

ELECTRICITY GENERATING AUTHORITY OF THAILAND



**BIDDING DOCUMENTS
FOR
SUPPLY AND CONSTRUCTION OF TRANSMISSION LINE
500 KV CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (FROM CHAIYAPHUM 2 TO KM.68)
TRANSMISSION SYSTEM IMPROVEMENT PROJECT IN NORTHEASTERN,
LOWER NORTHERN, CENTRAL REGIONS AND BANGKOK AREA
TO ENHANCE SYSTEM SECURITY**

**VOLUME II OF IV
DRAWINGS AND DATA**

EGAT'S FUND

BIDDER :

DRAWINGS AND DATA

The drawings and data listed below are made a part of the Contract Documents. Among all the drawings, some plan & profile drawings showing representative conditions along the transmission line are included. However, a complete set of plan & profile drawings are available for examination by the Bidders at the office of EGAT. The Contractor will be furnished a complete set of plan & profile drawings and additional drawings as may be required in the opinion of EGAT to complete the work after confirmation of Letter of Award of Contract.

| <u>DRAWING NO.</u> | <u>DESCRIPTION</u> |
|---------------------------|---|
| 1 | E01-187 |
| 2 | - |
| 3 | - |
| | <u>KEY MAP, PLAN & PROFILE</u> |
| 4 | T01-001 |
| 5 | T01-002 |
| 6 | T01-003 |
| 7 | T01-004 |
| 8 | T01-005 |
| 9 | T01-006 |
| 10 | T02-001 |
| 11 | T02-002 |
| 12 | T02-003 |
| 13 | T02-004 |
| 14 | T02-005 |
| 15 | T02-006 |
| 16 | T02-007 |
| 17 | T02-008 |
| 18 | T02-009 |
| 19 | T02-010 |
| 20 | T02-011 |
| 21 | T02-012 |
| 22 | T02-013 |
| 23 | T02-014 |
| 24 | T02-015 |
| 25 | T02-016 |
| 26 | T02-017 |
| 27 | T02-018 |
| 28 | T02-019 |
| 29 | T02-020 |
| 30 | T02-021 |

DRAWING NO.

DESCRIPTION

| | | |
|----|---------|---|
| 31 | T02-022 | PLAN & PROFILE (STA. 17+800.000 – STA. 20+800.000) |
| 32 | T02-023 | PLAN & PROFILE (STA. 20+800.000 – STA. 22+748.884(BK.) / STA. 0+000.000(AH.)) |
| 33 | T02-024 | PLAN & PROFILE (STA. 22+748.884(BK.) / STA. 0+000.000(AH.) – STA. 2+800.000) |
| 34 | T02-025 | PLAN & PROFILE (STA. 2+800.000 – STA. 5+800.000) |
| 35 | T02-026 | PLAN & PROFILE (STA. 5+800.000 – STA. 7+840.145) |

LINE TERMINATION

| | | |
|----|---------|---|
| 36 | T04-001 | LINE TERMINATION AT CHAIYAPHUM 2 SUBSTATION |
|----|---------|---|

DETAILS OF WORK

| | | |
|----|---------|--------------------------|
| 37 | T05-001 | INTERFACING WORK AT KM68 |
|----|---------|--------------------------|

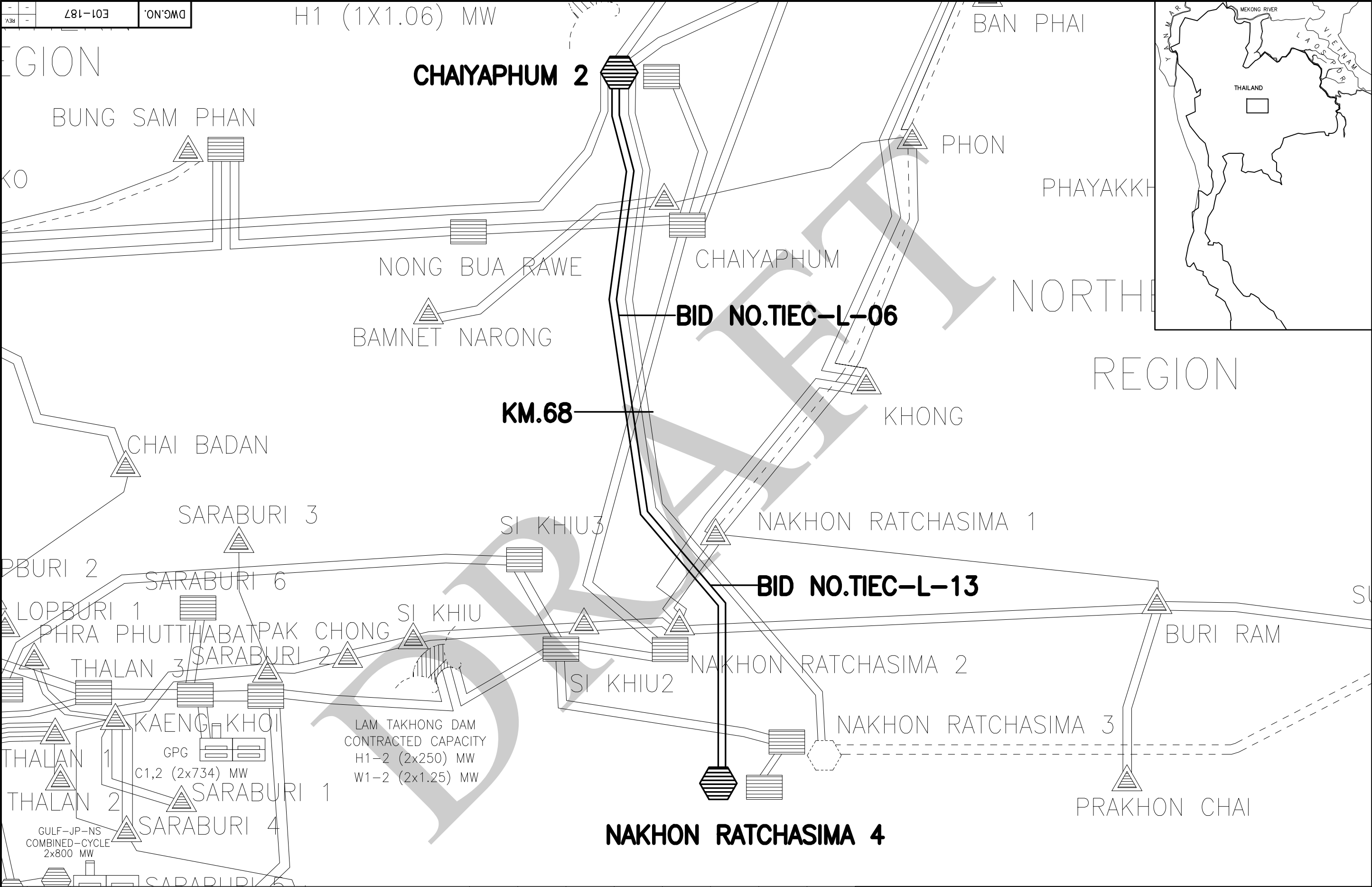
TOWERS

| | | |
|----|---------|--|
| 38 | C01-045 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQV3 |
| 39 | C01-046 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQV9(3) |
| 40 | C01-047 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQV9(9) |
| 41 | C01-048 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQTR |
| 42 | C01-049 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQT20 |
| 43 | C01-050 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQT40 |
| 44 | C01-051 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQT60 |
| 45 | C01-052 | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQT90 |
| 46 | C02-003 | LOADING DIAGRAM TOWER TYPE DQV3 |
| 47 | C02-004 | LOADING DIAGRAM TOWER TYPE DQV3 |
| 48 | C02-005 | LOADING DIAGRAM TOWER TYPE DQV9 |
| 49 | C02-006 | LOADING DIAGRAM TOWER TYPE DQV9 |
| 50 | C02-007 | LOADING DIAGRAM TOWER TYPE DQT20 |
| 51 | C02-008 | LOADING DIAGRAM TOWER TYPE DQT20 |
| 52 | C02-009 | LOADING DIAGRAM TOWER TYPE DQT40 |
| 53 | C02-010 | LOADING DIAGRAM TOWER TYPE DQT40 |
| 54 | C02-011 | LOADING DIAGRAM TOWER TYPE DQT60 |
| 55 | C02-012 | LOADING DIAGRAM TOWER TYPE DQT60 |
| 56 | C02-013 | LOADING DIAGRAM TOWER TYPE DQT60 |
| 57 | C02-014 | LOADING DIAGRAM TOWER TYPE DQT60 |
| 58 | C02-015 | LOADING DIAGRAM TOWER TYPE DQT60 |
| 59 | C02-016 | LOADING DIAGRAM TOWER TYPE DQT60 |
| 60 | C02-017 | LOADING DIAGRAM TOWER TYPE DQT90 |
| 61 | C02-018 | LOADING DIAGRAM TOWER TYPE DQT90 |
| 62 | C02-019 | LOADING DIAGRAM TOWER TYPE DQT90 |
| 63 | C02-020 | LOADING DIAGRAM TOWER TYPE DQT90 |
| 64 | C02-021 | LOADING DIAGRAM TOWER TYPE DQT90 |
| 65 | C02-022 | LOADING DIAGRAM TOWER TYPE DQT90 |

| <u>DRAWING NO.</u> | <u>DESCRIPTION</u> | |
|--|--------------------|---|
| 66 | C02-023 | LOADING DIAGRAM TOWER TYPE DQTR |
| 67 | C02-024 | LOADING DIAGRAM TOWER TYPE DQTR |
| 68 | C03-108 (1/3) | STRUCTURAL DESIGN TOWER TYPE HDQV3 |
| 69 | C03-108 (2/3) | STRUCTURAL DESIGN TOWER TYPE HDQV3 |
| 70 | C03-108 (3/3) | STRUCTURAL DESIGN TOWER TYPE HDQV3 |
| <u>TOWER FOUNDATION</u> | | |
| 71 | C11-015 | DETAIL OF PRESTRESSED CONCRETE PILE Ø 0.40 X 0.40 X 5.00 - 17.00 M. |
| 72 | C21-011 | FOUNDATION DESIGN CRITERIA |
| 73 | C21-025 | TYPICAL FOUNDATION OUTLINE |
| 74 | C21-026 | TYPICAL OUTLINE PILE FOUNDATION |
| 75 | C25-037 | STUB AND CLEAT ANGLES AND LOAD ON FOUNDATION FOR TOWER TYPE HDQV3 |
| 76 | JOB NO.-F-01 | FOUNDATION LIST FORM |
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| 77 | - | LOCATION OF BOREHOLES BH-1 TO BH-13 |
| 78 | - | LOCATION OF BOREHOLES BH-10 TO BH-20 |
| 79 | - | LOCATION OF BOREHOLES BH-19 TO BH-31 |
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| 81 | C32-964 | SOIL BORING LOGS BORING NO. BH-5 TO BH-6 |
| 82 | C32-965 | SOIL BORING LOGS BORING NO. BH-7 TO BH-9 |
| 83 | C32-966 | SOIL BORING LOGS BORING NO. BH-10 TO BH-13 |
| 84 | C32-967 | SOIL BORING LOGS BORING NO. BH-14 TO BH-17 |
| 85 | C32-968 | SOIL BORING LOGS BORING NO. BH-18 TO BH-21 |
| 86 | C32-969 | SOIL BORING LOGS BORING NO. BH-22 TO BH-25 |
| 87 | C32-970 | SOIL BORING LOGS BORING NO. BH-26 TO BH-28 |
| <u>ELECTRICAL AND GROUND CLEARANCE</u> | | |
| 88 | E03-049.1 | RULING SPAN SUMMARY AND TOWER HEIGHT DESCRIPTION |
| 89 | E03-049.2 | PARTICULARS OF CONDUCTOR OHGW AND OPGW |
| 90 | E05-123 | CONFIGURATION, ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE HDQV3 |
| 91 | E05-135 | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQV3 |
| 92 | E05-136 | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQV9 (3) |
| 93 | E05-141 | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQT20 |
| 94 | E05-142 | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQT40 |

| <u>DRAWING NO.</u> | <u>DESCRIPTION</u> | |
|---|---|--|
| 95 | E05-143 | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQT60 |
| 96 | E05-144 | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQT90 |
| 97 | E05-145 | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQTR |
| 98 | E07-091 | TRANSPOSITION |
| 99 | E08-002 | INSTALLATION OF CONDUCTOR & OHG. WIRE ON SLACK TENSION APPROACH SPANS |
| 100 | E11-024 | INSULATOR AND HARDWARE DETAILS FOR SHIELD WIRE ASSEMBLIES |
| 101 | E11-166 | INSULATOR AND HARDWARE DETAILS FOR SUSPENSION ASSEMBLY – ASSEMBLY 3C |
| 102 | E11-197 | INSULATOR AND HARDWARE DETAILS FOR SUSPENSION ASSEMBLY – ASSEMBLY 3D |
| 103 | E11-198 | INSULATOR AND HARDWARE DETAILS FOR SUSPENSION ASSEMBLY – ASSEMBLY 8D |
| 104 | E11-203 | INSULATOR AND HARDWARE DETAILS FOR DEADEND ASSEMBLIES – ASSEMBLIES 13D, 13AD AND 14D |
| 105 | E11-204 | INSULATOR AND HARDWARE DETAILS FOR DEADEND ASSEMBLY – ASSEMBLY 15D |
| 106 | E11-205 | INSULATOR AND HARDWARE DETAILS FOR ASSEMBLY 17D |
| 107 | E21-037 | INSTALLATION OF WARNING SIGNS |
| 108 | E31-003 (REV. 1) | TOWER GROUNDING |
| 109 | E31-024 | TOWER GROUNDING FOR TOWER TYPE HDQV3 |
| 110 | 500-EHV-T-15.2 (REV. 1) | FENCE/METAL OBJECT GROUNDING FOR 500 kV TRANSMISSION SYSTEM |
| <u>OPTICAL FIBER TRANSMISSION SYSTEM</u> | | |
| 111 | DW-FOT-D01-202-01 (REV. 2) | GENERAL CONFIGURATION OF OPGW IN POWER TRANSMISSION LINK (SINGLE/DOUBLE CIRCUIT) |
| 112 | DW-FOT-D01-202-02 (REV. 7) | CONFIGURATION OF OFC AND OPGW WITH INSULATOR (TAKE OFF STRUCTURE TO BUILDING) |
| 113 | DW-FOT-D01-207-01 (REV. 3) | TYPE AND INSTALLATION OF JOINT BOX |
| 114 | DW-FOT-D01-221-01 (REV. 2) | TYPICAL OPGW JOINT BOX ARRANGEMENT FOR 500 KV |
| 115 | DW-FOT-D01-212-01 (PAGE NO. P1, REV. 3) | TYPICAL OPGW CLAMPLING ASSEMBLY |
| 116 | DW-FOT-D01-212-01 (PAGE NO. P3, REV. 1) | HOT-DIP GALVANIZED STEEL CLAMP |
| 117 | DW-FOT-D01-213-01 (REV. 2) | TYPICAL OPTICAL FIBER CONNECTION DIAGRAM |
| 118 | DW-FOT-D01-214-01 (REV. 2) | TYPICAL INSTALLATION EQUIPMENT FOR OPGW |
| 119 | DW-FOT-D01-215-01 (REV. 3) | FIBERFRAME TERMINATION CABINET & RACK CABINET |
| 120 | DW-FOT-D01-221-01 (REV. 2) | TYPICAL OPGW JOINT BOX MOUNTING POSITION |
| 121 | DW-FOT-D01-233-01 (REV. 2) | TYPICAL FIBER ENCLOSING IN JOINT BOX |
| 122 | CYP2-S-2-OPGW | OPGW INSTALLATION AT CHAIYAPHUM 2 SUBSTATION |

| <u>DRAWING NO.</u> | | <u>DESCRIPTION</u> |
|------------------------|-----------------|---|
| <u>TYPICAL DRAWING</u> | | |
| 123 | TP-135C (REV.2) | RIGHT OF WAY CLEARING |
| 124 | TP-161C | R.O.W. ACCESS SIGN FOR PRESERVED FORESTS |
| 125 | TP-109A | TOWER ACCESSORIES INSTALLATION |
| 126 | TP-150B (REV.1) | TOWER ACCESSORIES DETAILS |
| 127 | TP-150.1 | WARNING SIGN |
| 128 | TP-126A (REV.2) | SUSPENSION INSULATORS |
| 129 | TP-152 (REV.1) | CRITERIA AND BASIC DATA FOR CALCULATION AND SELECTION OF FOUNDATION |
| 130 | TP-602B | BOUNDARY POST |
| 131 | - | GEOLOGICAL MAP OF THAILAND |





| | | | | | | | | | | | | | | | | | | | | | |
|---------|---------|-----------------|--|--|--|-------|----------|----------|-----------|-------------|--|---|--|---|-------------------------------|---|-------------------|---------|---------|------|--|
| | | | | | | | | | | | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | |
| | | | | | | | | | | | DRAWN | ARNON W. | RECOMMENDED AND VALIDATED |  | DRAWING NAME | 500 kV CHAIYAPHUM 2 – NAKHON RATCHASIMA 4 | | | | | |
| | | | | | | | | | | | DESIGNED | PISSAGORN T. | CONCURRED | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | DESCRIPTION OF DETAIL DRAWING | | | | | | |
| | | | | | | | | | | | VERIFIED |  | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | LOCATION MAP | | | | | |
| | | | | | | | | | | | APPROVED | | | JOB NO. | | | REPLACING DWG.NO. | DWG.NO. | | REV. | |
| | | | | | | | | | | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | DATE | 3 / 18 / 2025 | TIEC-03-L02 | | — | E01-187 | | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | | | | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | | | | | | | | |
| — | — | — | | | | — | — | — | — | — | — | — | — | — | | | | | | | |

