

APPENDIX-7

CANDIDATE TARGET AREA (PACKAGE 5 / ITEM B)

Addis Center Substation - Feeder Layout

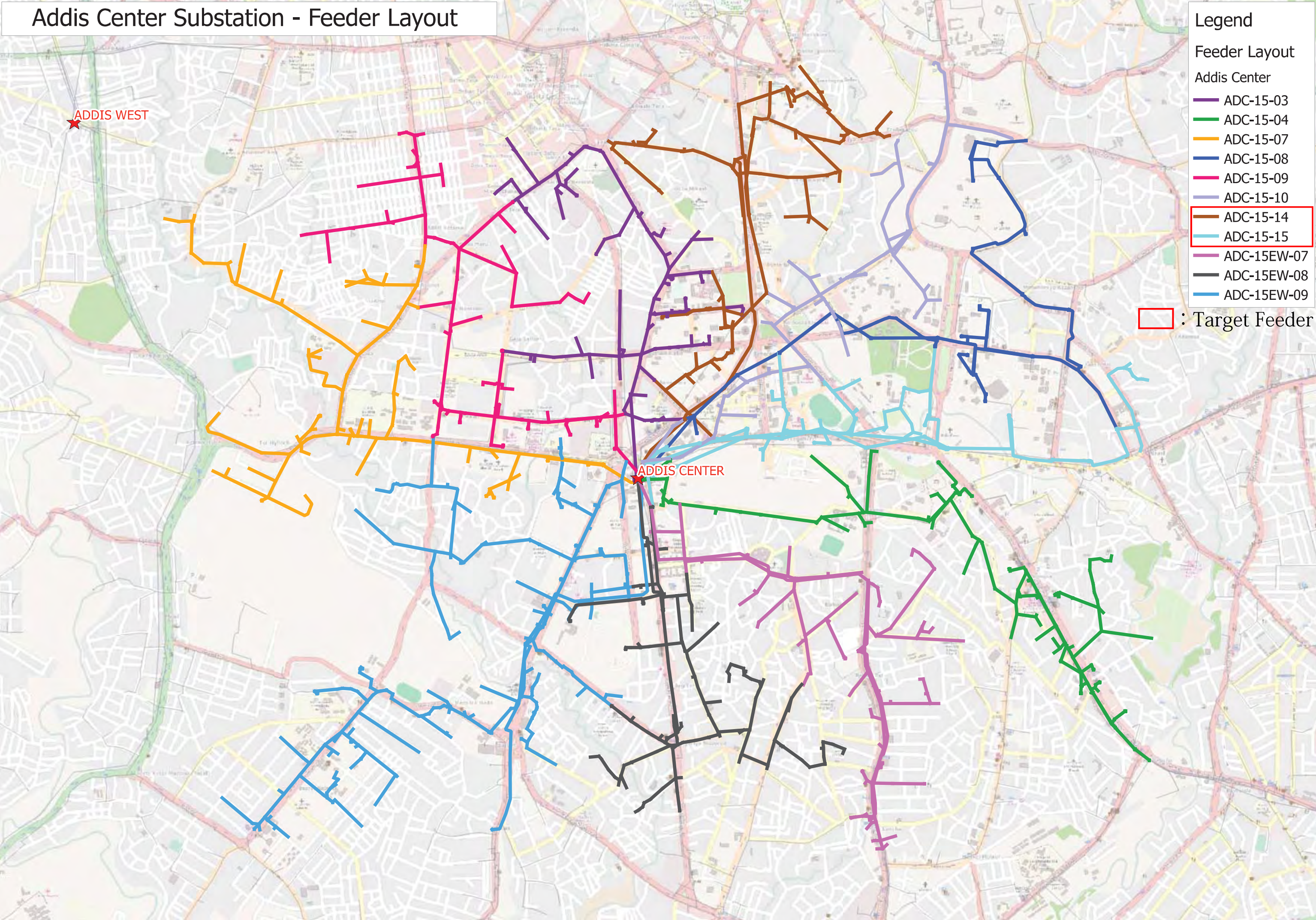
Legend

Feeder Layout

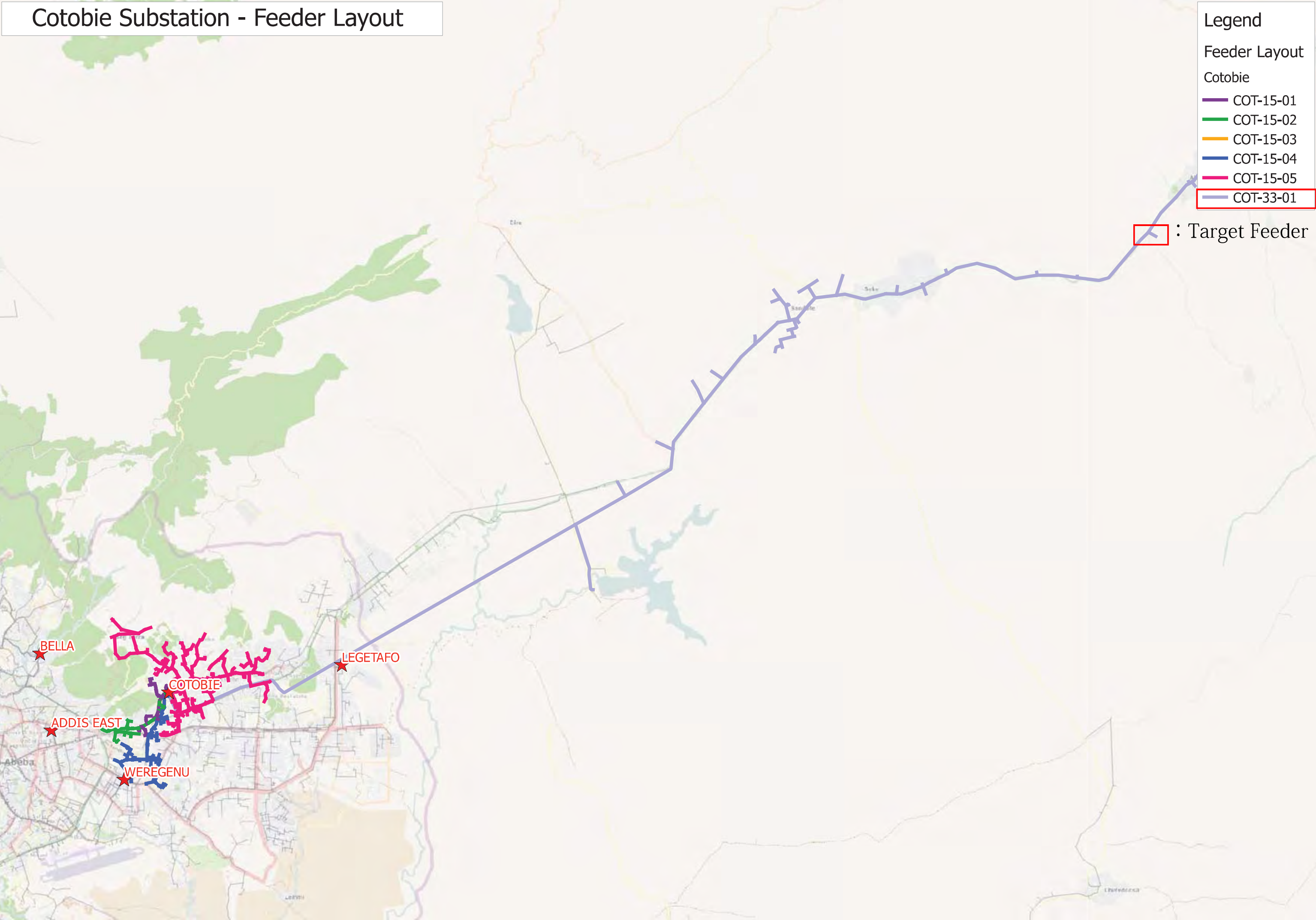
Addis Center

- ADC-15-03
- ADC-15-04
- ADC-15-07
- ADC-15-08
- ADC-15-09
- ADC-15-10
- ADC-15-14
- ADC-15-15
- ADC-15EW-07
- ADC-15EW-08
- ADC-15EW-09

