduit bundle transitions from the casing to an open-cut trench section on both ends and returns to the typical depth and configuration described in the open-cut installation.

Lastly, all equipment is removed from each shaft, then the shaft is backfilled and restored to its original condition.

Figure E-3-1

Typical Trenchless Crossing Cross Section



TYPICAL 138-kV TRENCHLESS CROSS SECTION

REV	DATE	DESCRIPTION	DRAWN	REVIEW	APPR
A	03/17/2025	ARTICLE VII	JCB	JAC	DAG

BURNS McDONNELL
Burns & McDonnell EGS
PROJ. NO. 178873

ISSUE

NO.	DATE	W.O.	DESCRIPTION	DWN BY	CKD BY	REVIEWED	APPD
0	11/01/2023	L####	ORIGINAL ISSUE	KJL	JAS	D. GOGOL P.E.	P.E.

Long Island Power Authority
SYOSSET TO OAKWOOD ARTICLE VII
138-kV TRANSMISSION LINE

OAKWOOD SUBSTATION
138-kV TRANSMISSION LINE
TYPICAL 138-kV TRENCHLESS CROSS SECTION

PSEG LONG ISLAND
175 East Old Country Road
Hicksville, New York

SCALE	VENDOR DWG. NO.	
NONE		
DRAWING NO.	SMART NO.	REVISION
F441512	BWAxx-FU-xxxxxxx	000
SYSTEM GRID NUMBER	CABINET NO.	FOLDER NO.