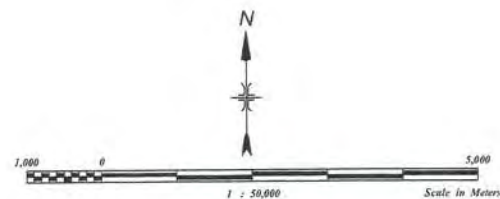
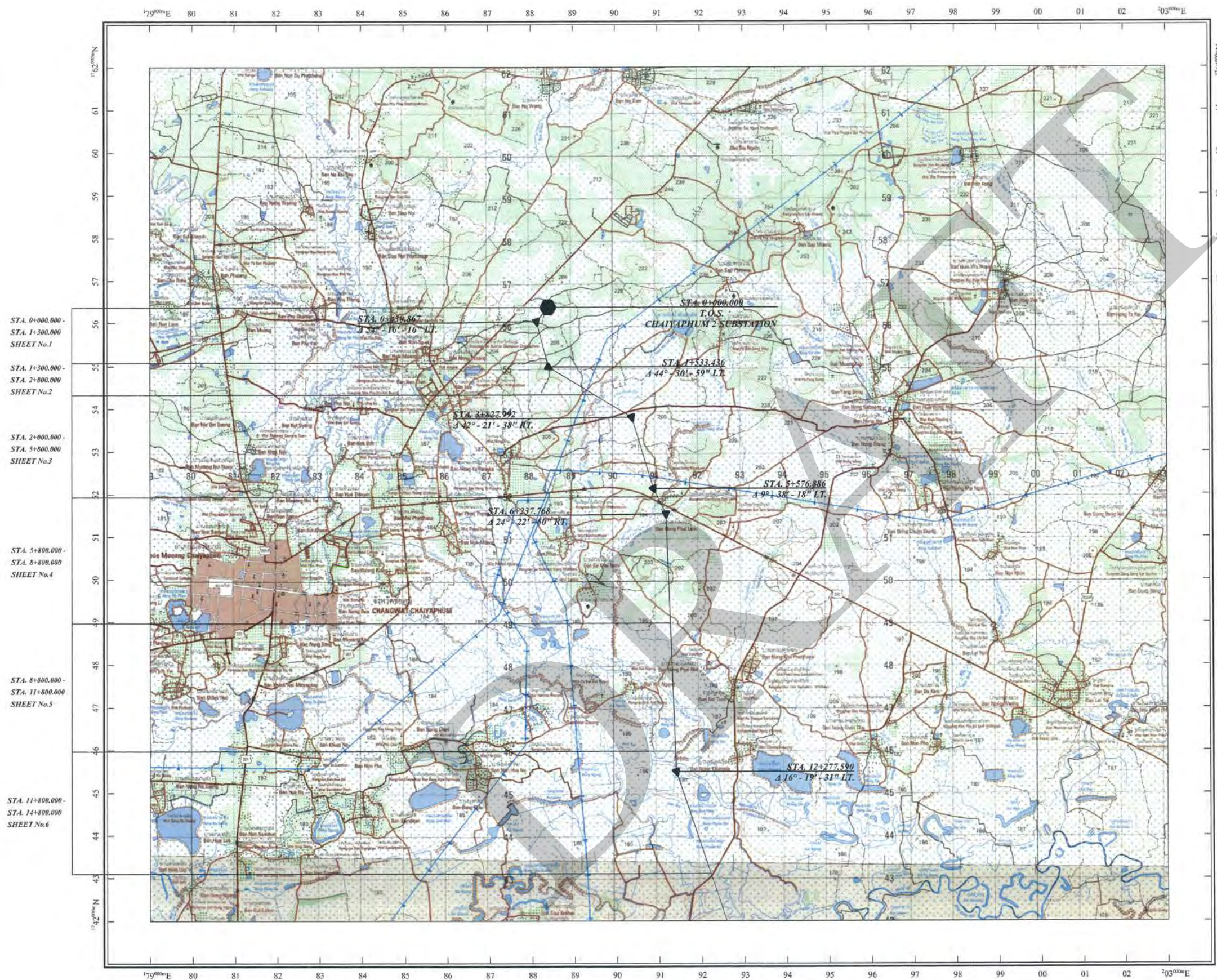
TABLE 1
CLIMATOLOGICAL DATA FOR THE PERIOD 1968 - 1997
CHAIYAPHUM

| | MONTH | | | | | | | | | | | | |
|------------------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|-------|
| | JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | YEAR |
| <u>RAINFALL (mm)</u> | | | | | | | | | | | | | |
| Mean | 3.9 | 17.9 | 46.6 | 83.9 | 151.9 | 153.6 | 120.5 | 143.3 | 246.9 | 126.6 | 15.3 | 5.6 | 1116 |
| Mean Rainy Day | 1 | 1.9 | 4.3 | 7.2 | 13.5 | 13 | 13.7 | 15.4 | 18.2 | 9.9 | 2.3 | 0.8 | 101.2 |
| Daily Maximum | 19.6 | 79.2 | 70.9 | 76.3 | 93.7 | 123.7 | 111.3 | 76.4 | 158 | 107.2 | 55.1 | 40.6 | 158 |
| THUNDER STORM (Days) | 0.2 | 1.8 | 5.3 | 11 | 15.2 | 9 | 8 | 7.2 | 14.2 | 6.1 | 0.9 | 0.1 | 79 |
| <u>TEMPERATURE (Celsius)</u> | | | | | | | | | | | | | |
| Mean | 24 | 26.4 | 28.8 | 29.9 | 29 | 28.4 | 27.9 | 27.4 | 27.2 | 26.8 | 25.3 | 23.6 | 27.1 |
| Mean (Max.) | 30.5 | 33 | 35.4 | 36.1 | 34.5 | 33.1 | 32.5 | 31.9 | 31.6 | 31 | 30.2 | 29.5 | 32.4 |
| Mean (Min.) | 17.9 | 20.3 | 22.8 | 24.5 | 24.8 | 24.6 | 24.3 | 24 | 23.8 | 23.2 | 20.8 | 17.9 | 22.4 |
| Ext. (Max.) | 36.5 | 39.3 | 40.5 | 42.6 | 40.3 | 38 | 37.7 | 36.6 | 35.7 | 35.5 | 36.8 | 35.7 | 42.6 |
| Ext. (Min.) | 7.6 | 11.5 | 13.1 | 17.8 | 20 | 21.5 | 21.3 | 21.1 | 21 | 14.6 | 12.1 | 8.2 | 7.6 |
| <u>WIND (Knots)</u> | | | | | | | | | | | | | |
| Mean Wind Speed | 2.4 | 2.6 | 2.7 | 2.9 | 2.7 | 3.4 | 3.5 | 3.4 | 2.1 | 2.8 | 3.4 | 3 | - |
| Max. Wind Speed | 27 | 50 | 36 | 40 | 46 | 35 | 35 | 35 | 35 | 30 | 25 | 25 | 50 |
| Prevailing Wind | NE | NE | SW | SW | W | SW | SW | W | W | NE | NE | NE | - |

TABLE 1
CLIMATOLOGICAL DATA FOR THE PERIOD 1968 - 1997
NAKHON RATCHASIMA

| | MONTH | | | | | | | | | | | | |
|------------------------------|---------|----------|-------|-------|-------|-------|-------|--------|-----------|---------|----------|----------|--------|
| | JANUARY | FEBRUARY | MARCH | APRIL | MAY | JUNE | JULY | AUGUST | SEPTEMBER | OCTOBER | NOVEMBER | DECEMBER | YEAR |
| <u>RAINFALL (mm)</u> | | | | | | | | | | | | | |
| Mean | 6.4 | 16.8 | 38.1 | 57.9 | 140.6 | 113.4 | 116.5 | 137.6 | 237 | 135.6 | 24.4 | 4.1 | 1028.4 |
| Mean Rainy Day | 1.2 | 2.1 | 5 | 7.3 | 14.3 | 13.7 | 13.9 | 16.2 | 18.5 | 11.9 | 3.4 | 1 | 108.5 |
| Daily Maximum | 71.2 | 51.2 | 97.3 | 91.8 | 107.3 | 114.8 | 104.1 | 70.2 | 143.7 | 136 | 84.3 | 20.6 | 143.7 |
| THUNDER STORM (Days) | 0.3 | 2.1 | 6.1 | 12.1 | 15.9 | 9.4 | 9.4 | 8.6 | 13.2 | 7.4 | 1 | 0 | 85.5 |
| <u>TEMPERATURE (Celsius)</u> | | | | | | | | | | | | | |
| Mean | 23.8 | 26.4 | 28.6 | 29.6 | 28.9 | 28.7 | 28.2 | 27.8 | 27.1 | 26.3 | 24.8 | 23.1 | 26.9 |
| Mean (Max.) | 30.8 | 33.6 | 35.9 | 36.6 | 35.2 | 34.3 | 33.8 | 33.2 | 32.2 | 30.8 | 29.7 | 29.3 | 33 |
| Mean (Min.) | 17.5 | 20.2 | 22.6 | 24.3 | 24.6 | 24.6 | 24.2 | 24 | 23.6 | 22.7 | 20.3 | 17.5 | 22.2 |
| Ext. (Max.) | 37.8 | 40.6 | 42.3 | 42.7 | 41.4 | 39.7 | 40 | 38.1 | 38 | 35.3 | 36.1 | 36 | 42.7 |
| Ext. (Min.) | 7.9 | 11.4 | 12.4 | 17.2 | 21 | 21.2 | 21.3 | 21.5 | 20.4 | 16.2 | 10.1 | 6.2 | 6.2 |
| <u>WIND (Knots)</u> | | | | | | | | | | | | | |
| Mean Wind Speed | 1.4 | 1.5 | 1.6 | 1.8 | 1.9 | 2.4 | 2.4 | 2.3 | 1.5 | 1.8 | 2.2 | 1.9 | - |
| Max. Wind Speed | 24 | 50 | 42 | 35 | 50 | 58 | 41 | 32 | 33 | 30 | 36 | 25 | 58 |
| Prevailing Wind | NE | NE | S | S | S | SW | SW | SW | W | NE | NE | NE | - |

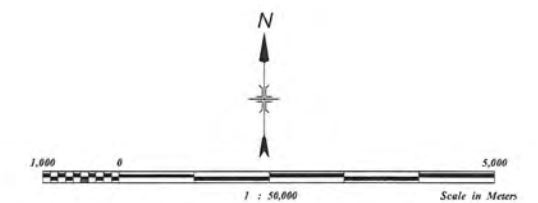
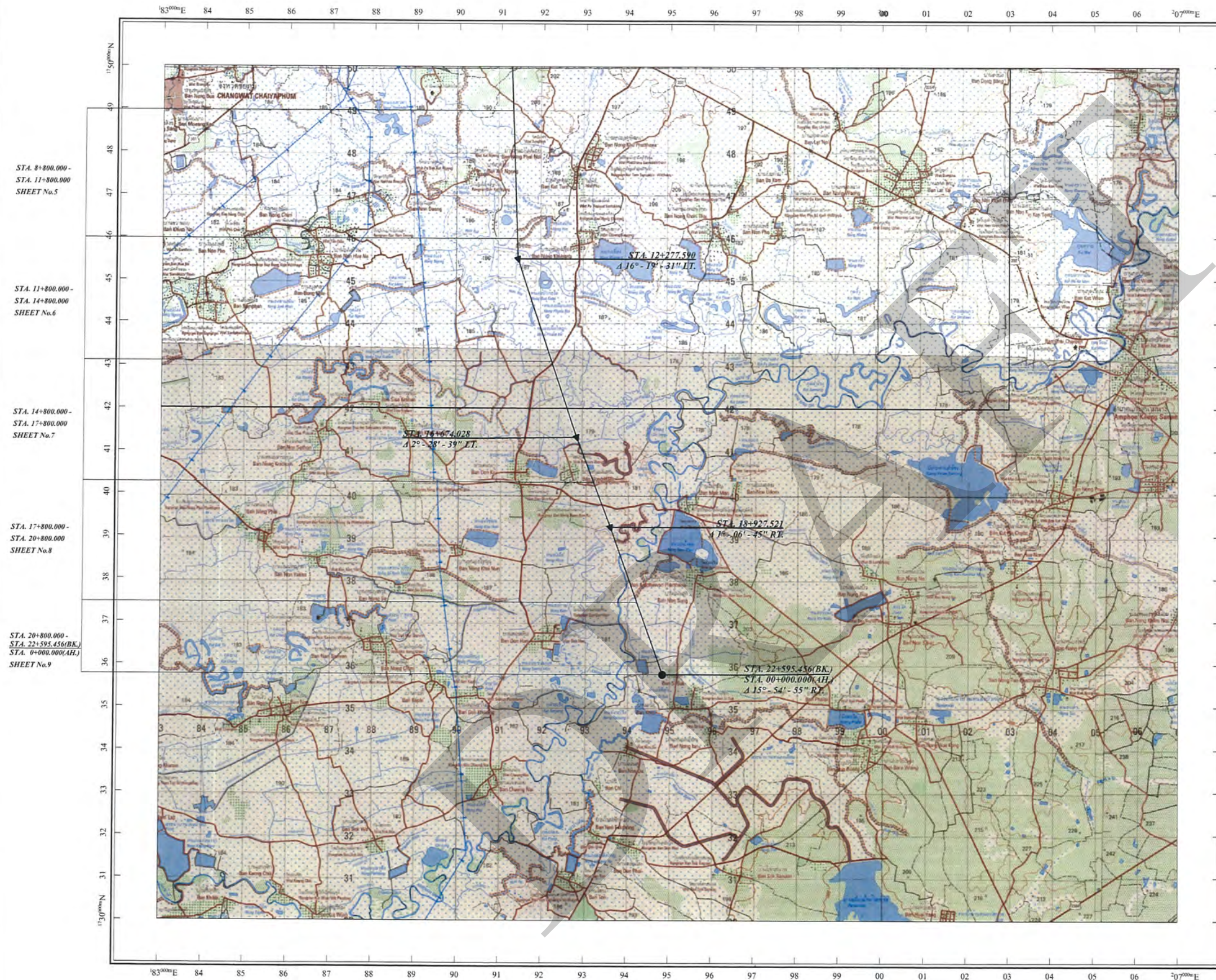
FOR BIDDING



NOTE: This index is a part of RTSD. Topographic map series L7018 (WGS. 84) Sheet No. 4825 I, 4825 II, 4825 III, 4825 IV

| No. | DATE | REVISION | CONCURRED | APPROVED |
|---|------|---|-----------|----------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | |
| 500 kV TRANSMISSION LINE | | | | |
| CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (SECTION 1) | | | | |
| KEY MAP | | | | |
| STA. 0+000.000 - STA. 14+800.000 | | | | |
| SUBMITTED: | | SUBMITTED: | | |
| CHIEF, SURVEY DEPARTMENT | | CHIEF, TRANSMISSION ENGINEERING DEPARTMENT | | |
| DATE | | DATE | | |
| APPROVED: | | APPROVED: | | |
| DIRECTOR, SURVEY DIVISION | | DIRECTOR, TRANSMISSION ENGINEERING DIVISION | | |
| DATE | | DATE | | |
| JOB No. | | DWG No. | | |
| TIEC - 03 - L02 | | T01 - 001 | | |
| | | REV | | |