: Target Feeder



Cotobie Substation - Feeder Layout



Legend

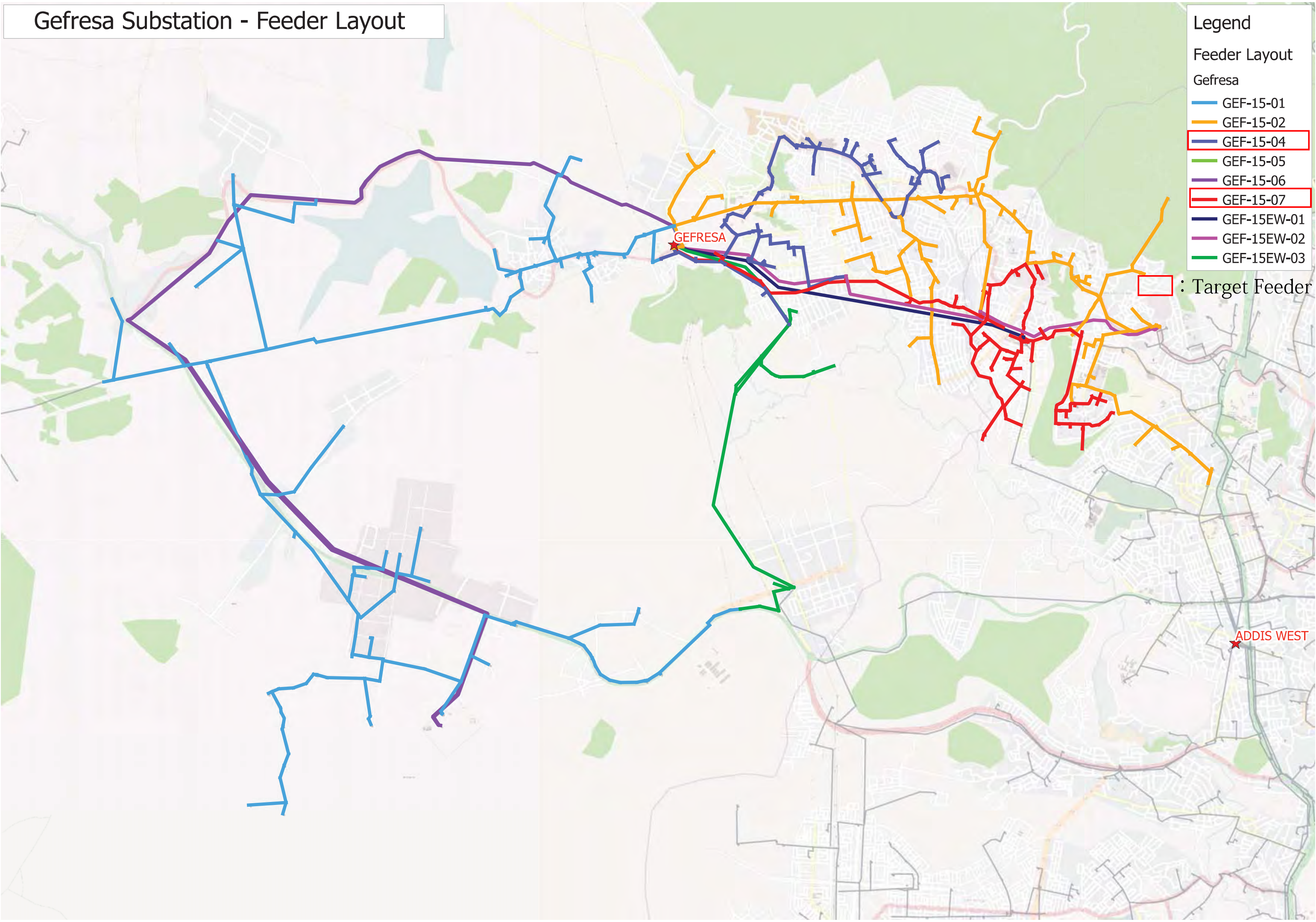
Feeder Layout

Cotobie

- COT-15-01
- COT-15-02
- COT-15-03
- COT-15-04
- COT-15-05
- COT-33-01

: Target Feeder

Gefresa Substation - Feeder Layout



Gelan Substation - Feeder Layout

Legend

Feeder Layout

Gelan

GLN-15-01

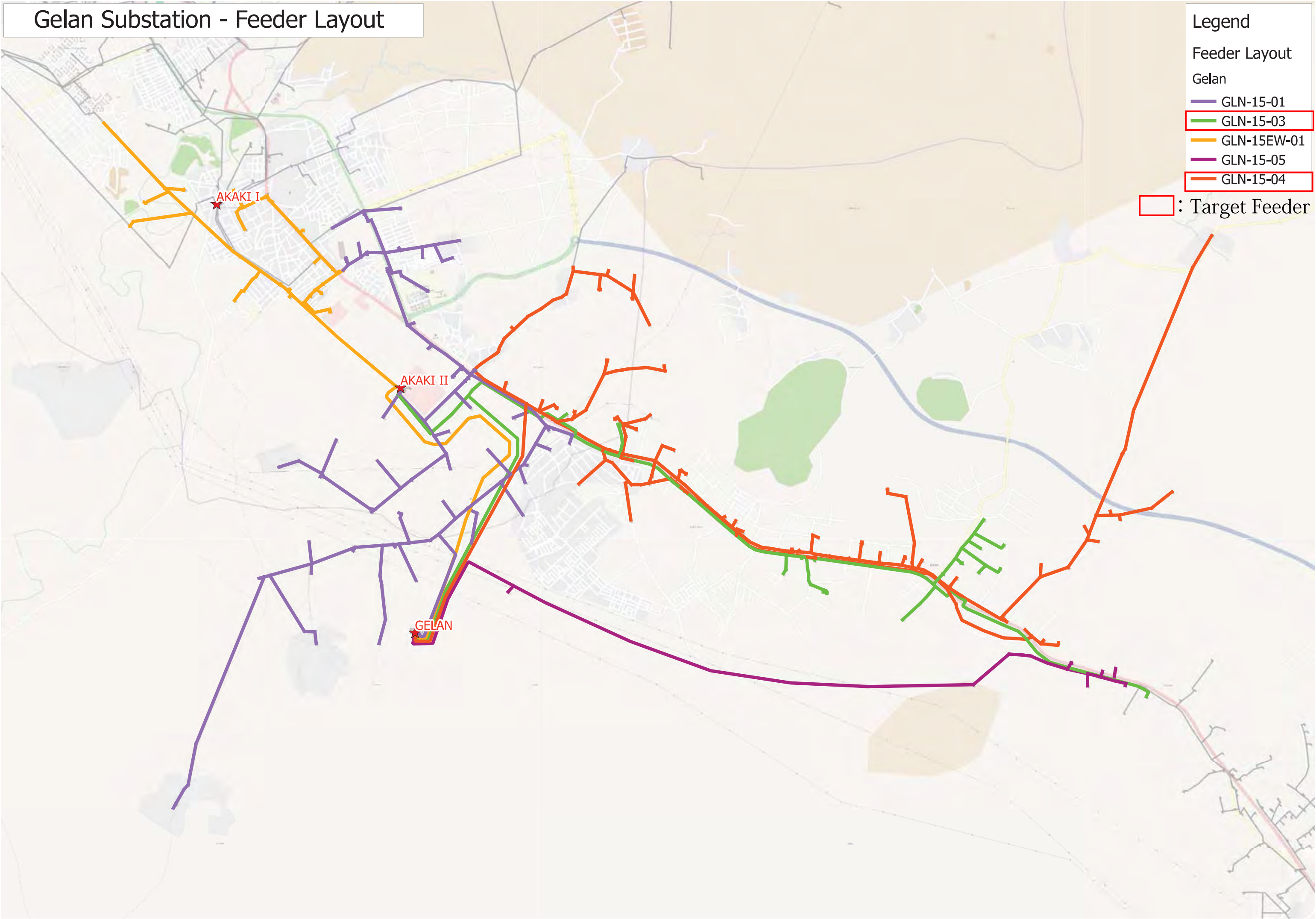
GLN-15-03

GLN-15EW-01