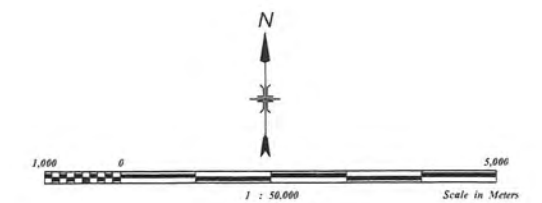
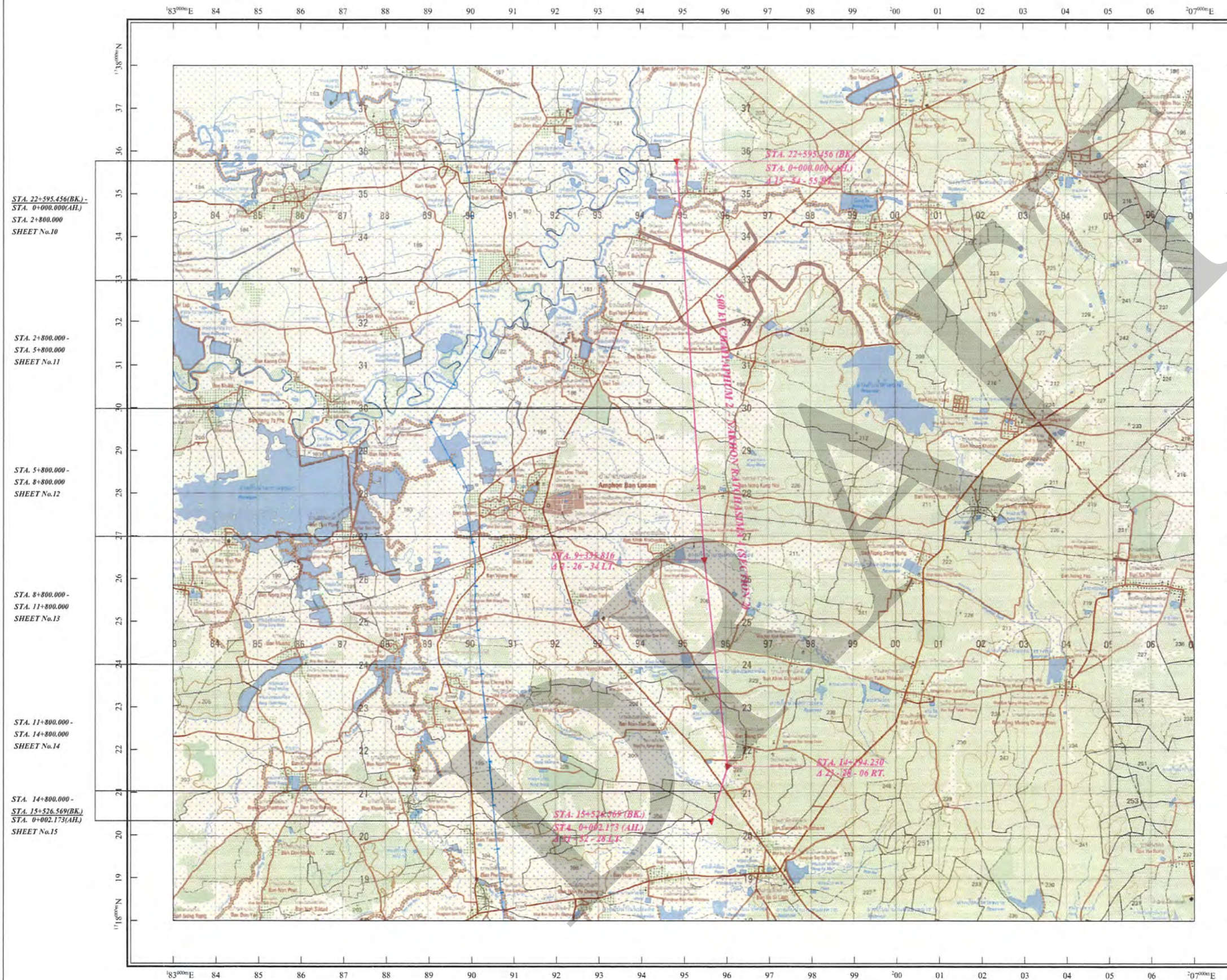
FOR BIDDING



NOTE : This index is a part of RTSD. Topographic map series L7018 (WGS. 84) Sheet No. 5440 III, 5440 IV

| | | | | |
|---|------|--|-----------|----------|
| No. | DATE | REVISION | CONCURRED | APPROVED |
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | |
| 500 kV TRANSMISSION LINE CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (SECTION 1) | | | | |
| KEY MAP STA. 8+800.000 - STA. 22+595.456(BK.) STA. 00+000.000(AH.) | | | | |
| SUBMITTED: EITIRONG PRAHAS CHIEF, TRANS. LINE ENGINEERING DEPARTMENT | | DATE: _____ CONCURRED: _____ APPROVED: _____ | | |
| CHIEF, SURVEY DEPARTMENT | | DATE: _____ | | |
| DIRECTOR, SURVEY DIVISION | | DATE: _____ | | |
| JOB No. TIEC - 03 - L02 | | DWG No. T01 - 002 | | |

FOR BIDDING

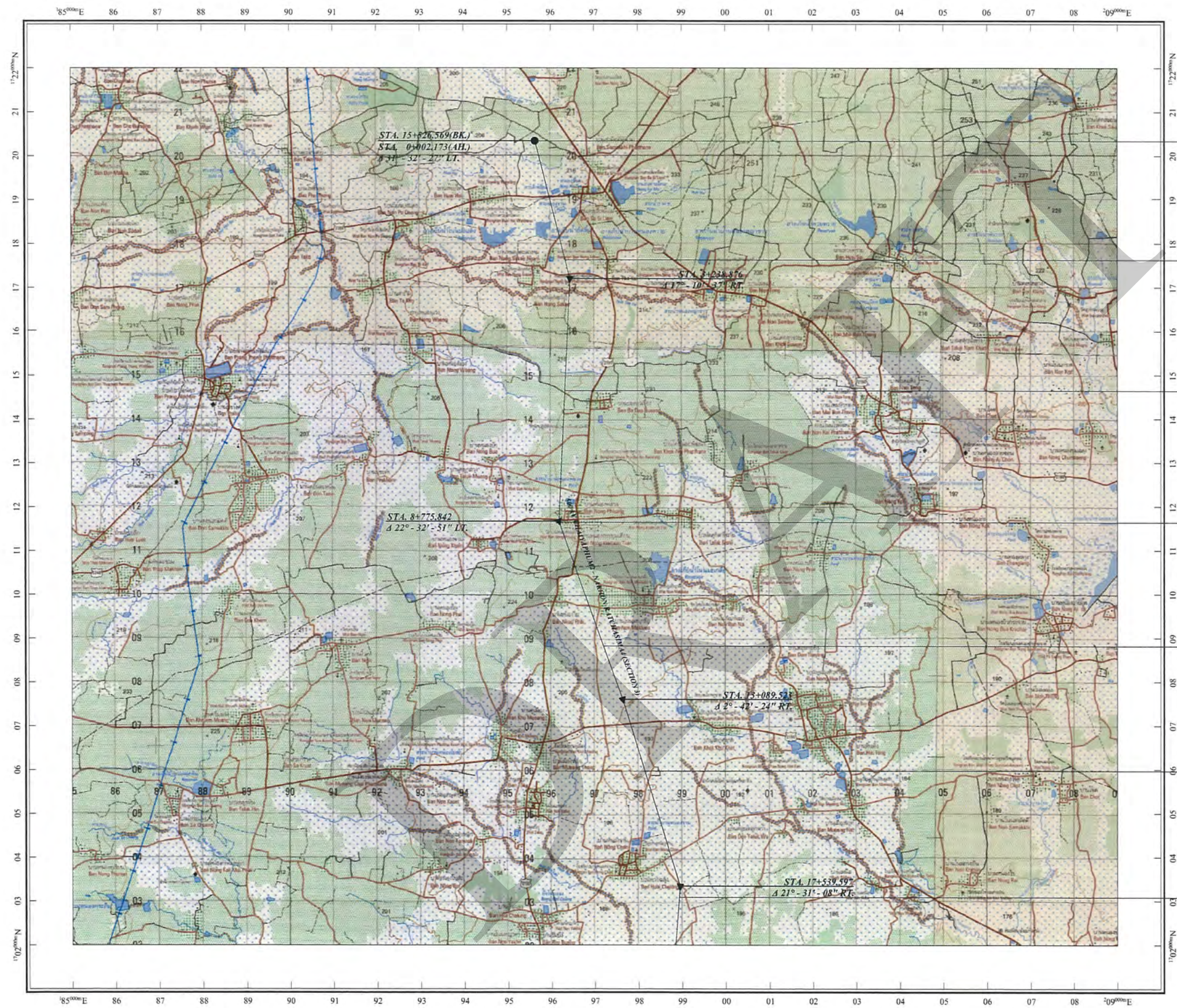


NOTE : This index is a part of RTSD, Topographic map series L7018 (WGS. 84) Sheet No. 5440 III

| No. | DATE | REVISION | CONCURRED | APPROVED |
|--|------|--|-----------|----------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | |
| 500 kV TRANSMISSION LINE | | | | |
| CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (SECTION 2) | | | | |
| KEY MAP | | | | |
| STA. 22+595.456 (BK.) - STA. 15+526.569 (BK.) | | | | |
| STA. 0+000.000 (AH.) - STA. 0+002.173 (AH.) | | | | |
| DRAWN: PATTARAWAT | | CHECKED: PATTARAWAT | | |
| TRACED: GRANT | | CHECKED: GRANT | | |
| CHECKED: PATTARAWAT | | CHECKED: PATTARAWAT | | |
| DATE: 17 Apr 25 | | DATE: 17 Apr 25 | | |
| CHIEF, SURVEY DEPARTMENT | | CHIEF, TRANS. LINE ENGINEERING DIVISION | | |
| DATE: 17 Apr 25 | | DATE: 17 Apr 25 | | |
| DIRECTOR, SURVEY DIVISION | | DIRECTOR, TRANS. SYSTEM ENGINEERING DIVISION | | |
| DATE: 17 Apr 25 | | DATE: 17 Apr 25 | | |
| JOB No. TIEC - 03 - L02 | | DWG No. T01 - 003 | | |
| REV. | | REV. | | |

SHEET No. 3 OF 11

FOR BIDDING



STA. 15+526.569(BK.) -
STA. 0+002.173(AH.)
STA. 2+800.000
SHEET No.16

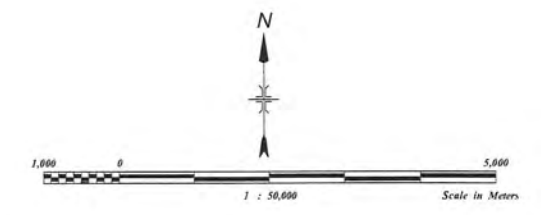
STA. 2+800.000 -
STA. 5+800.000
SHEET No.17

STA. 5+800.000 -
STA. 8+800.000
SHEET No.18

STA. 8+800.000 -
STA. 11+800.000
SHEET No.19

STA. 11+800.000 -
STA. 14+800.000
SHEET No.20

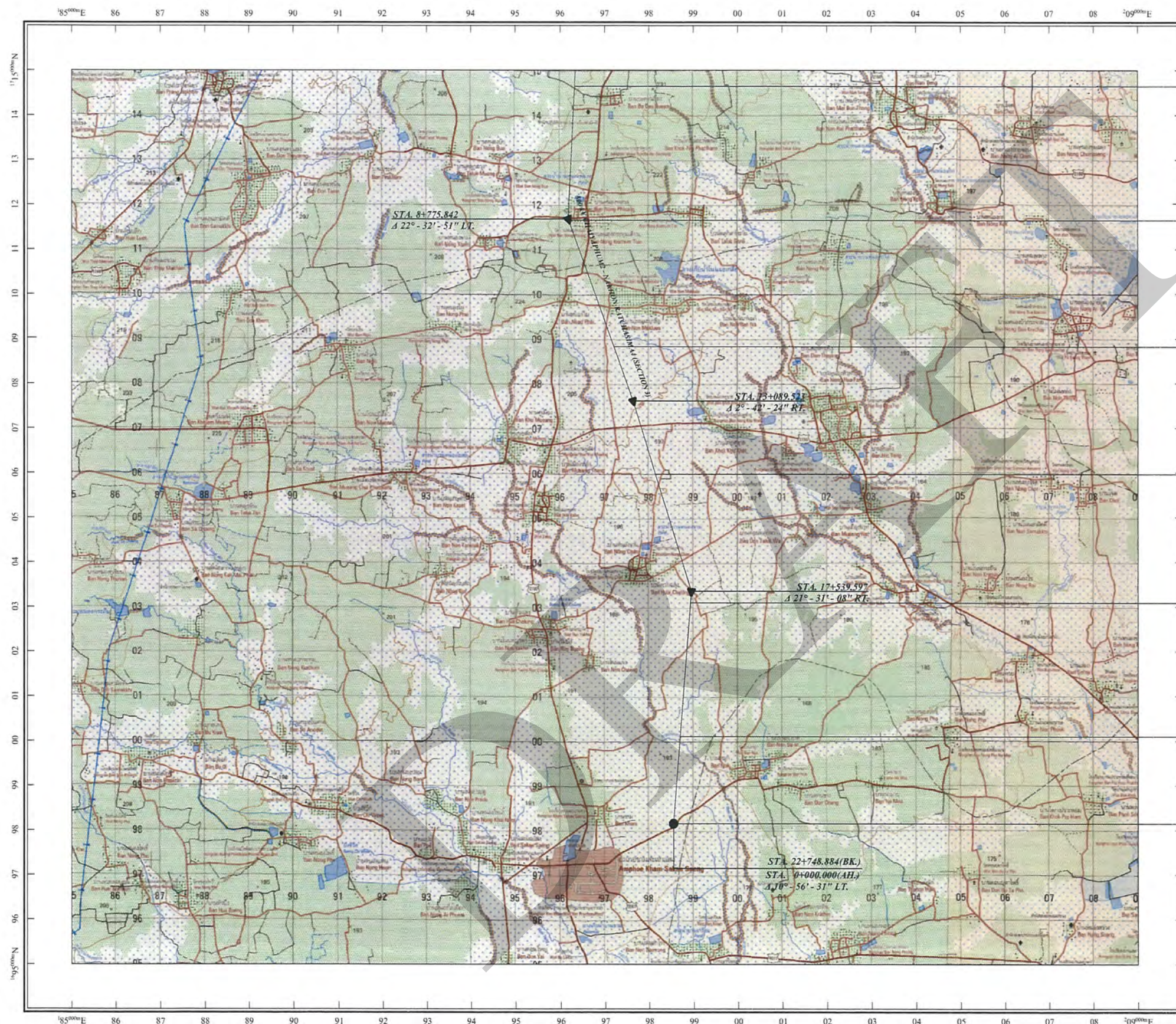
STA. 14+800.000 -
STA. 17+800.000
SHEET No.21



NOTE : This index is a part of RTSD. Topographic map
series L7018 (WGS. 84) Sheet No. 5439 I, 5439 IV, 5440 II, 5440 III

| No. | DATE | REVISION | CONCURRED | APPROVED |
|--|------|---|-----------|----------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | |
| 500 kV TRANSMISSION LINE | | | | |
| CHAIYAPHUM2 - NAKHON RATCHASIMA4 (SECTION 3) | | | | |
| KEY MAP | | | | |
| STA. 15+526.569(BK.) - STA. 17+800.00 STA. 0+002.173(AH.) | | | | |
| SUBMITTED: | | SUBMITTED: | | |
| DRAWN: CHANIT | | Tti: PONG 17 Apr 25 | | |
| CHECKED: Pongsakorn P. | | CHIEF, TRANS. LINE ENGINEERING DEPARTMENT DATE | | |
| CONCURRED: | | CONCURRED: | | |
| CHIEF, SURVEY DEPARTMENT DATE | | ASSISTANT DIRECTOR, TRANS. SYSTEM ENGINEERING DIVISION DATE | | |
| APPROVED: | | APPROVED: | | |
| DIRECTOR, SURVEY DIVISION DATE | | DIRECTOR, TRANS. SYSTEM ENGINEERING DIVISION DATE | | |
| JOB No. TIEC - 03 - L02 | | DWG No. T01 - 004 | | REV. |

FOR BIDDING



STA. 5+800.000 -
STA. 8+800.000
SHEET No.18

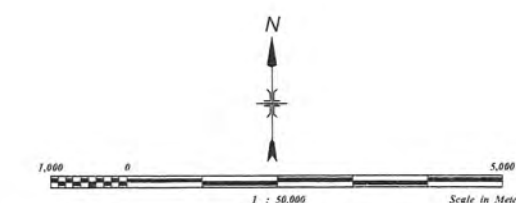
STA. 8+800.000 -
STA. 11+800.000
SHEET No.19

STA. 11+800.000 -
STA. 14+800.000
SHEET No.20

STA. 14+800.000 -
STA. 17+800.000
SHEET No.21

STA. 17+800.000 -
STA. 20+800.000
SHEET No.22

STA. 20+800.000 -
STA. 22+748.884(BK.)
STA. 0+000.000(AH.)
SHEET No.23



NOTE : This index is a part of RTSD, Topographic map
series L7018 (WGS. 84) Sheet No. 54391 I, 54391V

| | | | | |
|--|-----------------|--|-----------|----------|
| No. | DATE | REVISION | CONCURRED | APPROVED |
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | |
| 500 kV TRANSMISSION LINE CHAIYAPHUM2 - NAKHON RATCHASIMA4 (SECTION 3) | | | | |
| KEY MAP STA. 5+800.000 - STA. 22+748.884(BK.) STA. 0+000.000(AH.) | | | | |
| DESIGNED | CHECKED | APPROVED | | |
| DRAWN | PROCESSING | DATE | | |
| TRACED | DATE | DATE | | |
| CHECKED | DATE | DATE | | |
| CHIEF, SURVEY DEPARTMENT | | CHIEF, TRANS. LINE ENGINEERING DEPARTMENT | | |
| DATE | | DATE | | |
| APPROVED | | APPROVED | | |
| DIRECTOR, SURVEY DIVISION | | DIRECTOR, TRANS. SYSTEM ENGINEERING DIVISION | | |
| DATE | | DATE | | |
| JOB No. | TIEC - 03 - L02 | DWG No. | T01 - 005 | REV. |

SHEET No. 5 OF 11

FOR BIDDING



STA. 22+748.884 (BK.)
STA. 0+000.000 (AH.)
- STA. 2+800.000
SHEET No.24

STA. 2+800.000 -
STA. 5+800.000
SHEET No.25

STA. 5+800.000 -
STA. 7+840.145
SHEET No.26
(Bid No.TIEC-L-06)

STA. 7+840.145 -
STA. 8+800.000
SHEET No.26A
(Bid No.TIEC-L-13)

STA. 8+800.000 -
STA. 11+800.000
SHEET No.27

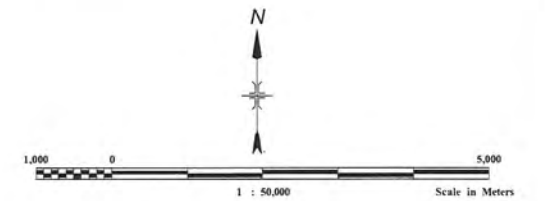
STA. 11+800.000 -
STA. 14+800.000
SHEET No.28

STA. 14+800.000 -
STA. 17+800.000
SHEET No.29

STA. 17+800.000 -
STA. 20+800.000
SHEET No.30

500KV TO CHAIYAPHUM 2
(Bid No.TIEC-L-06)

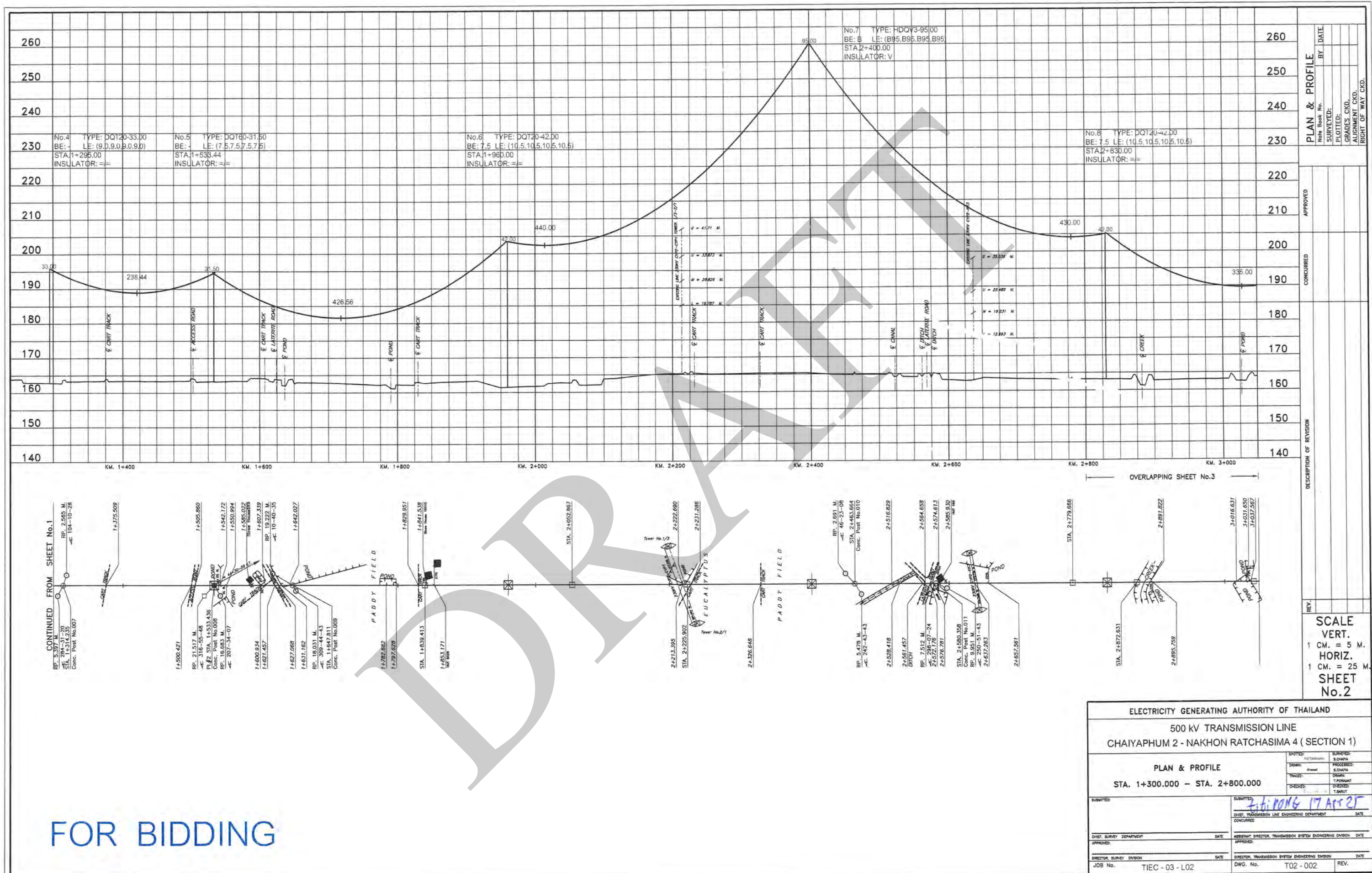
500KV TO NAKHON RATCHASIMA 4
(Bid No.TIEC-L-13)



NOTE : This index is a part of RTSD. Topographic map
series L7018 (WGS. 84) Sheet No. 5439 I, 5439 II, 5439 III, 5439 IV

SHEET No. 6 OF 11

| | | | | |
|--|------|---|-----------|----------|
| No. | DATE | REVISION | CONCURRED | APPROVED |
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | |
| 500 kV TRANSMISSION LINE CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (SECTION 4) | | | | |
| KEY MAP STA. 22+748.884 (BK.) - STA. 7+840.145 STA. 0+000.000 (AH.) | | | | |
| SUBMITTED T. PONGK 17 Apr 25 | | SURVEYED PATTARAVIN DRAWN CHANUT TRACKED PONGKOR CHECKED PONGKOR | | |
| CHIEF, SURVEY DEPARTMENT APPROVED | | CHIEF, TRANS. LINE ENGINEERING DEPARTMENT APPROVED | | |
| DIRECTOR, SURVEY DIVISION DATE | | DIRECTOR, TRANS. SYSTEM ENGINEERING DIVISION DATE | | |
| JOB No. TIEC - 03 - L02 | | DWG No. T01 - 006 | | REV. |



| PLAN & PROFILE | |
|-------------------|------|
| BY | DATE |
| SURVEYED | |
| PLOTTED | |
| GRADES CKD. | |
| ALIGNMENT CKD. | |
| RIGHT OF WAY CKD. | |

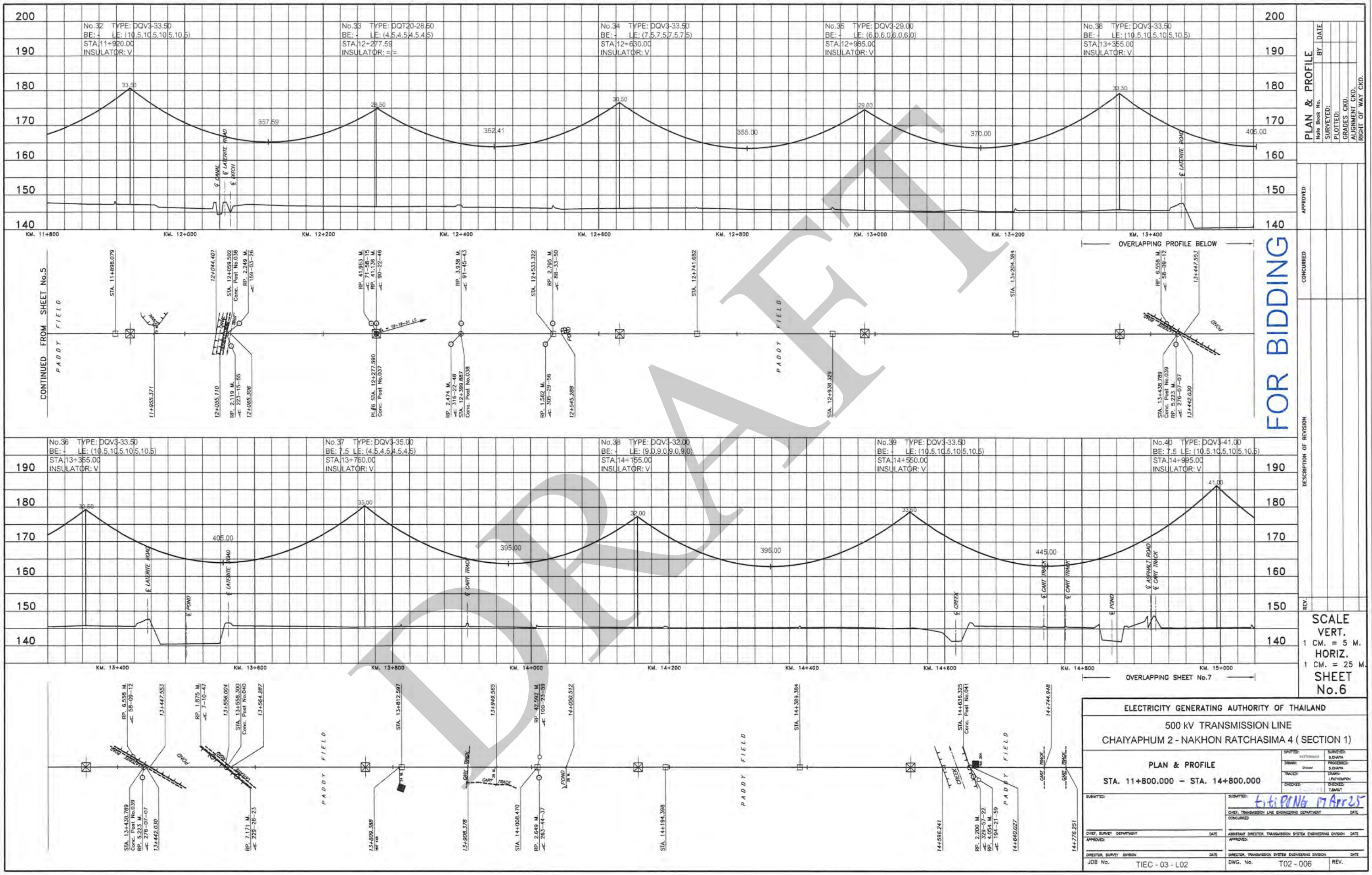
| APPROVED | |
|-----------|--|
| CONCURRED | |

| DESCRIPTION OF REVISION | |
|-------------------------|--|
| REV. | |

SCALE
VERT.
1 CM. = 5 M.
HORIZ.
1 CM. = 25 M.
SHEET
No.2

| | |
|--|--|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | |
| 500 kV TRANSMISSION LINE | |
| CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (SECTION 1) | |
| PLAN & PROFILE | |
| STA. 1+300.000 - STA. 2+800.000 | |
| SUBMITTED | SUBMITTED |
| DATE | DATE |
| APPROVED | APPROVED |
| DATE | DATE |
| DIRECTOR, SURVEY DIVISION | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION |
| JOB No. TIEC-03-L02 | DWG. No. T02-002 |
| | REV. |

FOR BIDDING



| PLAN & PROFILE | |
|-------------------|------|
| BY | DATE |
| SURVEYED | |
| PLOTTED | |
| GRADES CKD. | |
| ALIGNMENT CKD. | |
| RIGHT OF WAY CKD. | |