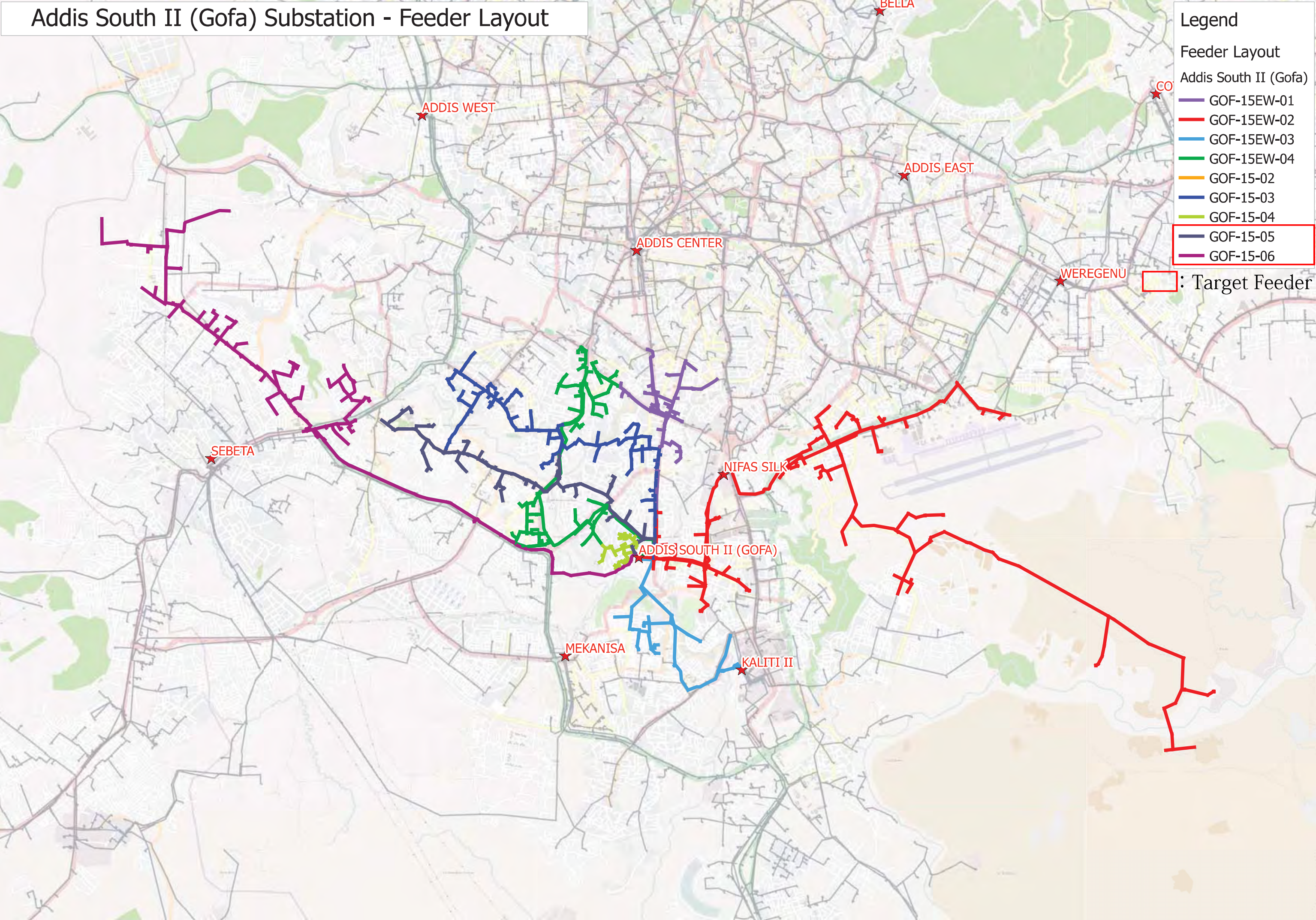
GLN-15-05

GLN-15-04

: Target Feeder



Addis South II (Gofa) Substation - Feeder Layout



Kaliti III Substation - Feeder Layout

Legend

Feeder Layout

Kaliti III

KALIII-15EW-01

KALIII-15EW-02

KALIII-15EW-03

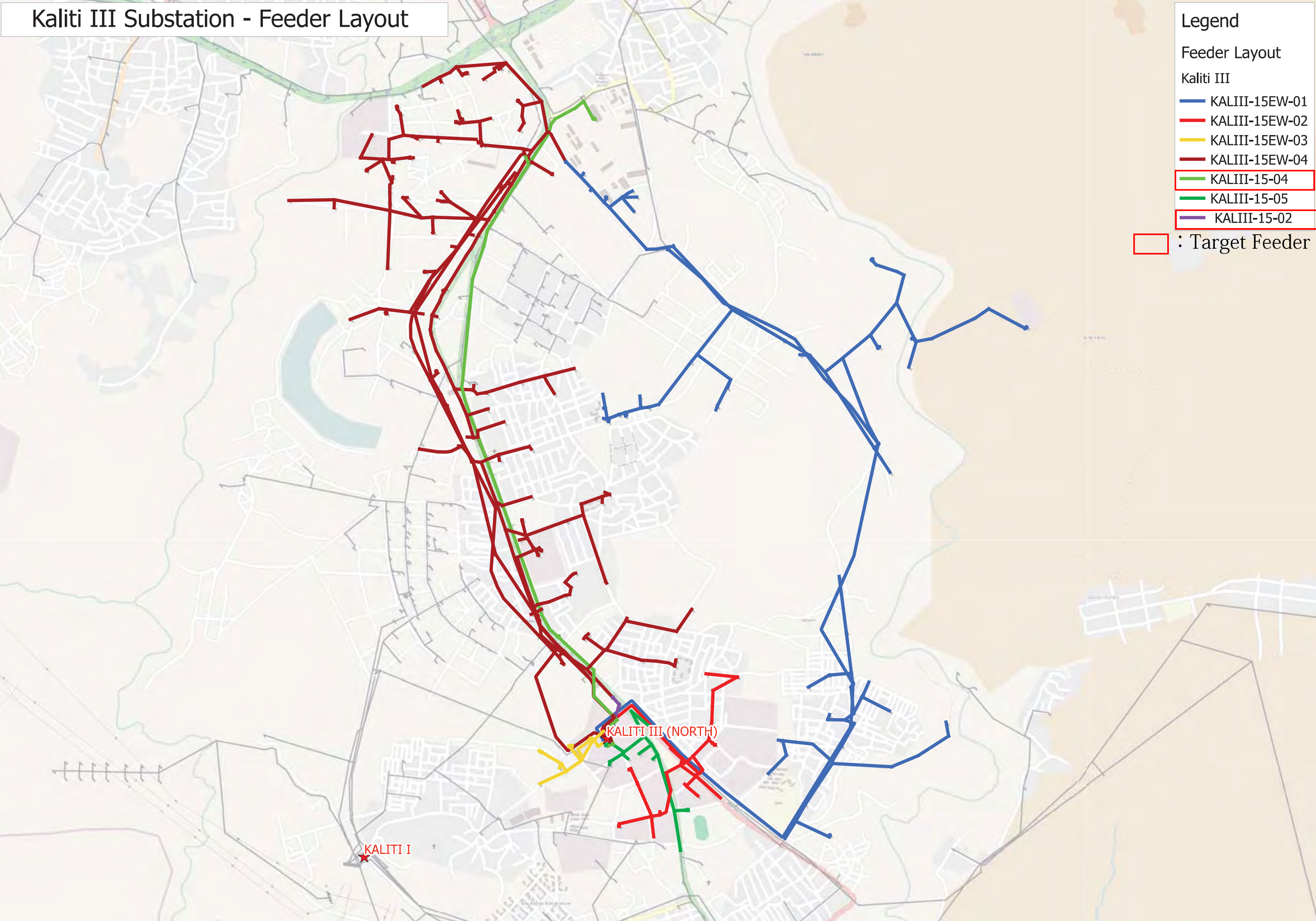
KALIII-15EW-04

KALIII-15-04

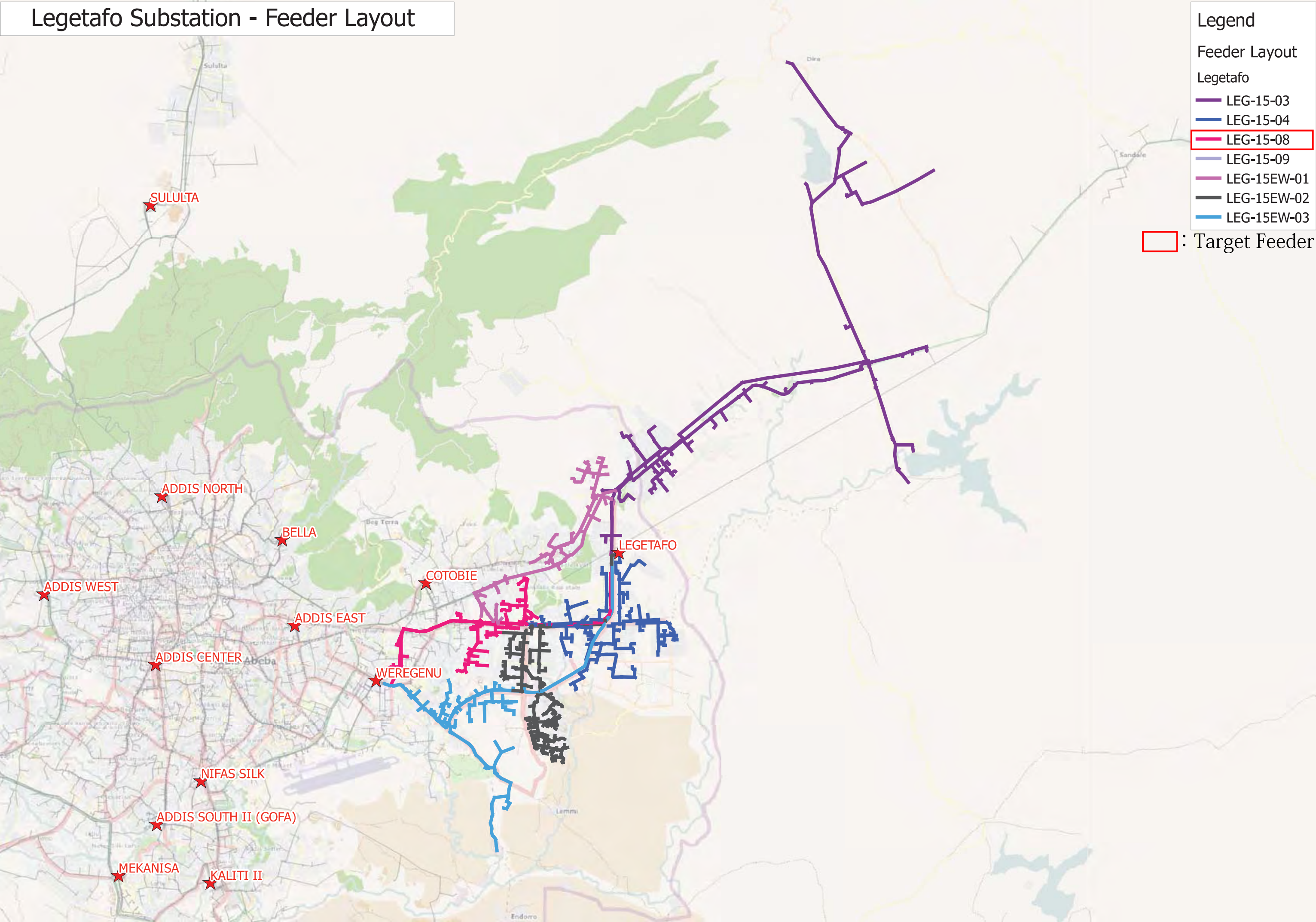
KALIII-15-05

KALIII-15-02

: Target Feeder