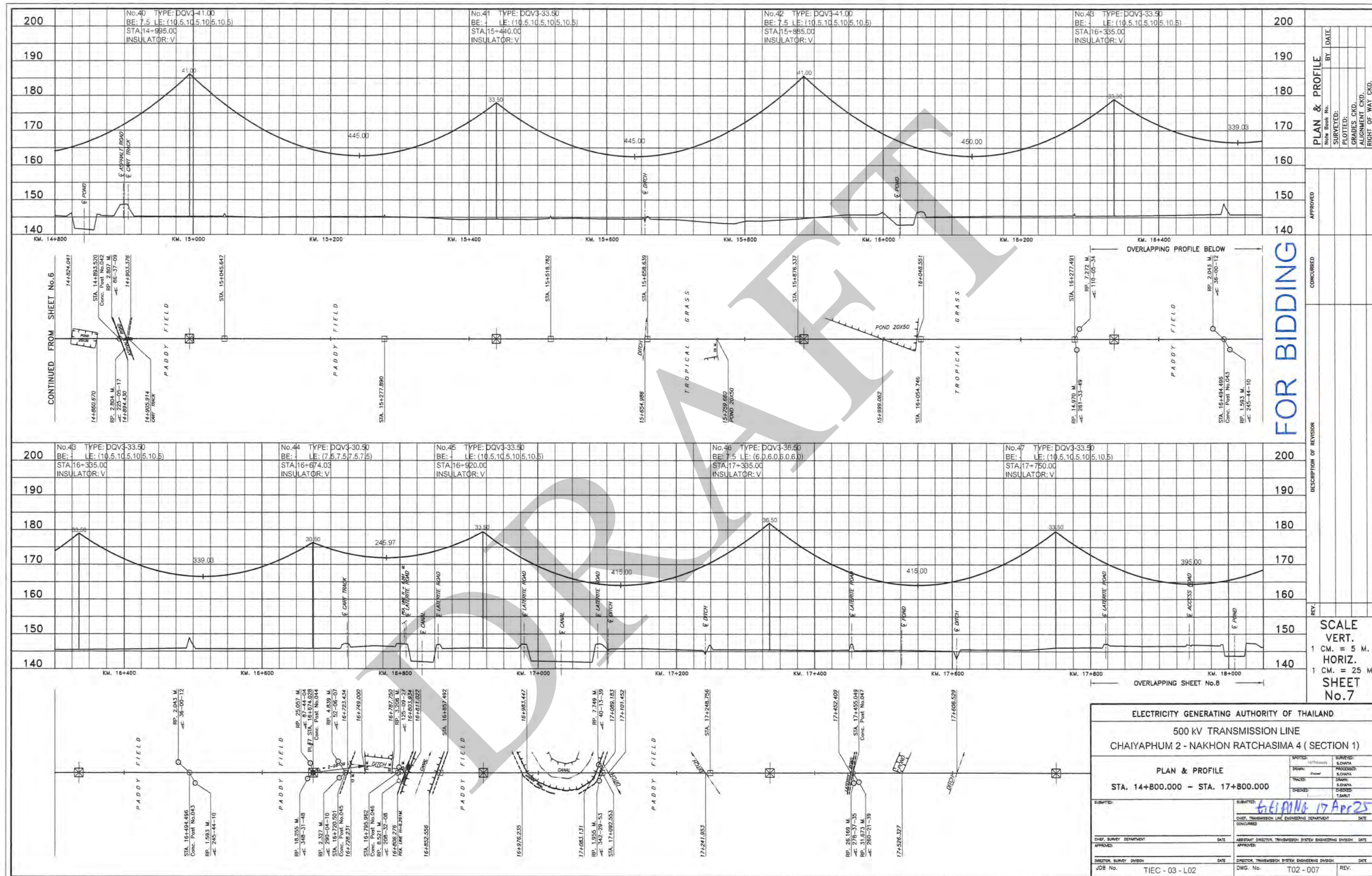
APPROVED

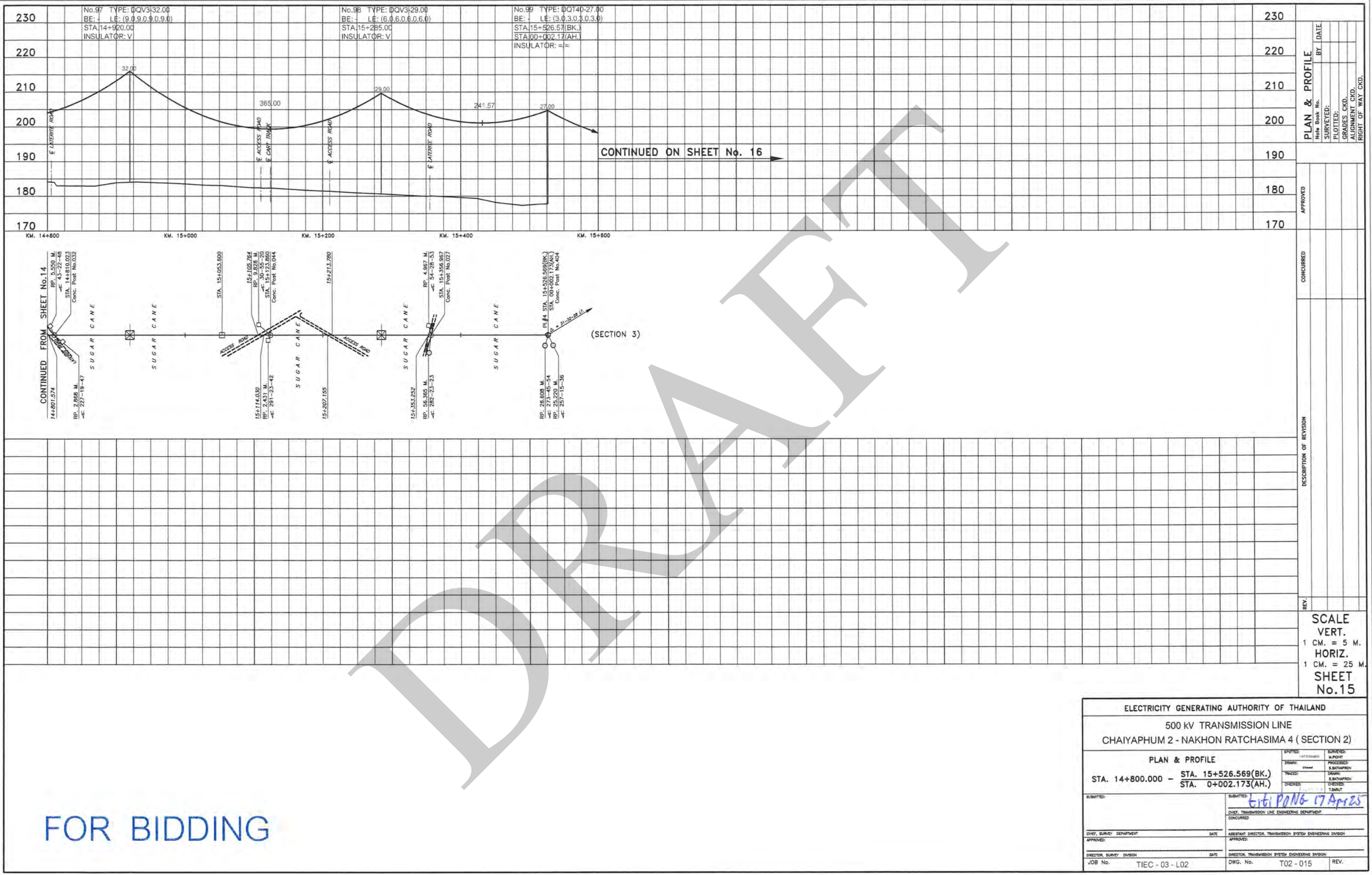
CONCURRED

DESCRIPTION OF REVISION

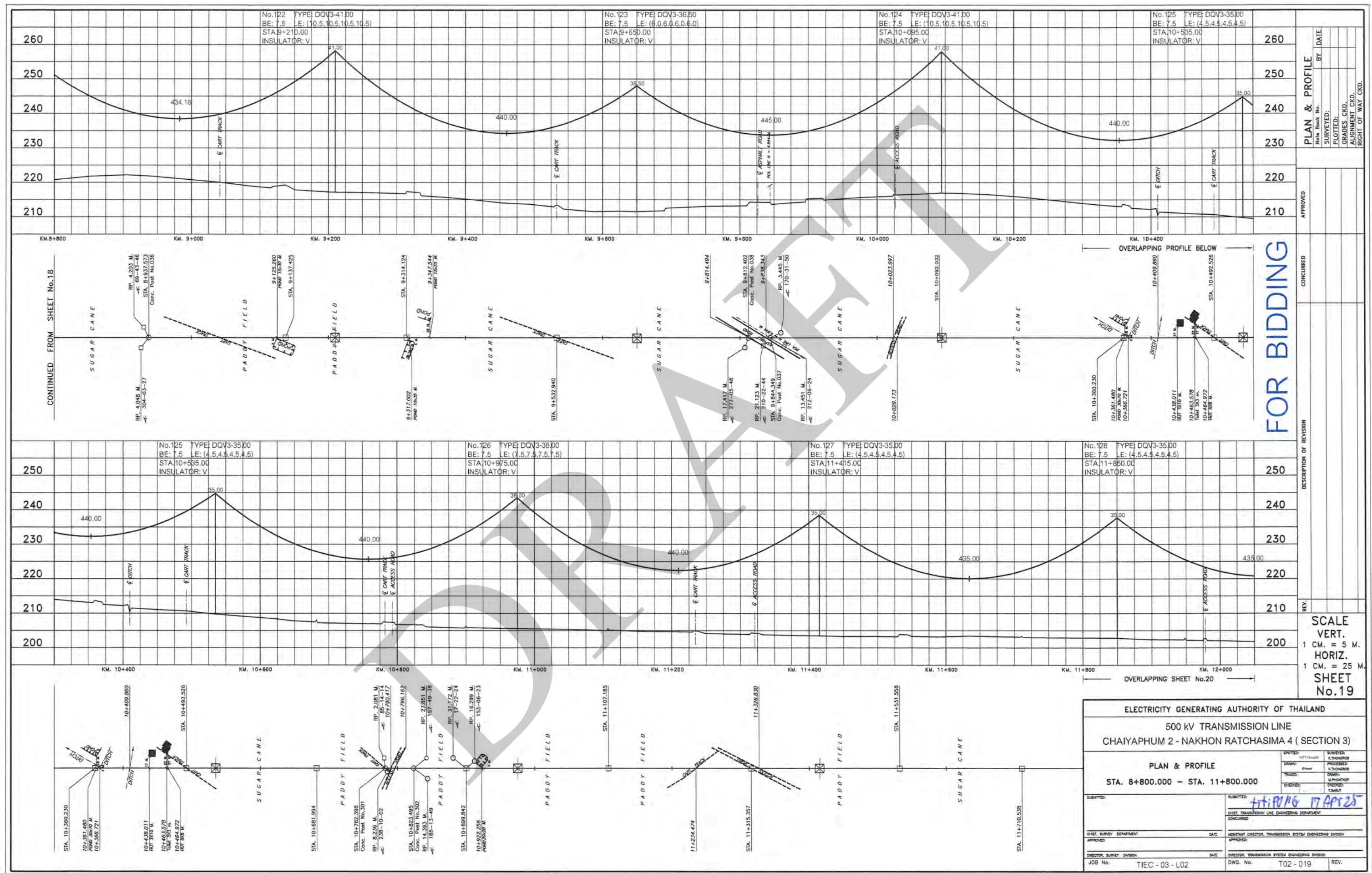
SCALE
VERT.
1 CM. = 5 M.
HORIZ.
1 CM. = 25 M.
SHEET
No.6

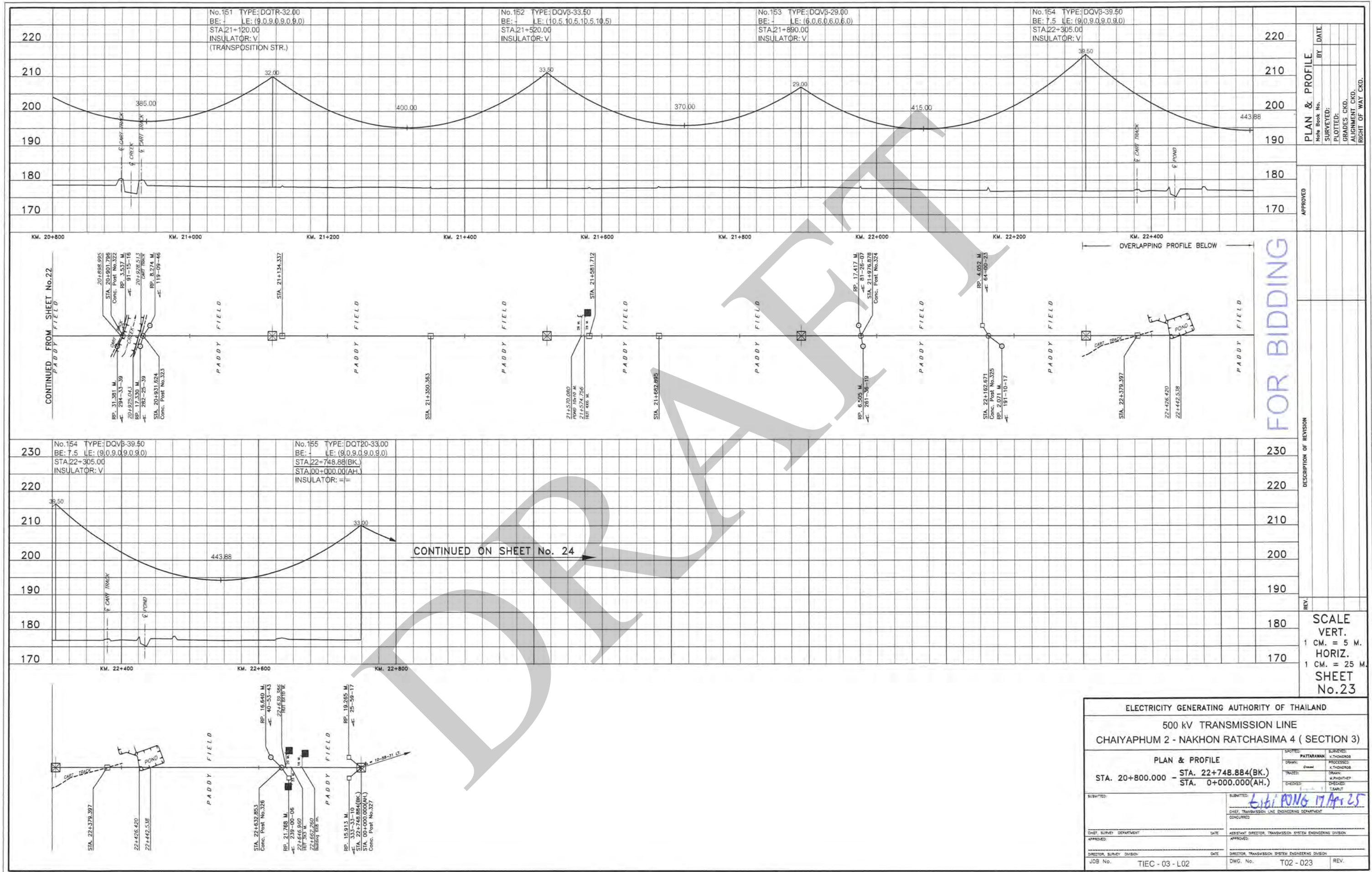
| | |
|--|------------------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | |
| 500 KV TRANSMISSION LINE | |
| CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (SECTION 1) | |
| PLAN & PROFILE | |
| STA. 11+800.000 - STA. 14+800.000 | |
| DATE: 17 Apr 25 | DATE: |
| CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | DATE: |
| CHIEF, SURVEY DEPARTMENT | DATE: |
| CHIEF, TRANSMISSION SYSTEM ENGINEERING DIVISION | DATE: |
| CHIEF, TRANSMISSION SYSTEM ENGINEERING DIVISION | DATE: |
| JOB No. TIEC-03-L02 | DWG. No. T02-006 |
| REV. | |

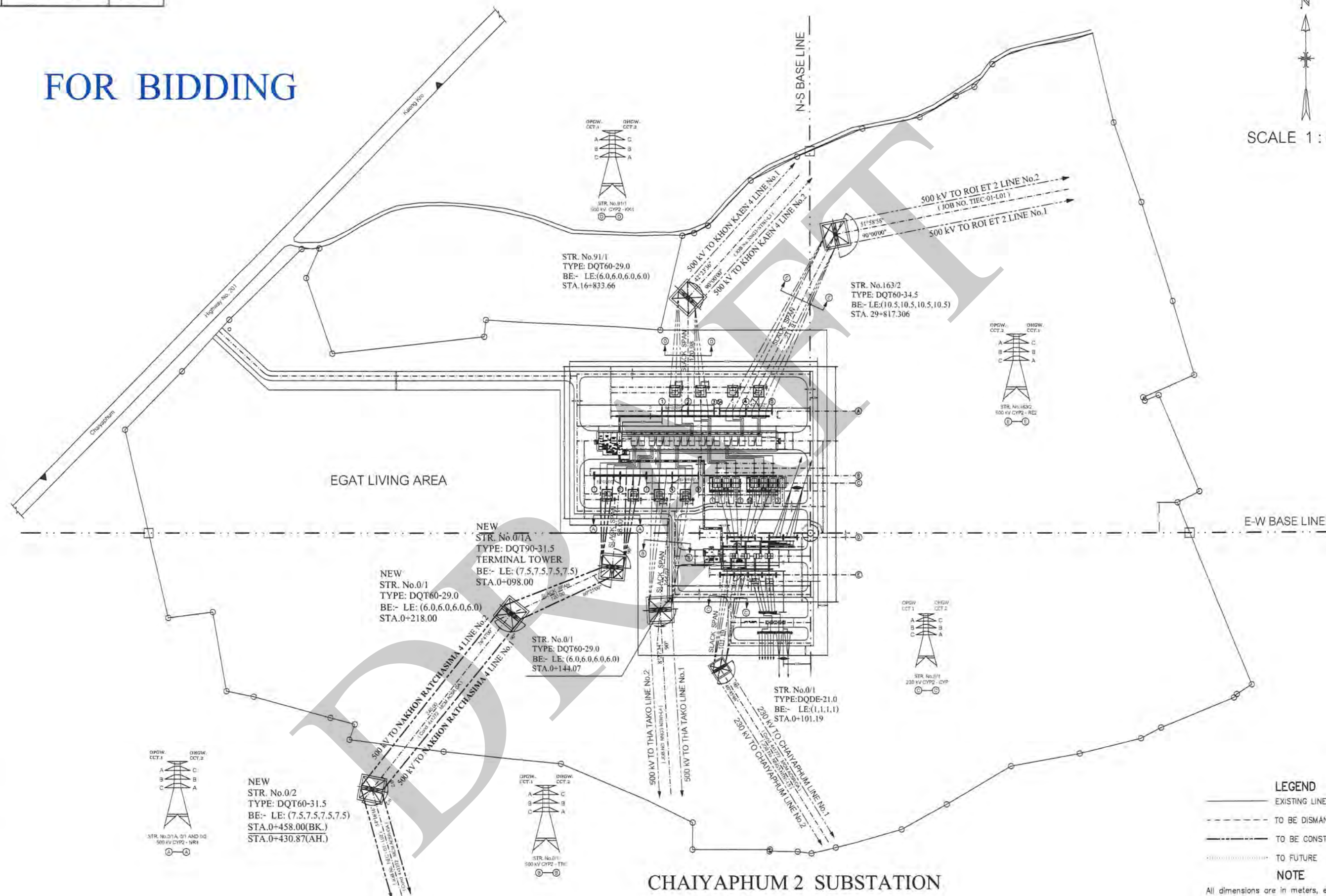




| | | | |
|---|-----------------|--|------------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | |
| 500 KV TRANSMISSION LINE | | | |
| CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 (SECTION 2) | | | |
| PLAN & PROFILE | | | |
| STA. 14+800.000 - STA. 15+526.569(BK.) STA. 0+002.173(AH.) | | | |
| DESIGNED BY | CHAIYAPHUM | CHECKED BY | CHAIYAPHUM |
| DRAWN BY | CHAIYAPHUM | PROCESSED BY | CHAIYAPHUM |
| TRACED BY | CHAIYAPHUM | DESIGNED BY | CHAIYAPHUM |
| CHECKED BY | CHAIYAPHUM | CHECKED BY | CHAIYAPHUM |
| SUBMITTED: 17 April 25 | | | |
| SUBMITTED: 17 April 25 | | | |
| CHIEF, TRANSMISSION LINE ENGINEERING DIVISION | | | |
| CONCURRED: | | | |
| CHIEF, SURVEY DEPARTMENT | DATE | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | DATE |
| APPROVED: | | APPROVED: | |
| DIRECTOR, SURVEY DIVISION | DATE | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | DATE |
| JOB No. | TIEC - 03 - L02 | DWG. No. | T02 - 015 |
| | | REV. | |







LEGEND

— EXISTING LINE

- TO BE DISMANTLED

— TO BE CONSTRUCTED

TO FUTURE

NOTE

All dimensions are in meters, except as noted

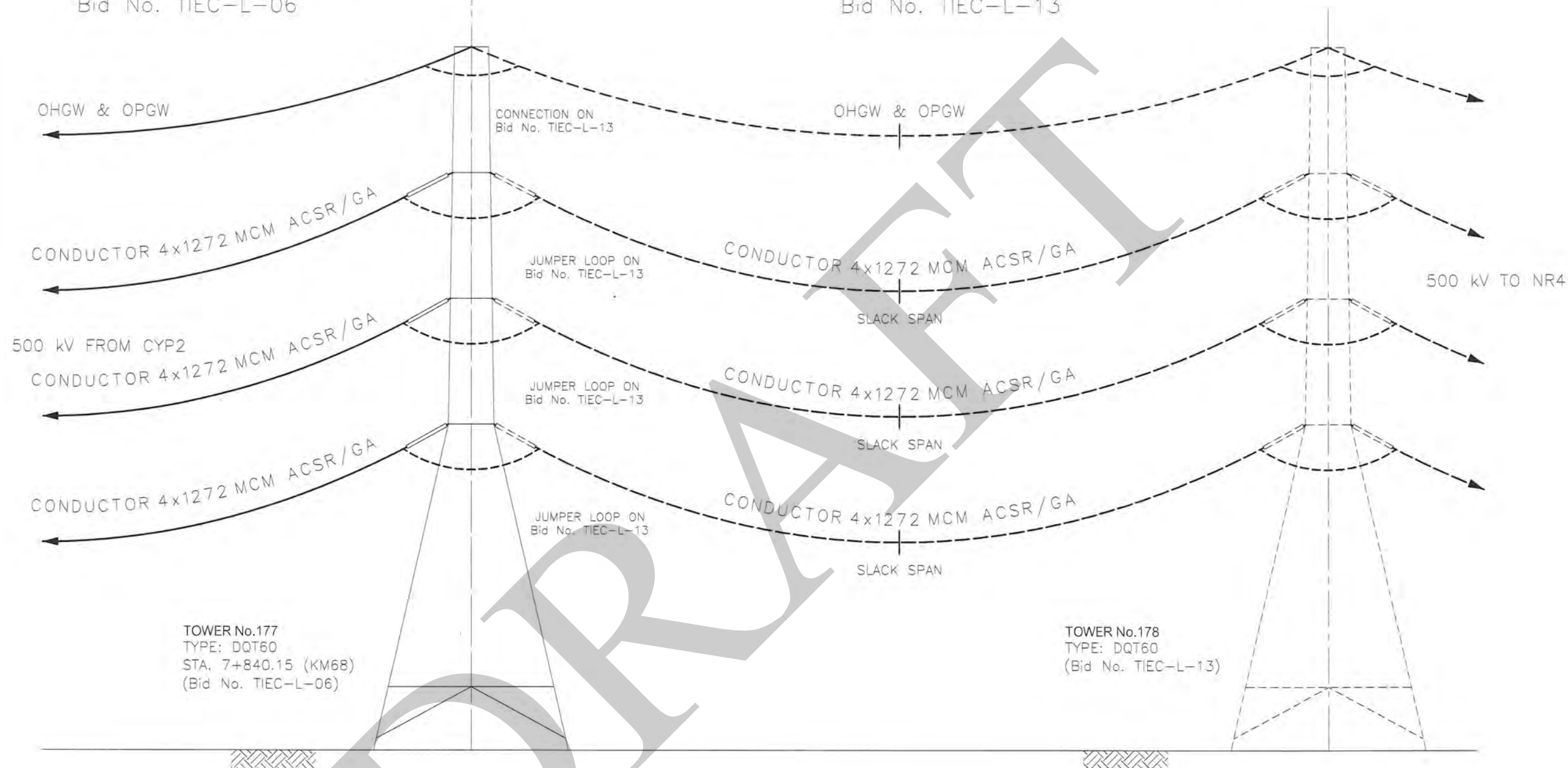
CHAIYAPHUM 2 SUBSTATION

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | | | | |
|----------|--|--|--|--|--|---|--|
| DRAWN | | DRAFTER | | RECOMMENDED AND VALIDATED | | DRAWING NAME | |
| DESIGNED | | RATTARAWAN | | CONCURRED | | 500 kV TRANSMISSION LINE | |
| VERIFIED | | Pongsa born P. | | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | | CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 | |
| APPROVED | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION-2 | | LINE TERMINATION AT CHAIYAPHUM 2 SUBSTATION | |
| | | DATE | | JOB NO. | | DWG. NO. | |
| | | | | TIEC - 03 - L02 | | T04 - 001 | |