Legetafo Substation - Feeder Layout



Mekanisa Substation - Feeder Layout

Legend

Feeder Layout

Mekanisa

MEK-15-01

MEK-15-02

MEK-15-03

MEK-15-04

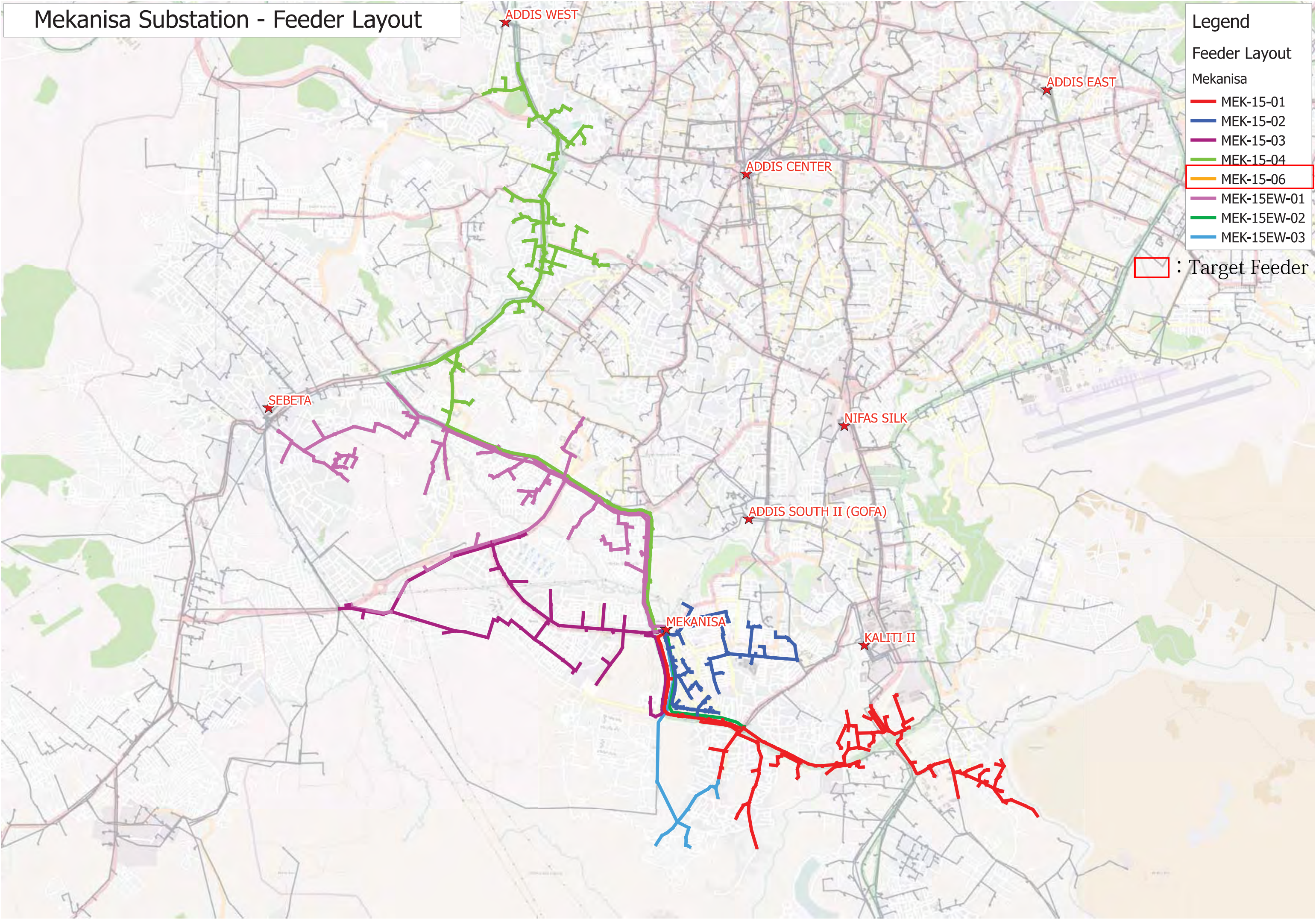
MEK-15-06

MEK-15EW-01

MEK-15EW-02

MEK-15EW-03

: Target Feeder



Sebeta II Substation - Feeder Layout

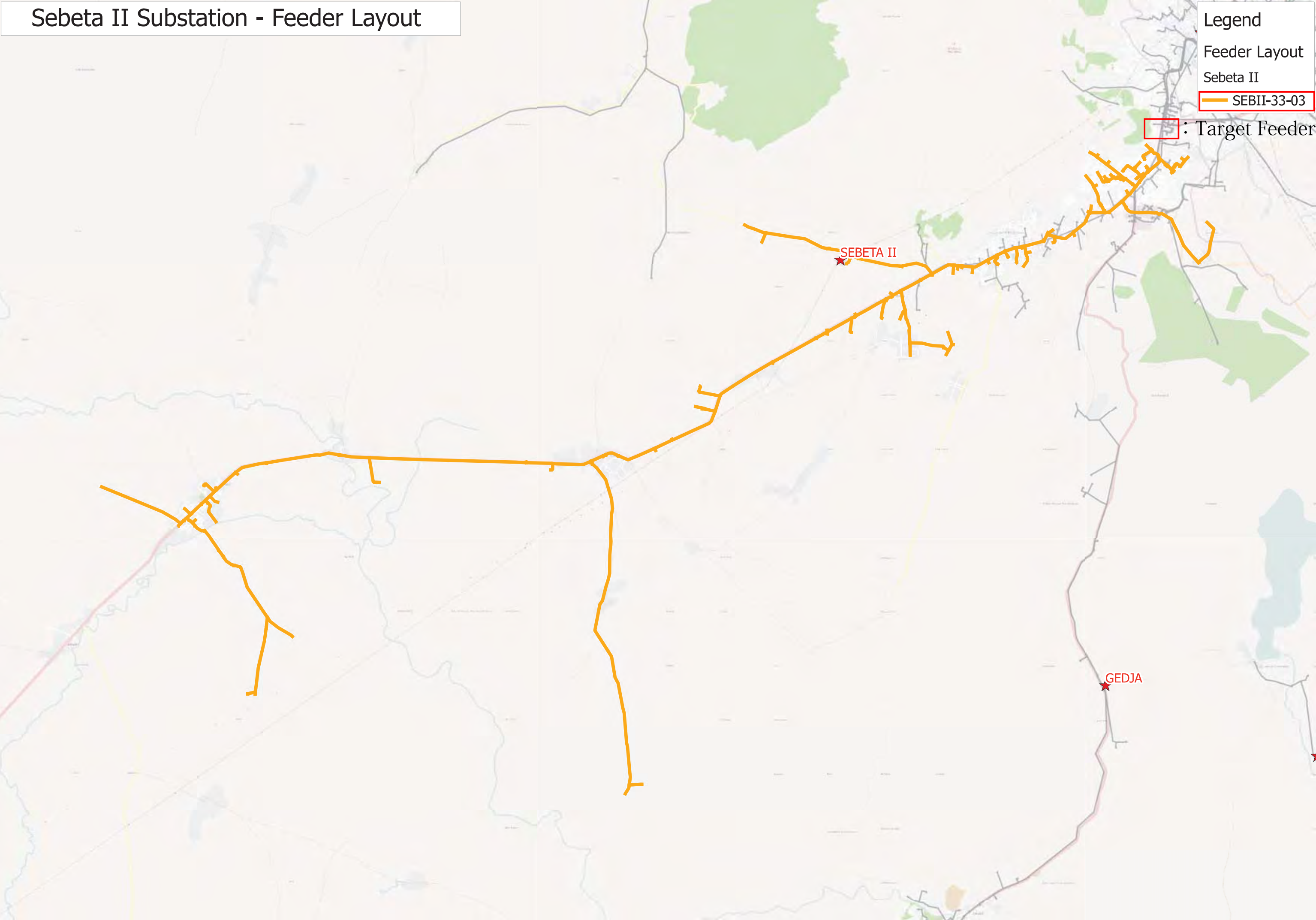
Legend

Feeder Layout

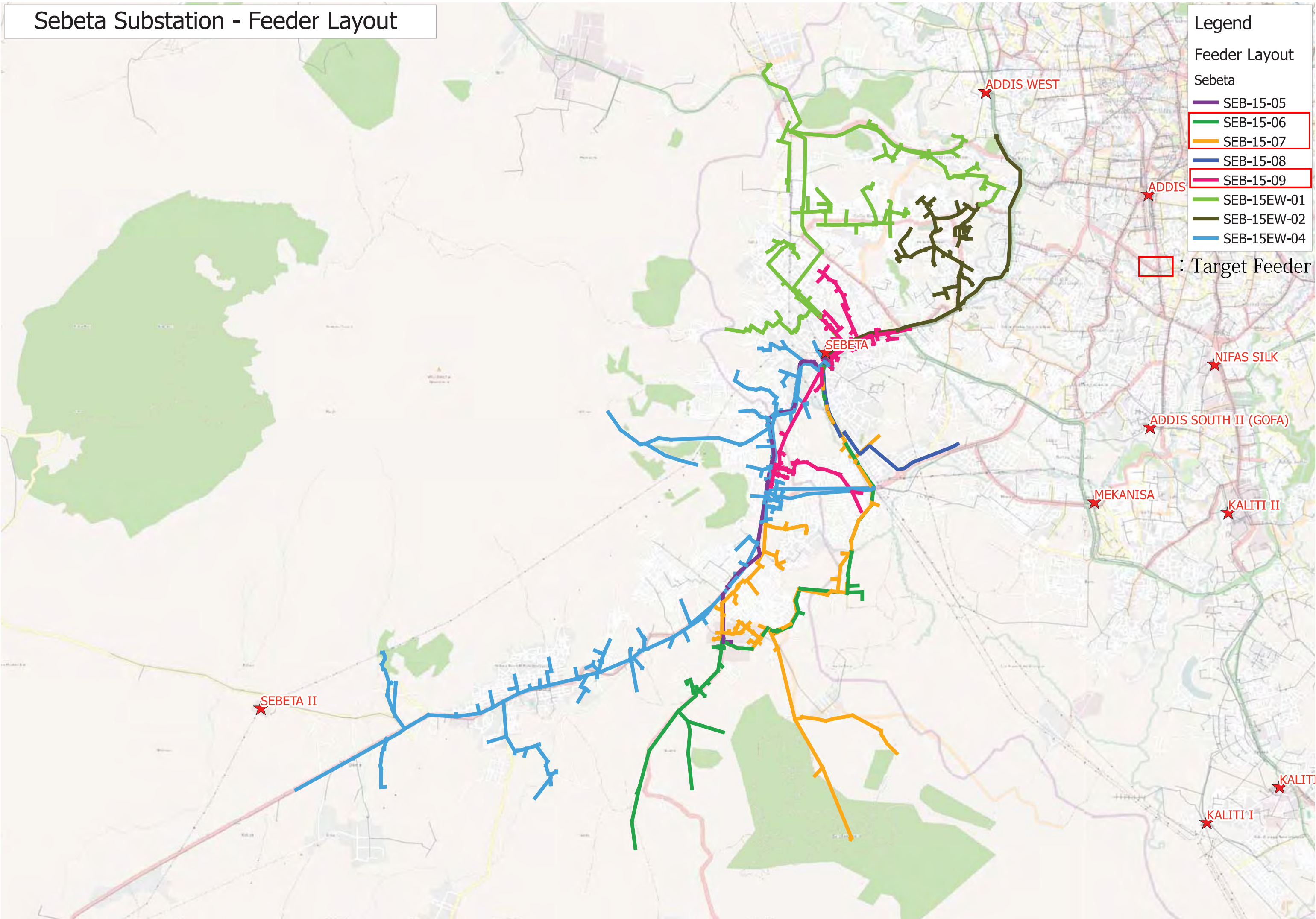
Sebeta II

SEBII-33-03