500 kV CHAIYAPHUM 2 — TOWER No.177
 Job No. TIEC-03-L02
 Bid No. TIEC-L-06

500 kV TOWER No.177 — NAKHON RATCHASIMA 4
 Job No. TIEC-03-L02
 Bid No. TIEC-L-13



TOWER No.177
 TYPE: DQT60
 STA. 7+840.15 (KM68)
 (Bid No. TIEC-L-06)

TOWER No.178
 TYPE: DQT60
 (Bid No. TIEC-L-13)

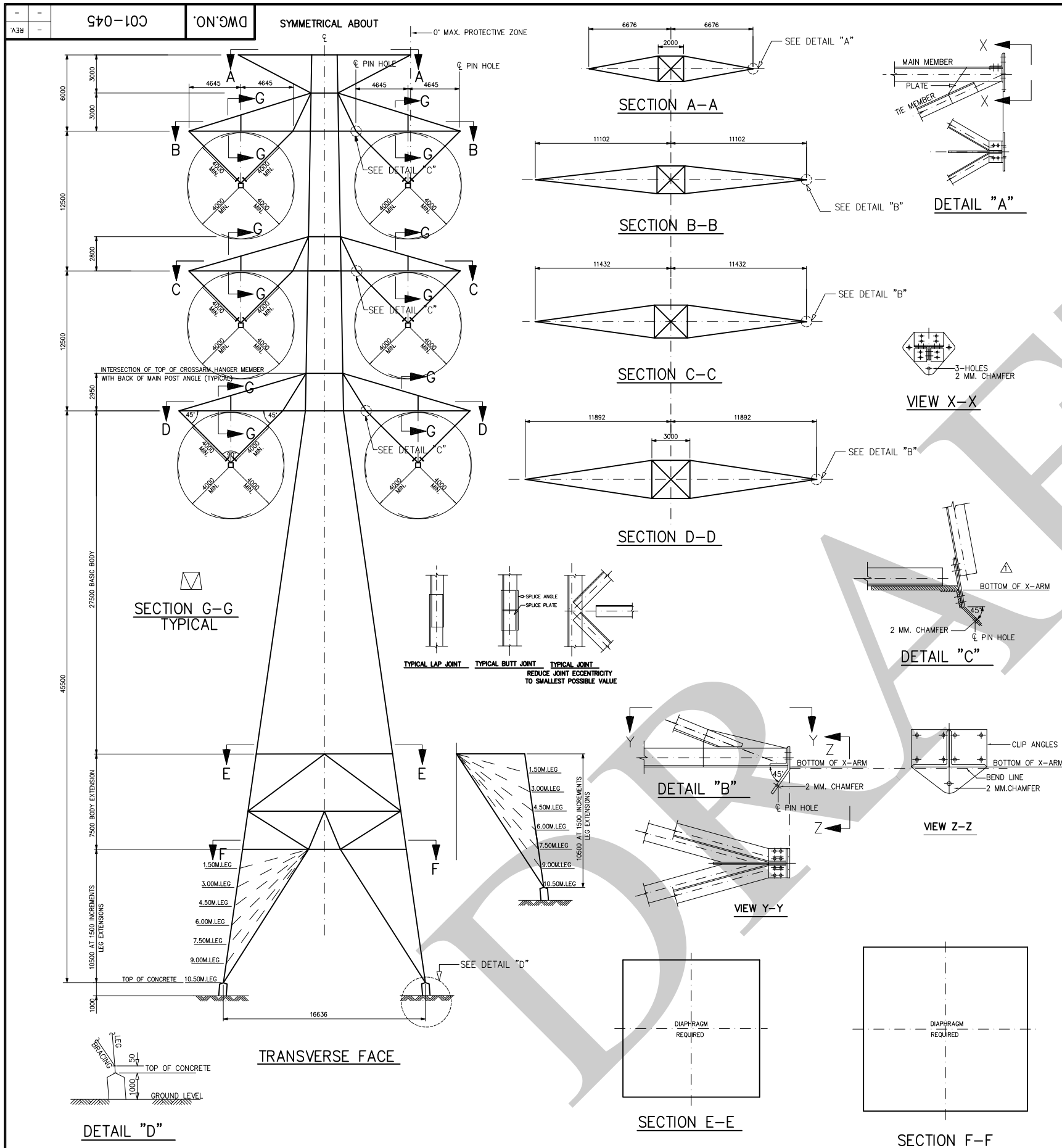
LEGEND

- SCOPE OF Bid No. TIEC-L-06
- SCOPE OF Bid No. TIEC-L-13

INTERFACE BETWEEN 500 kV CHAIYAPHUM 2 — TOWER No.177 AND 500 kV TOWER No.177 — NAKHON RATCHASIMA 4

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | | |
|----------|---------------|--|----------|---------------------|--|
| DRAWN | ORANUT | RECOMMENDED AND VALIDATED | 6/6/2016 | DRAWING NAME | 500 kV TRANSMISSION LINE |
| DESIGNED | PATTARAWAN | CONCURRED | | | CHAIYAPHUM 2 — NAKHON RATCHASIMA 4 (CYP2-KM68) |
| VERIFIED | Pongsakorn P. | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION-3 | | | INTERFACING WORK AT KM68 |
| APPROVED | | | | JOB NO. | TIEC-03-L02 |
| | | | | (Bid No. TIEC-L-06) | |
| | | | | DWG. NO. | T05-001 |
| | | | | REV. | |



LOADING CASES

- EXTREME TRANSVERSE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSION. WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATORS. L.F.=1.15 (SEE NOTES B, D)
- EXTREME LONGITUDINAL WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS. WITH A LONGITUDINAL WIND OF 156 KG/M² ACTING ON TRANSVERSE FACES OF THE TOWER, NO WINDS ON WIRES. L.F.=1.15 (SEE NOTES B, D)
- EXTREME OBLIQUE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATOR, WIND BLOWING AT 75°, 60° AND 45° TO LINE. L.F.=1.15 (SEE NOTES A, B, D)
- FAILURE CONTAINMENT**
ALL WIRES INTACT AT 27°C FINAL WIRES TENSIONS. WITH A TRANSVERSE WIND OF 91 KG/M² ON SHIELD WIRES, 76 KG/M² ON CONDUCTORS, 101.5 KG/M² ON TOWER AND INSULATOR, PLUS AN UNBALANCED LONGITUDINAL LOAD APPLIED AT ANY ONE WIRE ATTACHMENT LOCATIONS EQUAL TO 100% IN THE TENSION IN THE SHIELD WIRE OR 70% OF THE TENSION IN THE CONDUCTOR PHASE BUNDLE. (SEE NOTE E)
- STRINGING AND MAINTENANCE**
ALL WIRES INTACT AT 4°C INITIAL WIRE TENSIONS. WITH A TRANSVERSE WIND OF 27.5 KG/M² ACTING ON SHIELD WIRES, 23 KG/M² ON CONDUCTORS, 29.4 KG/M² ON TOWER AND INSULATORS. WITH AN ADDITIONAL VERTICAL LOAD AT ANT OR ALL OF THE WIRE ATTACHMENT POINTS SIMULTANEOUSLY OF 1,000 KG. PLUS 33% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. AND WITH AN ADDITIONAL LONGITUDINAL LOAD ANY ONE WIRE ATTACHMENT LOCATION SIMULTANEOUSLY OF 50% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. (SEE NOTES E, F)
- HIGH INTENSITY**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSIONS. PRESSURE OF 306.25 KG/M² ACTING ON TOWER AND INSULATORS WITH NO WIND ON SHIELD WIRE OR CONDUCTORS. WIND BLOWING AT 90°, 75°, 60°, 45°, 0° TO LINE. (SEE NOTE B)

NOTES

- FOR WIND AT ANGLE θ TO WIRES. WIND PRESSURE TO BE REDUCED BY $\sin^2(\theta)$
- WIND PRESSURE ON TOWER APPLIED ON 3.2 TIMES MOST EXPOSED FACE. FOR WIND AT AN ANGLE θ TO A FACE PRESSURE HAS BEEN ADDITIONALLY INCREASED BY $[1+0.2 \times \sin^2(2\theta)]$; WIND LOAD IS ASSUMED IN THE DIRECTION OF THE WIND.
- ALL ELEMENT OF TOWER ARE TO BE DESIGNED TO 0.92 CAPACITY.
- L.F. DENOTED LOAD FACTOR APPLYING TO STATISTIC LOAD SUCH AS WIND LOADS.
- FOR LOADING CASED IV. AND V THE ADDITIONAL LONGITUDINAL LOADS MAY BE ASSUMED TO ACT AT ANY ONE WIRE ATTACHMENT LOCATIONS.
- LOCATIONS OF THE ADDITIONAL VERTICAL STRINGING LOADS SPECIFIED IN LOADING CASE V ARE INDEPENDENT OF THE LOCATIONS OF THE ADDITIONAL LONGITUDINAL STRINGING LOADS. APPLY ADDITIONAL LONGITUDINAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.

GENERAL NOTES

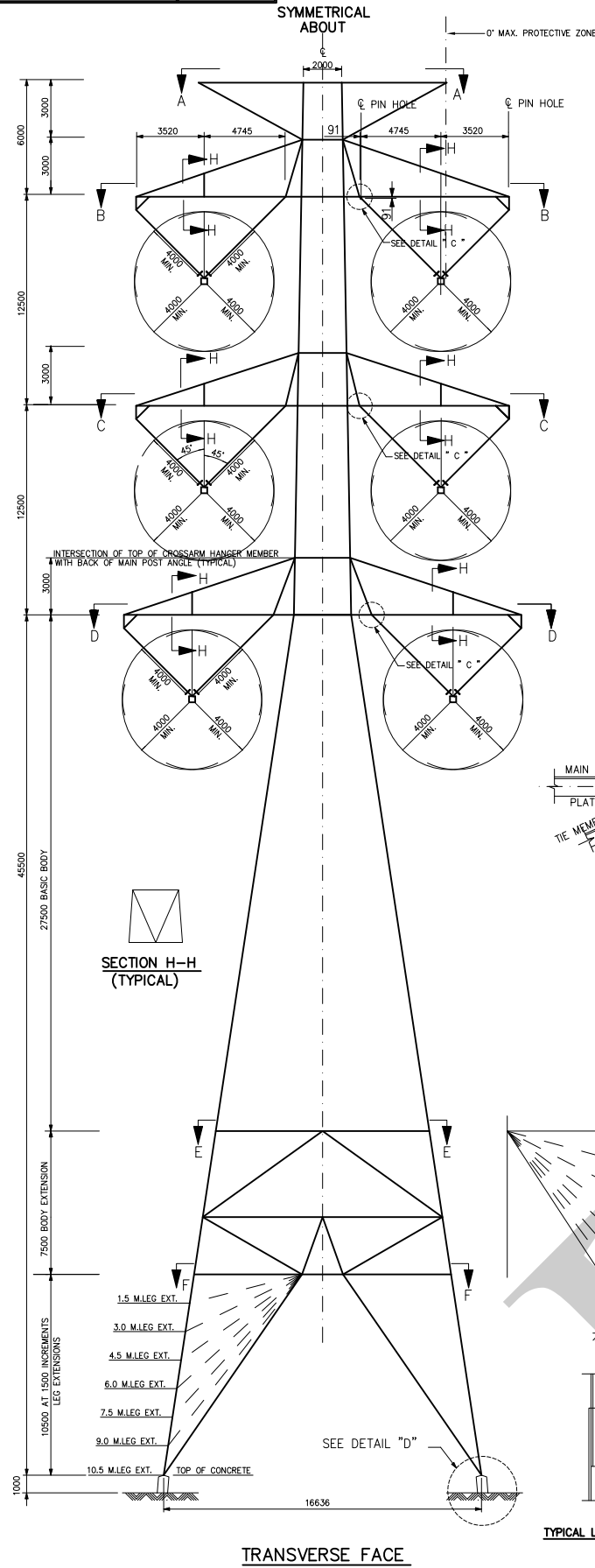
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGES OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR CONDUCTOR HARDWARE.
- ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
- ALL DIMENSIONS ON TOWER ARE TO THE WORKING LINES EXCEPT AS OTHERWISE NOTED.
- CONDUCTOR DATA : 1272 MCM, 42/7 ACSR/GA, WT=2.04 KG/M, DIA=33.91 MM, RATED BREAKING STRENGTH=14,050 KG. (4 SUB-CONDUCTORS PER PHASE BUNDLE)
- SHIELD WIRE DATA : 7 NO.8 ALUMINUM-CLAD STEEL, WT=0.39 KG/M, DIA=9.78 MM, RATED BREAKING STRENGTH=7,227 KG. OR 3/8 INCH EHS CLASS A, WT=0.406 KG/M, DIA=9.14 MM, RATED BREAKING STRENGTH=6,985 KG.
- TOWER SHALL BE DESIGNED FOR ONE OR BOTH CIRCUITS INSTALLED, FOR THE PURPOSES OF TOWER DESIGN, EACH CIRCUIT SHALL BE DEFINED AS THE THREE PHASE BUNDLES AND THE CORRESPONDING SHIELD WIRE VERTICALLY ADJACENT TO ONE ANOTHER ON ONE SIDE OF THE TOWER.
- TOWER SHALL BE DESIGNED FOR MAINTENANCE LOADS (SAME AS HEAVY PHASE VERTICAL LOADS FROM CASE VI) APPLIED DIRECTLY ABOVE CONDUCTOR SUPPORT POINTS.
- TOWERS ARE DESIGNED FOR USE OF ANY COMBINATION OF LEG EXTENSION HEIGHTS RESULTING IN A MAXIMUM DIFFERENTIAL OF LEG HEIGHT OF SIX METERS BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

TOWER APPLICATIONS

RULING SPAN = 440 M.
 MAXIMUM WIND SPAN = 460 M. AT 0° AND 355 M. AT 3°
 MAXIMUM WEIGHT SPAN = 690 M.
 MAXIMUM DEVIATION ANGLE = 3°
 DESIGN CRITERIA BASED ON RIGHT OF WAY = 60 M.
 SHIELD WIRE ; 3/8" EHS CLASS A OR 7 NO.8 ALUMINUM-CLAD STEEL OR OPGW 36 CORES (13.5 MM. DIAMETER)
 CONDUCTOR ; 4 x 1272 MCM. ACSR/GA

| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| | | | | | | | | | | |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|-----------|--|---|-------------------------------|---|---------|---------|---|------|
| DRAWN | ARKET | RECOMMENDED AND VALIDATED | ti TIPONG | DRAWING NAME | 500 kV TRANSMISSION LINE | | | | |
| DESIGNED | P.sit | CONCURRED | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | DESCRIPTION OF DETAIL DRAWING | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQV3 | | | | |
| VERIFIED | Visat.m | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | REPLACING DWG.NO. | DWG.NO. | C01-045 | - | REV. |
| APPROVED | Sorachich | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | DATE | 24/04/2025 | | | | |