: Target Feeder



Sebeta Substation - Feeder Layout



Sululta Substation - Feeder Layout

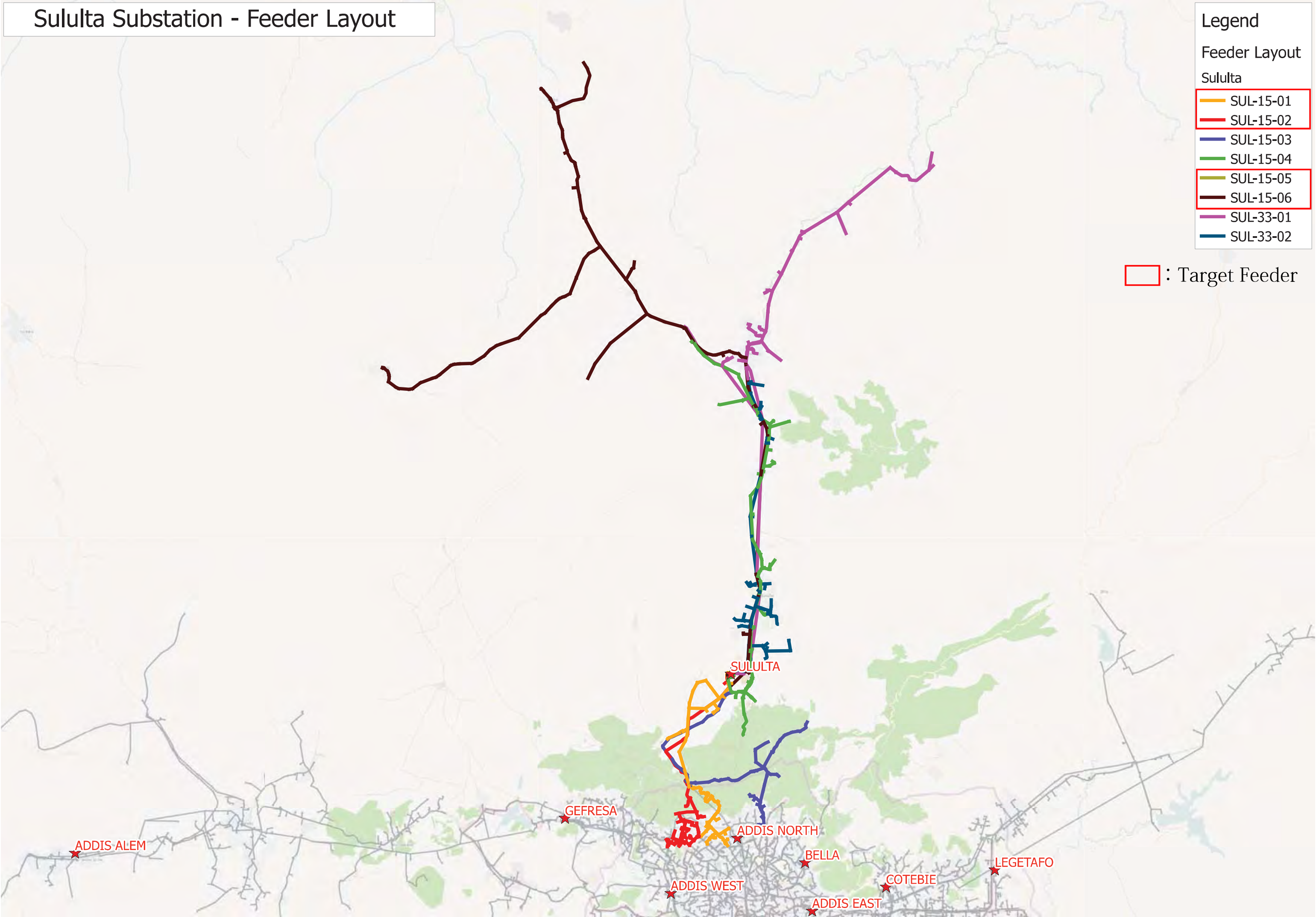
Legend

Feeder Layout

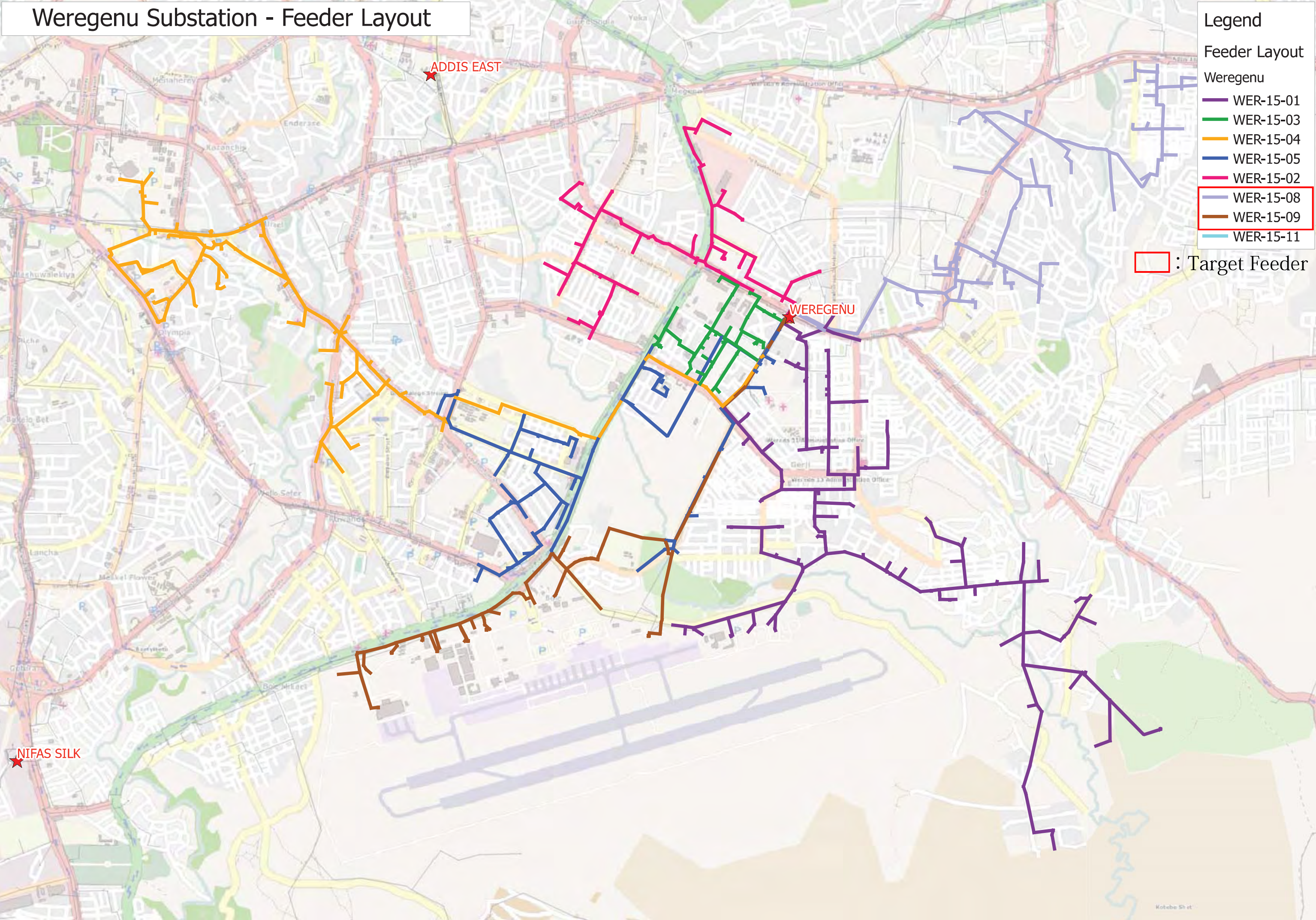
Sululta

- SUL-15-01
- SUL-15-02
- SUL-15-03
- SUL-15-04
- SUL-15-05
- SUL-15-06
- SUL-33-01
- SUL-33-02

: Target Feeder



Weregenu Substation - Feeder Layout



APPENDIX-8

CANDIDATE TARGET AREA (PACKAGE 5 / ITEM C)

Aba Samuel Substation - Feeder Layout

Legend

Feeder Layout

Aba Samuel

ABS-15-01

□ : Target Feeder



Addis Alem Substation - Feeder Layout

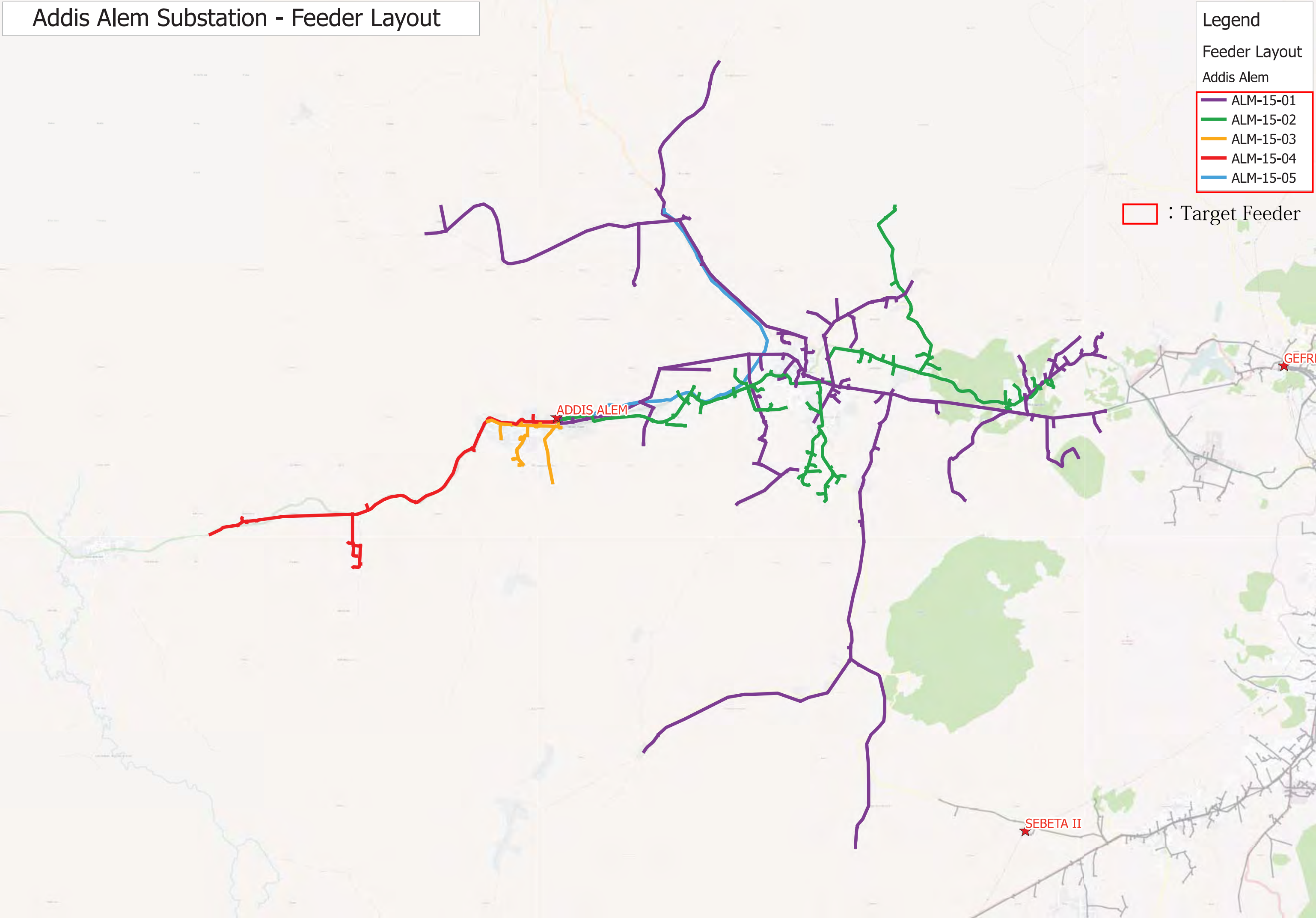
Legend

Feeder Layout

Addis Alem

- ALM-15-01
- ALM-15-02
- ALM-15-03
- ALM-15-04
- ALM-15-05

: Target Feeder



Addis North Substation - Feeder Layout

Legend

Feeder Layout

Addis North

ADN-15-04

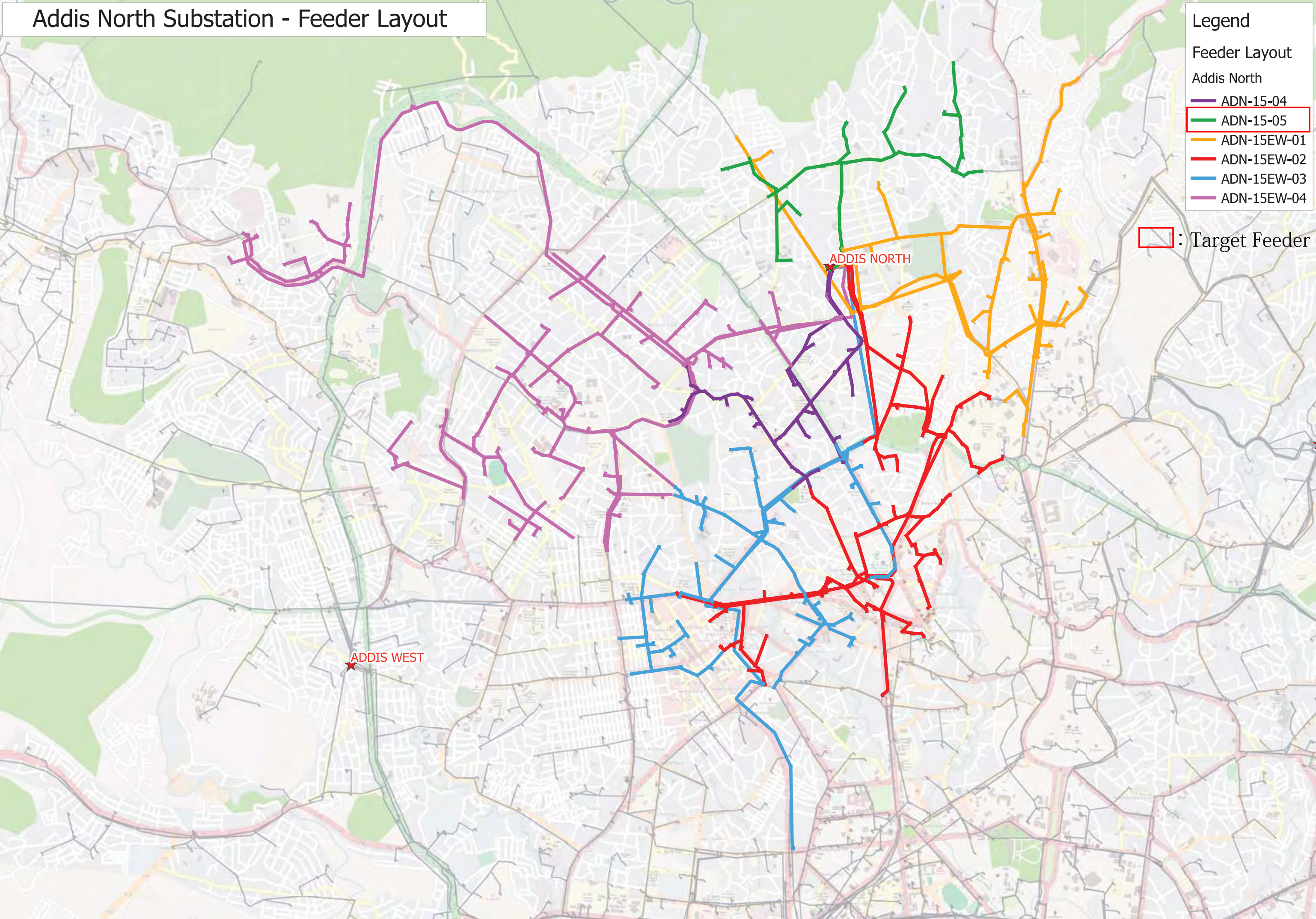
ADN-15-05

ADN-15EW-01

ADN-15EW-02

ADN-15EW-03

ADN-15EW-04

: Target Feeder

Bella Substation - Feeder Layout

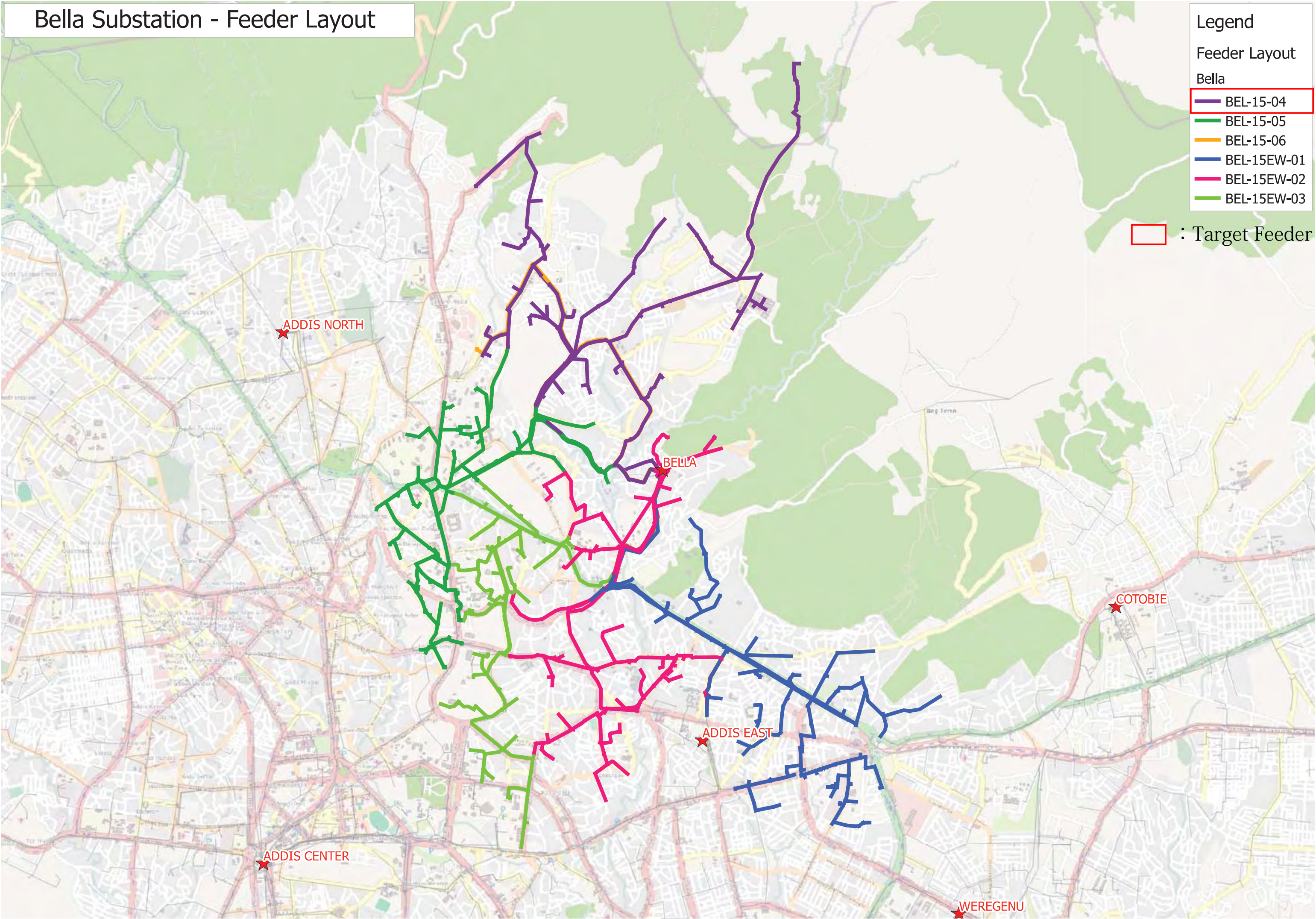
Legend

Feeder Layout

Bella

- BEL-15-04
- BEL-15-05
- BEL-15-06
- BEL-15EW-01
- BEL-15EW-02
- BEL-15EW-03

: Target Feeder



Dukem Substation - Feeder Layout

Legend

Feeder Layout

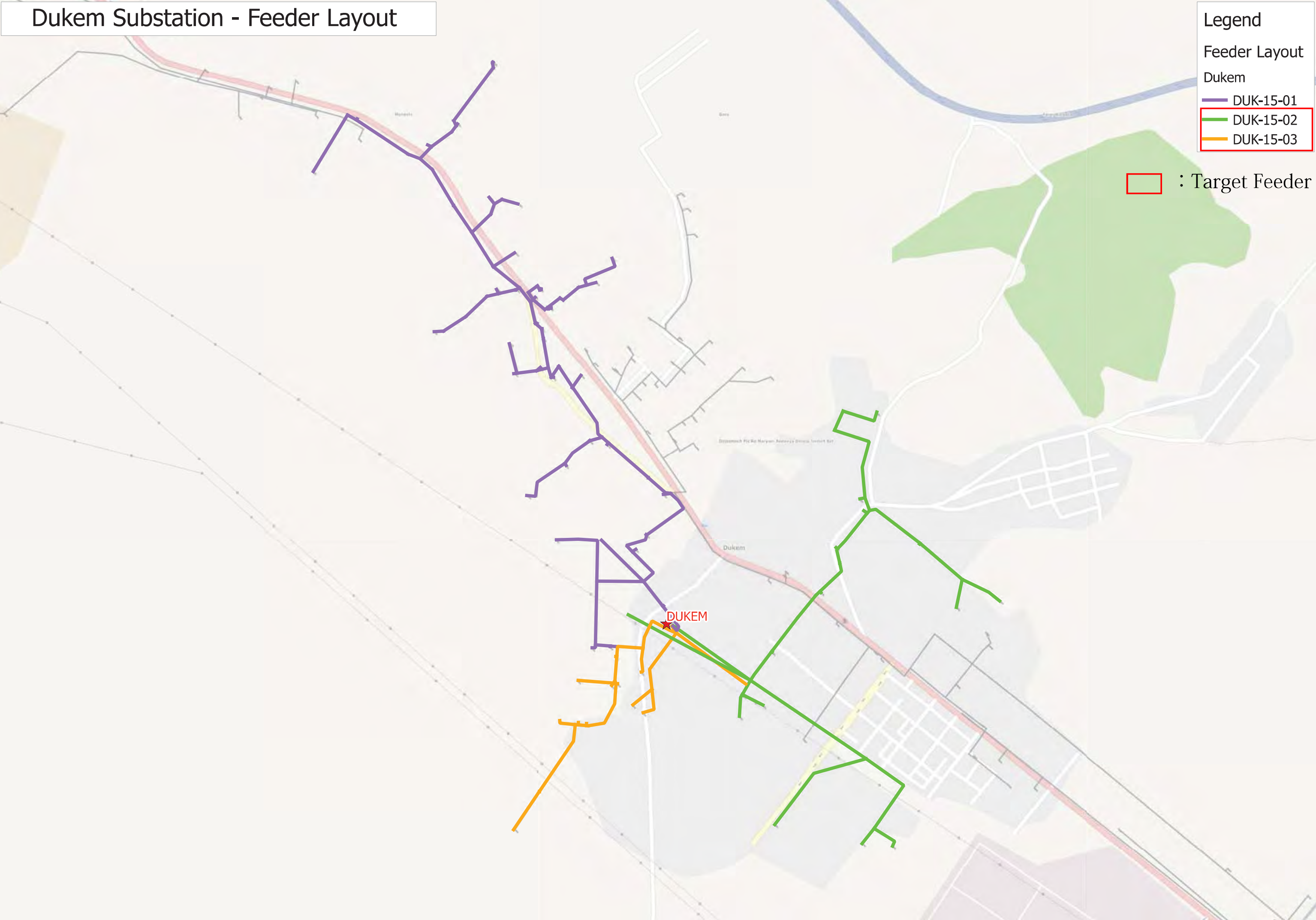
Dukem

DUK-15-01

DUK-15-02

DUK-15-03

□ : Target Feeder



Gelan Substation - Feeder Layout

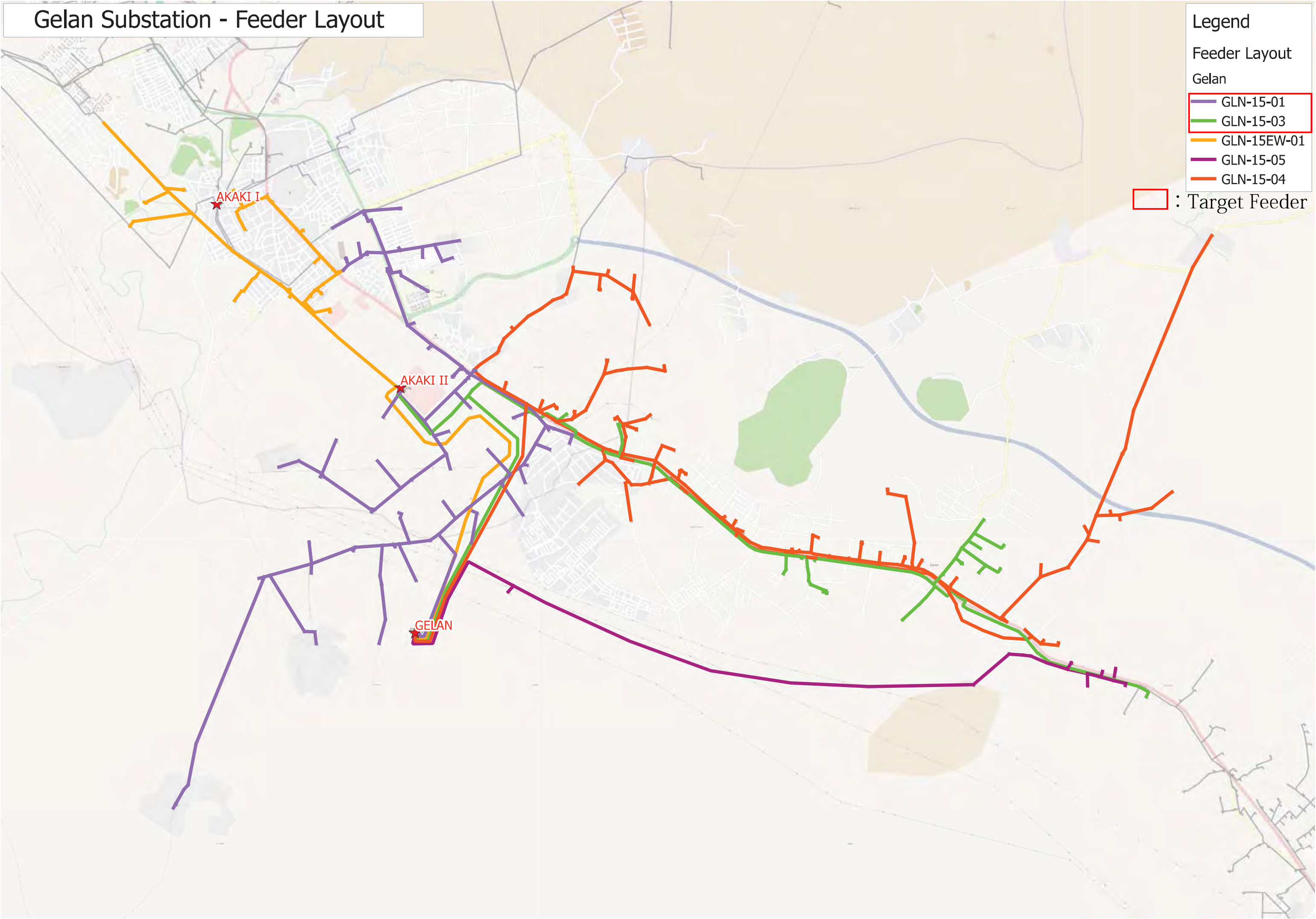
Legend

Feeder Layout

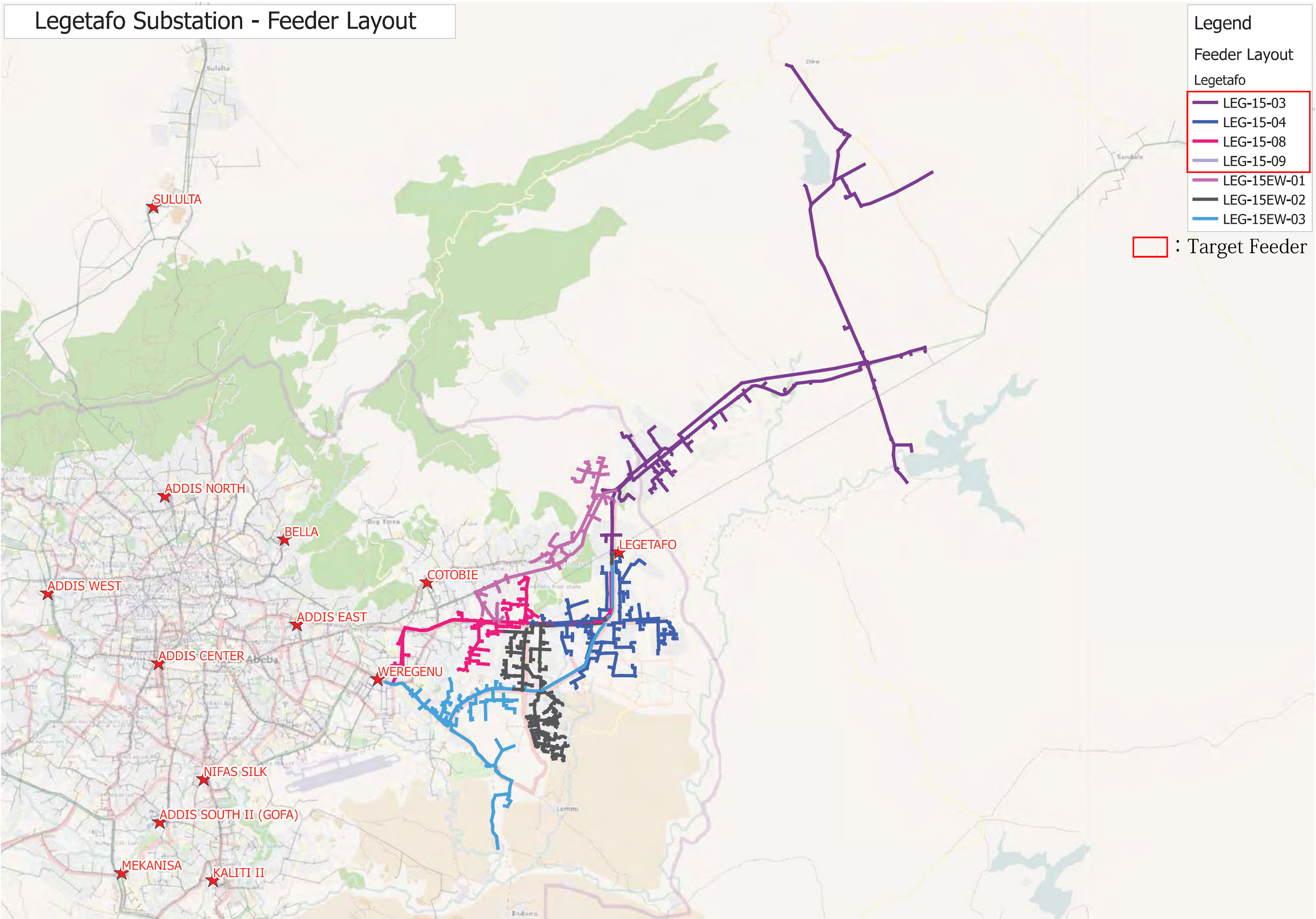
Gelan

- GLN-15-01
- GLN-15-03
- GLN-15EW-01
- GLN-15-05
- GLN-15-04

: Target Feeder



Legetafo Substation - Feeder Layout



Sululta Substation - Feeder Layout

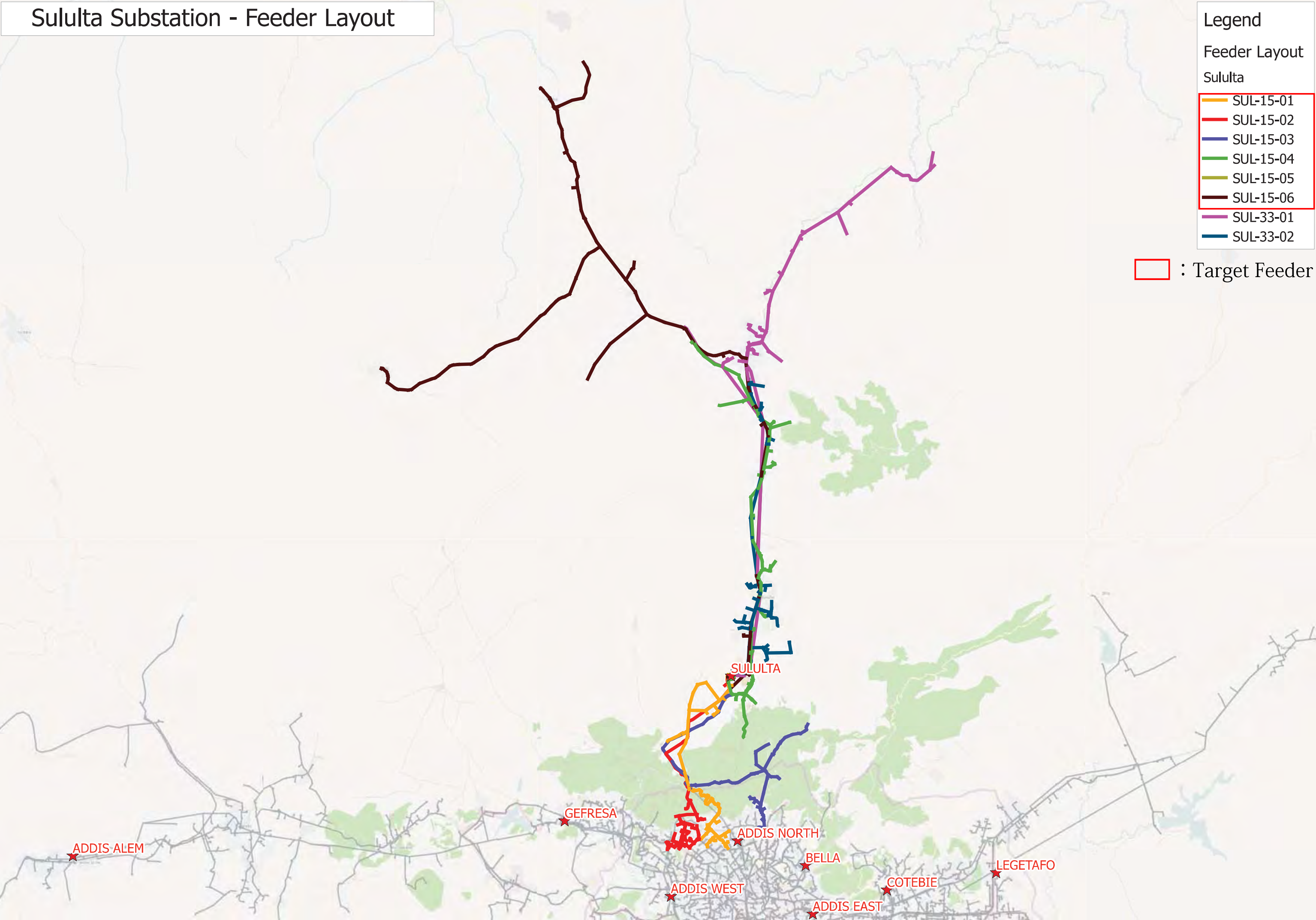
Legend

Feeder Layout

Sululta

- SUL-15-01
- SUL-15-02
- SUL-15-03
- SUL-15-04
- SUL-15-05
- SUL-15-06
- SUL-33-01
- SUL-33-02

: Target Feeder

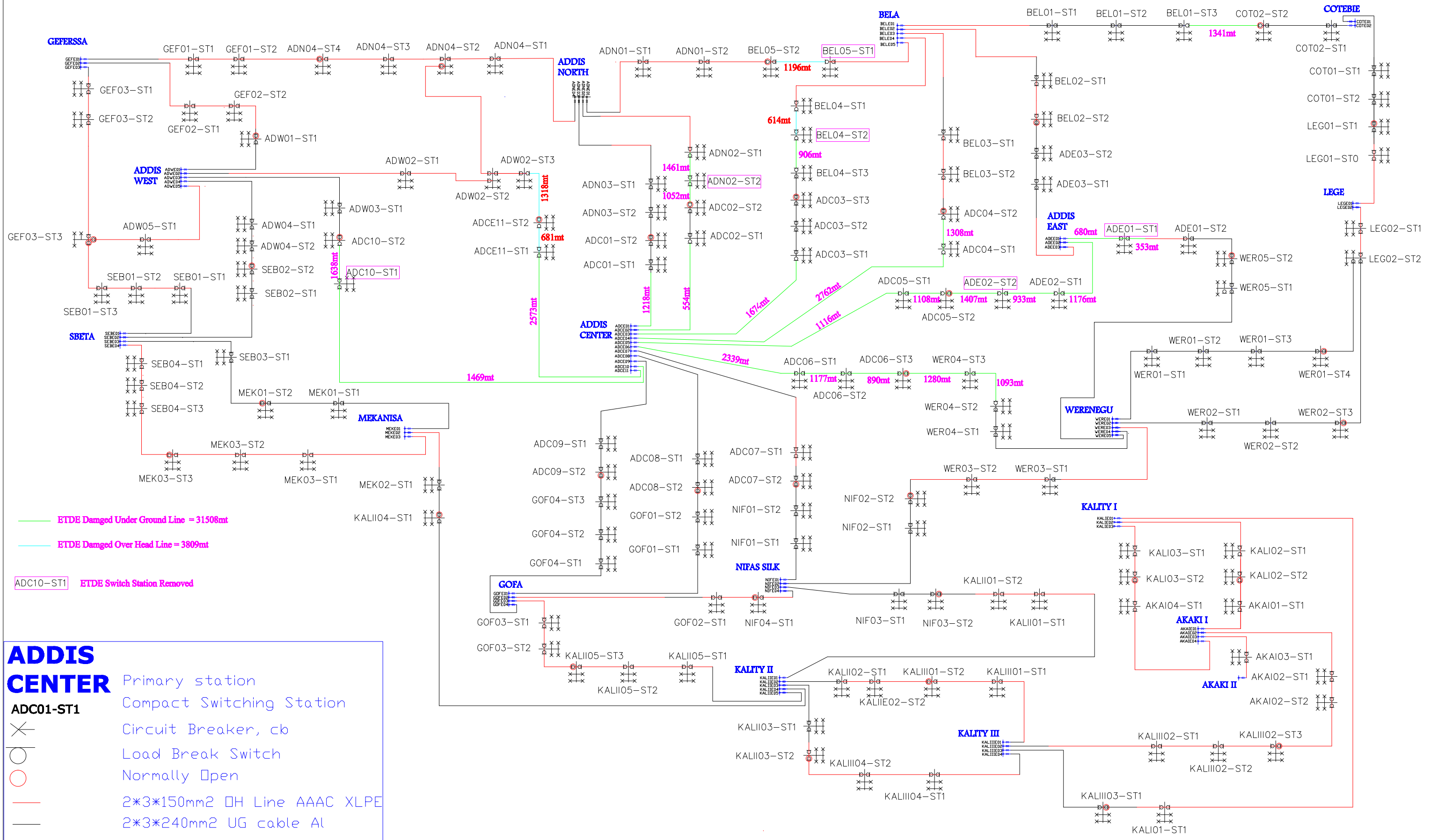


APPENDIX-9

SINGLE LINE DIAGRAM OF EXPRESS LINE

ETHIOPIA ELECTRIC POWER Co

ADDIS ABABA DISTRIBUTION BACK BONE SYSTEM SINGLE LINE DIAGRAM



APPENDIX-10

SCADA

HV side (more than 132kV)

AFD: Agence Francaise de Developpement

MV side



AFD*1 planning to upgrade NLC system

NDC (National Dispatch Centre) at Weregenu

DCC (Distribution Control Center) at Weregenu



Generating Plants (Hydro, Wind)



Outside of Addis Ababa



28 S/S in AADMP study area

--- Data link



--- Express way with fiber optic cables

28 S/S in AADMP study area

NDC can gathering the data from each substation and generation plants, command the switching operation of the breakers at substation and generating plants smoothly.

Supervision of MV network is carried out manually by the substation operator with verbal instructions from the network operation engineer at DCC.

DCC (Distribution Control Center) at Weregenu

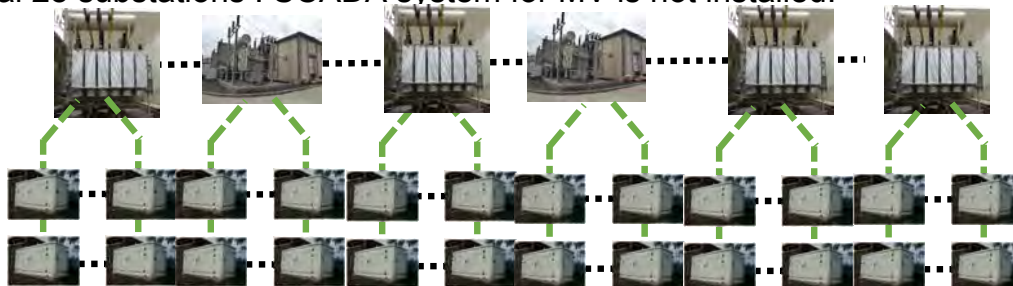


An off-line Distribution Management System (DMS) was installed. Name of software is Micro SCADA Pro DMS 600 (ABB Finland)



The DMS does not receive any real-time data about measuring values or actual switching positions of circuit breakers etc.

Total 28 substations : SCADA system for MV is not installed.

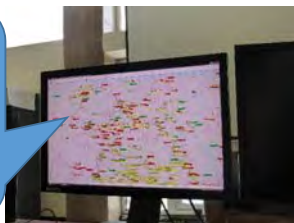


Total 166 Switching Stations are existing.

--- Express way with fiber optic cables

DCC (Distribution Control Center) at Weregenu

SCADA software could be extended to an online DMS. (Same supplier for the SCADA system is recommended)



Target of automation capability by Power China

Schedule of installation

Document including the drawings for approval by EEU was submitted (Implementation stage). But those documents is described mainly hardware specification.

Total 8 S/S
ADN, SHE, ADW, GOF
A, NIFS, WERE,
ADE, BELA



Remaining 20+ S/S requiring automation capability in the future.



36 Newly install Sw/S

56 existing Sw/S

Remaining 74 Sw/S requiring automation capability in the future.

Express way with fiber optic cables, Sw/S : Switching Station

Technical issue for package VI (SCADA) as Japanese Yen Loan.

- Specification of SCADA(online DMS) software is no clear.
Specification of SCADA(online DMS) including mapping of signals is not describe on their drawings and other documents clearly(mainly described hard ware). So, it is very difficult to study on the scope of work of the package VI.
- Assessment of SCADA system is difficult.
Before appraisal by donor, the existing condition of SCADA system should be assessed by the Consultant, to study the scope of work, and the budget so on. However the impact of incomplete work by Power China is very big. So, we can not asses the SCADA without full information of software, actual mapping of signals and so on.
- Responsibility for future integration and remodeling is not clear.
When commissioning of the package VI (SCADA) , remodeling of existing software installed by Power China will be required, but responsible of software integration and remodeling is not clear.

Recommendation by JICA Study Team

The study on extension of the MV distribution network automation should commence after completion of Power China's automation system.