LOADING CASES

- EXTREME TRANSVERSE WIND
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSION. WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATORS. L.F.=1.15 (SEE NOTES B, D)
- EXTREME LONGITUDINAL WIND
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS. WITH A LONGITUDINAL WIND OF 156 KG/M² ACTING ON TRANSVERSE FACES OF THE TOWER, NO WINDS ON WIRES. L.F.=1.15 (SEE NOTES B, D)
- EXTREME OBLIQUE WIND
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATOR, WIND BLOWING AT 75°, 60° AND 45° TO LINE. L.F.=1.15 (SEE NOTES A, B, D)
- FAILURE CONTAINMENT
ALL WIRES INTACT AT 27°C FINAL WIRES TENSIONS. WITH A TRANSVERSE WIND OF 91 KG/M² ON SHIELD WIRES, 76 KG/M² ON CONDUCTORS, 101.5 KG/M² ON TOWER AND INSULATOR, PLUS AN UNBALANCED LONGITUDINAL LOAD APPLIED AT ANY ONE WIRE ATTACHMENT LOCATIONS EQUAL TO 100% IN THE TENSION IN THE SHIELD WIRE OR 70% OF THE TENSION IN THE CONDUCTOR PHASE BUNDLE. (SEE NOTE E)
- STRINGING AND MAINTENANCE
ALL WIRES INTACT AT 4°C INITIAL WIRE TENSIONS. WITH A TRANSVERSE WIND OF 27.5 KG/M² ACTING ON SHIELD WIRES, 23 KG/M² ON CONDUCTORS, 29.4 KG/M² ON TOWER AND INSULATORS. WITH AN ADDITIONAL VERTICAL LOAD AT ANT OR ALL OF THE WIRE ATTACHMENT POINTS SIMULTANEOUSLY OF 1,000 KG. PLUS 33% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. AND WITH AN ADDITIONAL LONGITUDINAL LOAD ANY ONE WIRE ATTACHMENT LOCATION SIMULTANEOUSLY OF 50% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. (SEE NOTES E, F)
- HIGH INTENSITY
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSIONS. PRESSURE OF 306.25 KG/M² ACTING ON TOWER AND INSULATORS WITH NO WIND ON SHIELD WIRE OR CONDUCTORS. WIND BLOWING AT 90°, 75°, 60°, 45°, 0° TO LINE. (SEE NOTE B)

NOTES

- FOR WIND AT ANGLE β° TO WIRES. WIND PRESSURE TO BE REDUCED BY $\sin^2(\beta)$
- WIND PRESSURE ON TOWER APPLIED ON 3.2 TIMES MOST EXPOSED FACE. FOR WIND AT AN ANGLE β° TO A FACE PRESSURE HAS BEEN ADDITIONALLY INCREASED BY $[1 + 0.2 \times \sin^2(2\beta)]$; WIND LOAD IS ASSUMED IN THE DIRECTION OF THE WIND.
- ALL ELEMENT OF TOWER ARE TO BE DESIGNED TO 0.92 CAPACITY.
- L.F. DENOTED LOAD FACTOR APPLYING TO STATISTIC LOAD SUCH AS WIND LOADS.
- FOR LOADING CASES IV. AND V THE ADDITIONAL LONGITUDINAL LOADS MAY BE ASSUMED TO ACT AT ANY ONE WIRE ATTACHMENT LOCATIONS.
- LOCATIONS OF THE ADDITIONAL VERTICAL STRINGING LOADS SPECIFIED IN LOADING CASE V ARE INDEPENDENT OF THE LOCATIONS OF THE ADDITIONAL LONGITUDINAL STRINGING LOADS. APPLY ADDITIONAL LONGITUDINAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.

GENERAL NOTES

- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGES OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR CONDUCTOR HARDWARE.
- ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
- ALL DIMENSIONS ON TOWER ARE TO THE WORKING LINES EXCEPT AS OTHERWISE NOTED.
- CONDUCTOR DATA : 1272 MCM, 42/7 ACSR/GA, WT=2.04 KG/M, DIA=33.91 MM, RATED BREAKING STRENGTH=14,050 KG. (4 SUB-CONDUCTORS PER PHASE BUNDLE)
- SHIELD WIRE DATA : 7 NO.8 ALUMINUM-CLAD STEEL, WT=0.39 KG/M, DIA=9.78 MM, RATED BREAKING STRENGTH=7,227 KG. OR 3/8 INCH EHS CLASS A, WT=0.406 KG/M, DIA=9.14 MM, RATED BREAKING STRENGTH=6,985 KG.
- TOWER SHALL BE DESIGNED FOR ONE OR BOTH CIRCUITS INSTALLED, FOR THE PURPOSES OF TOWER DESIGN, EACH CIRCUIT SHALL BE DEFINED AS THE THREE PHASE BUNDLES AND THE CORRESPONDING SHIELD WIRE VERTICALLY ADJACENT TO ONE ANOTHER ON ONE SIDE OF THE TOWER.
- TOWER SHALL BE DESIGNED FOR MAINTENANCE LOADS (SAME AS HEAVY PHASE VERTICAL LOADS FROM CASE VI) APPLIED DIRECTLY ABOVE CONDUCTOR SUPPORT POINTS.
- TOWERS ARE DESIGNED FOR USE OF ANY COMBINATION OF LEG EXTENSION HEIGHTS RESULTING IN A MAXIMUM DIFFERENTIAL OF LEG HEIGHT OF SIX METERS BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

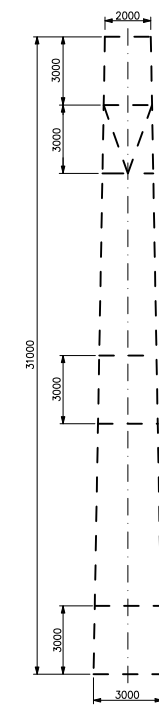
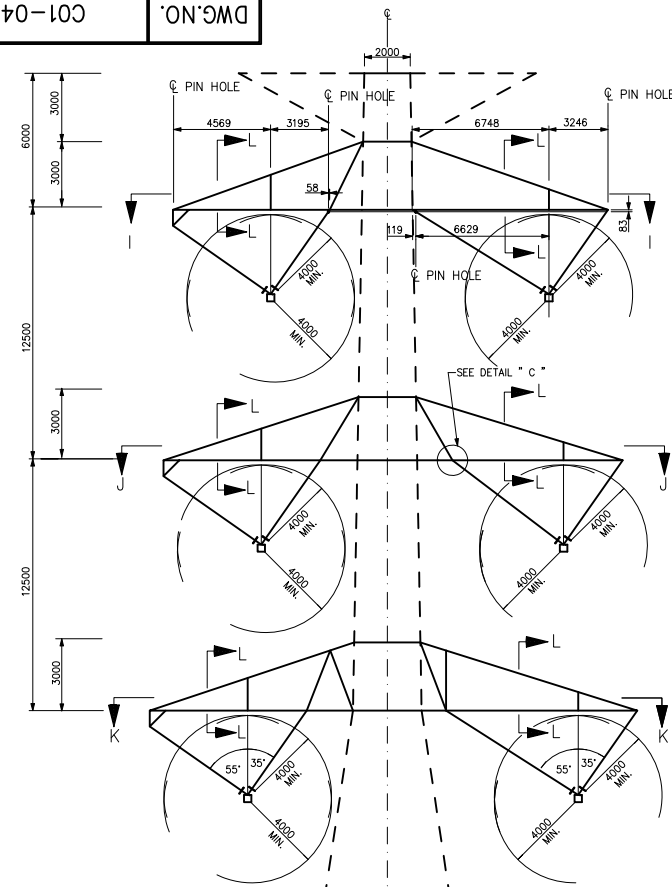
TOWER APPLICATIONS

RULING SPAN = 440 M.
MAXIMUM WIND SPAN = 650 M. AT 0° AND 335 M. AT 9°
MAXIMUM WEIGHT SPAN = 1300 M.
MAXIMUM DEVIATION ANGLE = 9°
DESIGN CRITERIA BASED ON RIGHT OF WAY = 60 M.
SHIELD WIRE : 3/8" EHS CLASS A OR 7 NO.8 ALUMINUM-CLAD STEEL OR OPGW 36 CORES (13.5 MM. DIAMETER)
CONDUCTOR : 4 x 1272 MCM. ACSR/GA

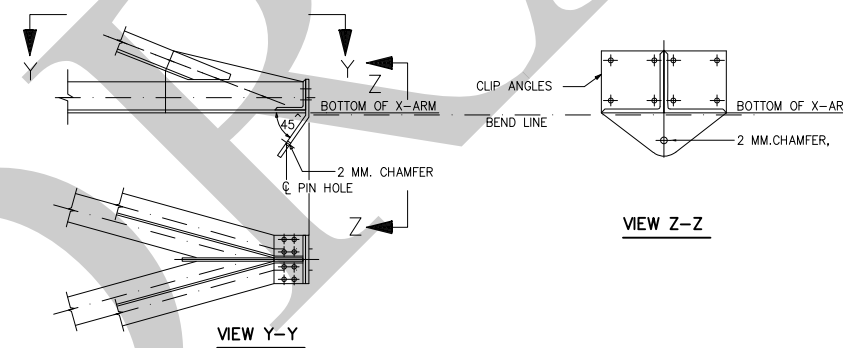
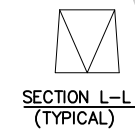
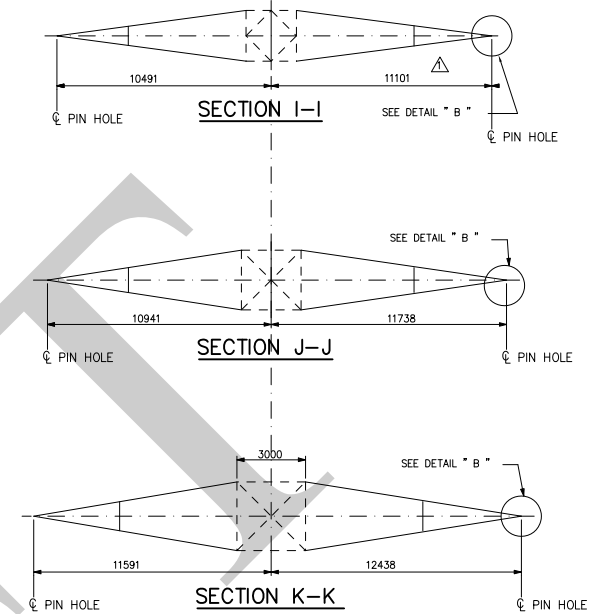
| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
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| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|--|---|--|---------------------------------------|--|--|--|-------------------------|--|
| DRAWN ARKET | | RECOMMENDED AND VALIDATED <i>titipong</i> | | DRAWING NAME 500 kV TRANSMISSION LINE | | DESCRIPTION OF DETAIL DRAWING CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQV9(3) | | | |
| DESIGNED <i>P.sit</i> | | CONCURRED CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | | VERIFIED <i>Visat.m</i> | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | APPROVED <i>Saorach</i> | |
| DATE 24/04/2025 | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | | REPLACING DWG.NO. | | DWG.NO. C01-046 | |
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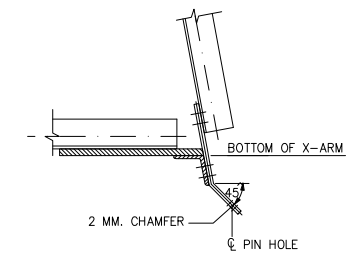
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| DWG.NO. | C01-047 | |
| REV. | - | - |



LONGITUDINAL FACE



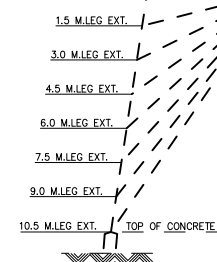
VIEW Z-Z



DETAIL "C"

NOTES

1. REFER TO DWG. NO. C01-011 FOR ADDITIONAL TOWER BODY DIMENSIONS AND INFORMATION AND NOTES.
2. 3 TO 9 DEGREE CONDUCTOR CROSSARMS (SHOWN AT LEFT) ARE TO BE INTERCHANGEABLE WITH 0 TO 3 DEGREE CROSSARMS SHOWN ON DWG. NO. C01-011 SHIELD WIRE CROSSARMS, TOWER BODY, BODY EXTENSION, AND LEG EXTENSIONS SHALL BE DESIGNED FOR THE MOST CRITICAL LOADS RESULTING FROM USE OF ANY SET OF ARMS.
(AND AT ANY LINE ANGLE FROM 0 TO 9 DEGREES)



TRANSVERSE FACE

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9001
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CAD
CENTER
DO NOT AMEND
MANUALLY

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| | | | | | | | | | | | | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | DRAWN | | ARKET | | RECOMMENDED AND VALIDATED | | titipONG | | DRAWING NAME | | 500 kV TRANSMISSION LINE | | | | | | | | | |
| | | | | | | | | | | | | DESIGNED | | P.sit | | CONCURRED | | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | | DESCRIPTION OF DETAIL DRAWING | | CONFIGURATION AND DESIGN CRITERIA | | | | | | | | | |
| | | | | | | | | | | | | VERIFIED | | Vivat.M | | | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | | TOWER TYPE DQV9(9) | | | | | | | | | |
| | | | | | | | | | | | | APPROVED | | Soanrich | | | | DATE 24/04/2025 | | JOB NO. | | REPLACING DWG.NO. | | DWG.NO. | | C01-047 | | - REV. | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | | | | | | | | | | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | | | | | | | | | | | | |



 AERIAL PATROL SIGN

SECTION D-D

SECTION F-F

TYPICAL LAP JOINT

TYPICAL BUTT JOINT

TYPICAL JOINT

1

11

111

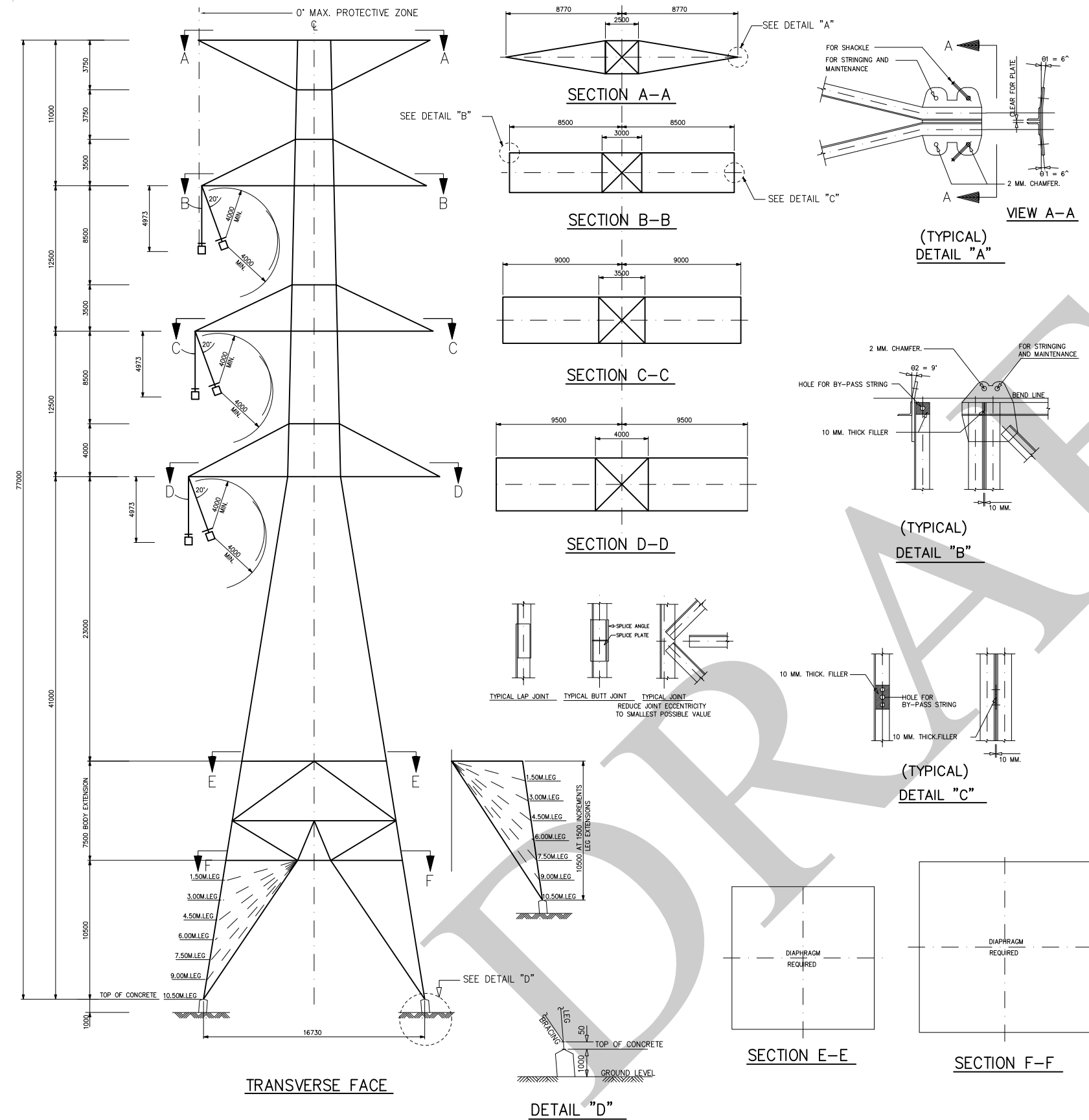
17

ALL WIRES INTACT AT 27°C, FINAL WIRE TENSIONS. PRESSURE OF 306.25 KG/M² ACTING ON TOWER AND INSULATORS WITH NO WIND ON SHIELD WIRE OR CONDUCTORS. WIND BLOWING AT 90°, 75°, 60°, 45°, 0° TO LINE. (SEE NOTE B)

- A. FOR WIND AT ANGLE β^* TO WIRES, WIND PRESSURE TO BE REDUCED BY $\sin^2(\beta)$
- B. WIND PRESSURE ON TOWER APPLIED ON 3.2 TIMES MOST EXPOSED FACE. FOR WIND AT AN ANGLE β^* TO A FACE PRESSURE HAS BEEN ADDITIONALLY INCREASED BY $[1 + 0.2 \times \sin^2(2\beta)]$; WIND LOAD IS ASSUMED IN THE DIRECTION OF THE WIND.
- C. ALL ELEMENT OF TOWER ARE TO BE DESIGNED TO 0.92 CAPACITY.
- D. L.F. DENOTED LOAD FACTOR APPLYING TO STATISTIC LOAD SUCH AS WIND LOADS.
- E. FOR LOADING CASED IV. AND V THE ADDITIONAL LONGITUDINAL LOADS MAY BE ASSUMED TO ACT AT ANY ONE WIRE ATTACHMENT LOCATIONS.
- F. LOCATIONS OF THE ADDITIONAL VERTICAL STRINGING LOADS SPECIFIED IN LOADING CASE V ARE INDEPENDENT OF THE LOCATIONS OF THE ADDITIONAL LONGITUDINAL STRINGING LOADS. APPLY ADDITIONAL LONGITUDINAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.

1. CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGES OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR CONDUCTOR HARDWARE.
2. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
3. ALL DIMENSIONS ON TOWER ARE TO THE WORKING LINES EXCEPT AS OTHERWISE NOTED.
4. CONDUCTOR DATA : 1272 MCM, 42/7 ACSR/GA, WT=2.04 KG/M, DIA=33.91 MM, RATED BREAKING STRENGTH=14,050 KG. (4 SUB-CONDUCTORS PER PHASE BUNDLE)
5. SHIELD WIRE DATA : 7 NO.8 ALUMINUM-CLAD STEEL, WT=0.39 KG/M, DIA=9.78 MM, RATED BREAKING STRENGTH=7,227 KG. OR 3/8 INCH EHS CLASS A , WT=0.406 KG/M, DIA=9.14 MM, RATED BREAKING STRENGTH=6,985 KG.
6. TOWER SHALL BE DESIGNED FOR ONE OR BOTH CIRCUITS INSTALLED, FOR THE PURPOSES OF TOWER DESIGN, EACH CIRCUIT SHALL BE DEFINED AS THE THREE PHASE BUNDLES AND THE CORRESPONDING SHIELD WIRE VERTICALLY ADJACENT TO ONE ANOTHER ON ONE SIDE OF THE TOWER.
7. TOWERS ARE DESIGNED FOR USE OF ANY COMBINATION OF LEG EXTENSION HEIGHTS RESULTING IN A MAXIMUM DIFFERENTIAL OF LEG HEIGHT OF SIX METERS BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

RULING SPAN = 440 M.
 MAXIMUM WIND SPAN = 460 M. AT 0° AND 355 M. AT 3°
 MAXIMUM WEIGHT SPAN = 690 M.
 MAXIMUM DEVIATION ANGLE = 3°
 DESIGN CRITERIA BASED ON RIGHT OF WAY = 60 M.
 SHIELD WIRE ; 3/8" EHS CLASS A OR 7 NO.8 ALUMINUM-CLAD STEEL OR OPGW 36 CORES (13.5 MM. DIAMETER)
 CONDUCTOR ; 4 x 1272 MCM. ACSR/GA



LOADING CASES

- EXTREME TRANSVERSE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSION. WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATORS. L.F.=1.15 (SEE NOTES B, D)
- EXTREME LONGITUDINAL WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS. WITH A LONGITUDINAL WIND OF 156 KG/M² ACTING ON TRANSVERSE FACES OF THE TOWER, NO WINDS ON WIRES. L.F.=1.15 (SEE NOTES B, D)
- EXTREME OBLIQUE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATOR, WIND BLOWING AT 75°, 60° AND 45° TO LINE. L.F.=1.15 (SEE NOTES A, B, D)
- FAILURE CONTAINMENT**
ALL WIRES INTACT AT 27°C FINAL WIRES TENSIONS. WITH A TRANSVERSE WIND OF 91 KG/M² ON SHIELD WIRES, 76 KG/M² ON CONDUCTORS, 101.5 KG/M² ON TOWER AND INSULATOR, PLUS AN UNBALANCED LONGITUDINAL LOAD EQUAL TO 100% OF THE TENSION IN THE SHIELD WIRE OR CONDUCTOR PHASE BUNDLE. (SEE NOTE E) OF THE TENSION IN THE CONDUCTOR PHASE BUNDLE. (SEE NOTE E)
- STRINGING AND MAINTENANCE**
ALL WIRES INTACT AT 4°C INITIAL WIRE TENSIONS. WITH A TRANSVERSE WIND OF 27.5 KG/M² ACTING ON SHIELD WIRES, 23 KG/M² ON CONDUCTORS, 29.4 KG/M² ON TOWER AND INSULATORS. WITH AN ADDITIONAL VERTICAL LOAD AT ANT OR ALL OF THE WIRE ATTACHMENT POINTS OF EITHER ONE (BUT NOT BOTH) OF THE CIRCUITS. THE ADDITIONAL VERTICAL LOAD SHALL BE EQUAL TO 1,500 KG. PLUS 33% OF THE SHIELD WIRE OR PHASE TENSION, SIMULTANEOUSLY, ADDITIONAL LONGITUDINAL LOADS SHALL BE APPLIED AT ANY OR ALL OF THE WIRE ATTACHMENT POINTS OF THE SAME CIRCUIT EQUAL TO 100% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. (SEE NOTE F)
- HIGH INTENSITY**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSIONS. PRESSURE OF 306.25 KG/M² ACTING ON TOWER AND INSULATORS WITH NO WIND ON SHIELD WIRE OR CONDUCTORS. WIND BLOWING AT 90°, 75°, 60°, 45°, 0° TO LINE. (SEE NOTE B)
- UPLIFT LOADS**
CROSSARM MEMBERS WILL BE DESIGNED TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO 100% OF THE DESIGN WEIGHT SPAN ACTING ON ALL ATTACHMENT, IN EACH LOADING CASE.

NOTES

- FOR WIND AT ANGLE β ° TO WIRES. WIND PRESSURE TO BE REDUCED BY $\sin^2(\beta)$
- WIND PRESSURE ON TOWER APPLIED ON 3.2 TIMES MOST EXPOSED FACE. FOR WIND AT AN ANGLE β ° TO A FACE PRESSURE HAS BEEN ADDITIONALLY INCREASED BY $[1 + 0.2 \times \sin^2(2\beta)]$; WIND LOAD IS ASSUMED IN THE DIRECTION OF THE WIND.
- ALL ELEMENT OF TOWER ARE TO BE DESIGNED TO 0.79 CAPACITY.
- L.F. DENOTED LOAD FACTOR APPLYING TO STATISTIC LOAD SUCH AS WIND LOADS.
- FOR LOADING CASED IV. AND V THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOADS MAY BE ASSUMED TO ACT AT ANY TWO WIRE ATTACHMENT LOCATIONS SIMULTANEOUSLY IN THE CASE OF BOTH CURCUITS INSTALLED, IN THE CASE OF ONLY ONE CURCUIT INSTALLED, APPLY THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.
- LOCATIONS OF THE ADDITIONAL VERTICAL STRINGING LOADS SPECIFIED IN LOADING CASE V ARE INDEPENDENT OF THE LOCATIONS OF THE ADDITIONAL LONGITUDINAL STRINGING LOADS. APPLY ADDITIONAL LONGITUDINAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.

GENERAL NOTES

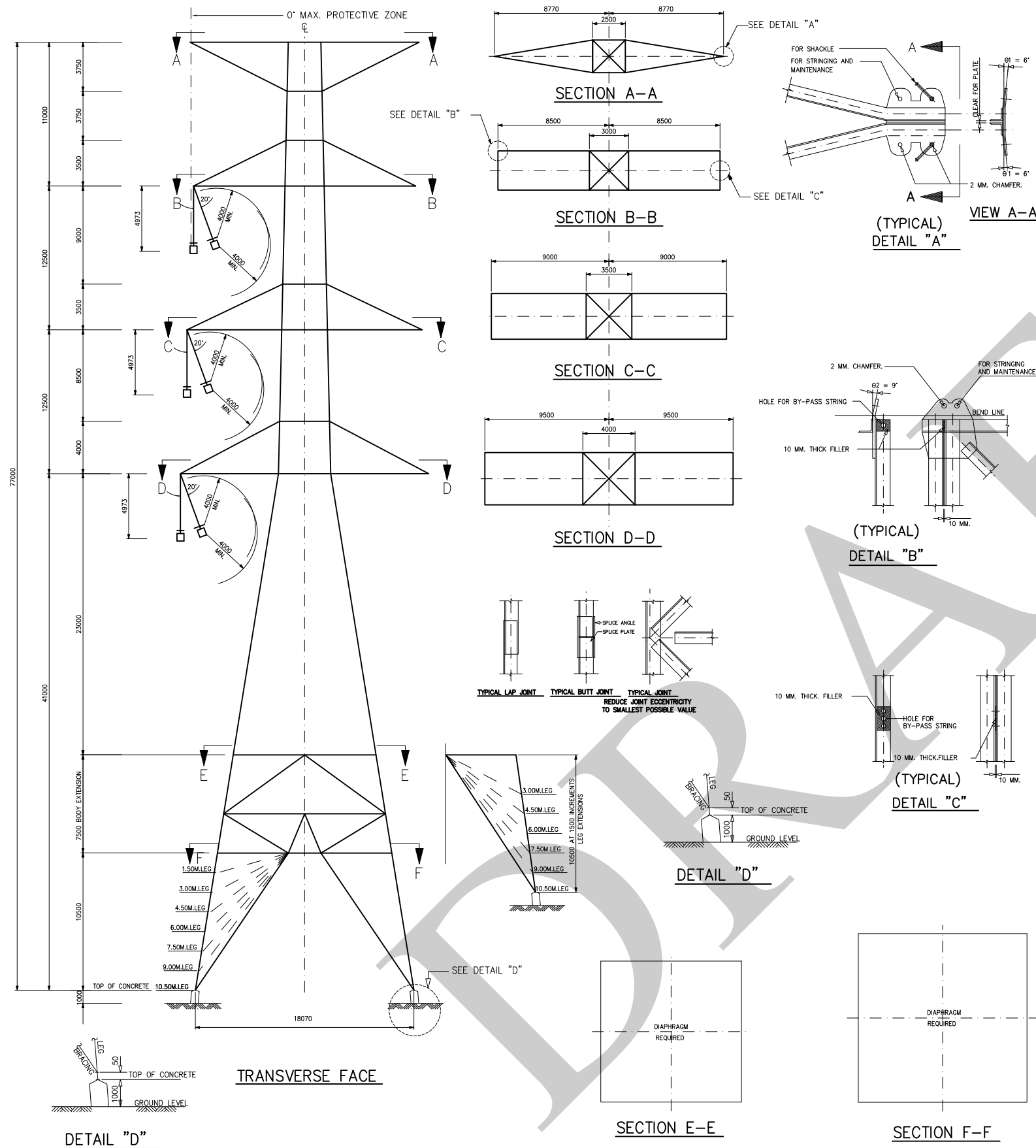
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGES OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR CONDUCTOR HARDWARE.
- ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
- ALL DIMENSIONS ON TOWER ARE TO THE WORKING LINES EXCEPT AS OTHERWISE NOTED.
- CONDUCTOR DATA : 1272 MCM, 42/7 ACSR/GA, WT=2.04 KG/M, DIA=33.91 MM, RATED BREAKING STRENGTH=14,050 KG. (4 SUB-CONDUCTORS PER PHASE BUNDLE)
- SHIELD WIRE DATA : 7 NO.8 ALUMINUM-CLAD STEEL, WT=0.39 KG/M, DIA=9.78 MM, RATED BREAKING STRENGTH=7,227 KG. OR 3/8 INCH EHS CLASS A, WT=0.406 KG/M, DIA=9.14 MM, RATED BREAKING STRENGTH=6,985 KG.
- TOWER SHALL BE DESIGNED FOR ONE OR BOTH CIRCUITS INSTALLED, FOR THE PURPOSES OF TOWER DESIGN, EACH CIRCUIT SHALL BE DEFINED AS THE THREE PHASE BUNDLES AND THE CORRESPONDING SHIELD WIRE VERTICALLY ADJACENT TO ONE ANOTHER ON ONE SIDE OF THE TOWER.
- TOWERS ARE DESIGNED FOR USE OF ANY COMBINATION OF LEG EXTENSION HEIGHTS RESULTING IN A MAXIMUM DIFFERENTIAL OF LEG HEIGHT OF SIX METERS BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

TOWER APPLICATIONS

RULING SPAN = 440 M.
MAXIMUM WIND SPAN = 460 M. AT 20°
MAXIMUM WEIGHT SPAN = 690 M.
MAXIMUM DEVIATION ANGLE = 20°
DESIGN CRITERIA BASED ON RIGHT OF WAY = 60 M.
SHIELD WIRE : 3/8 EHS CLASS A OR 7 NO.8 ALUMINUM-CLAD STEEL OR OPGW 36 CORES (13.5 MM. DIAMETER)
CONDUCTOR : 4 x 1272 MCM. ACSR/GA

| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
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| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
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| DRAWN ARKET | | RECOMMENDED AND VALIDATED | | DRAWING NAME | | 500 kV TRANSMISSION LINE | | | |
| DESIGNED P.sit | | CONCURRED | | DESCRIPTION OF DETAIL DRAWING | | CONFIGURATION AND DESIGN CRITERIA | | | |
| VERIFIED Viwat.m | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | TOWER TYPE DQT20 | | | | | |
| APPROVED | | DATE 24/04/2025 | | JOB NO. | | REPLACING DWG.NO. | | DWG.NO. | |
| DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | | | | | | C01-049 | |
| | | | | | | | | - REV. | |
| | | | | | | | | - - | |



LOADING CASES

- I EXTREME TRANSVERSE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSION. WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATORS. L.F.=1.15 (SEE NOTES B, D)
- II EXTREME LONGITUDINAL WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS. WITH A LONGITUDINAL WIND OF 156 KG/M² ACTING ON TRANSVERSE FACES OF THE TOWER, NO WINDS ON WIRES. L.F.=1.15 (SEE NOTES B, D)
- III EXTREME OBLIQUE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATOR, WIND BLOWING AT 75°, 60° AND 45° TO LINE. L.F.=1.15 (SEE NOTES A, B, D)
- IV FAILURE CONTAINMENT**
ALL WIRES INTACT AT 27°C FINAL WIRES TENSIONS. WITH A TRANSVERSE WIND OF 91 KG/M² ON SHIELD WIRES, 76 KG/M² ON CONDUCTORS, 101.5 KG/M² ON TOWER AND INSULATOR, PLUS AN UNBALANCED LONGITUDINAL LOADS EQUAL TO 100% OF THE TENSION IN THE SHIELD WIRE OR CONDUCTOR PHASE BUNDLE. (SEE NOTE E)
- V STRINGING AND MAINTENANCE**
ALL WIRES INTACT AT 4°C INITIAL WIRE TENSIONS. WITH A TRANSVERSE WIND OF 27.5 KG/M² ACTING ON SHIELD WIRES, 23 KG/M² ON CONDUCTORS, 29.4 KG/M² ON TOWER AND INSULATORS. WITH AN ADDITIONAL VERTICAL LOAD AT ANT OR ALL OF THE WIRE ATTACHMENT POINTS OF EITHER ONE (BUT NOT BOTH) OF THE CIRCUITS. THE ADDITIONAL VERTICAL LOAD SHALL BE EQUAL TO 1,500 KG. PLUS 33% OF THE SHIELD WIRE OR PHASE TENSION, SIMULTANEOUSLY, ADDITIONAL LONGITUDINAL LOADS SHALL BE APPLIED AT ANY OR ALL OF THE WIRE ATTACHMENT POINTS OF THE SAME CIRCUIT EQUAL TO 100% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. (SEE NOTE F)
- VI HIGH INTENSITY**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSIONS. PRESSURE OF 306.25 KG/M² ACTING ON TOWER AND INSULATORS WITH NO WIND ON SHIELD WIRE OR CONDUCTORS. WIND BLOWING AT 90°, 75°, 60°, 45°, 0° TO LINE. (SEE NOTE B)
- VII UPLIFT LOADS**
CROSSARM MEMBERS WILL BE DESIGNED TO WITHSTAND VERTICAL UPLIFT CLOADS EQUAL TO 100% OF THE DESIGN WEIGHT SPAN ACTING ON ALL ATTACHMENT, IN EACH LOADING CASE.

NOTES

- FOR WIND AT ANGLE β TO WIRES. WIND PRESSURE TO BE REDUCED BY $\sin^2(\beta)$
- WIND PRESSURE ON TOWER APPLIED ON 3.2 TIMES MOST EXPOSED FACE. FOR WIND AT AN ANGLE β TO A FACE PRESSURE HAS BEEN ADDITIONALLY INCREASED BY $[1 + 0.2 \times \sin^2(2\beta)]$; WIND LOAD IS ASSUMED IN THE DIRECTION OF THE WIND.
- ALL ELEMENT OF TOWER ARE TO BE DESIGNED TO 0.79 CAPACITY.
- L.F. DENOTED LOAD FACTOR APPLYING TO STATISTIC LOAD SUCH AS WIND LOADS.
- FOR LOADING CASED IV. AND V THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOADS MAY BE ASSUMED TO ACT AT ANY TWO WIRE ATTACHMENT LOCATIONS SIMULTANEOUSLY IN THE CASE OF BOTH CIRCUITS INSTALLED, IN THE CASE OF ONLY ONE CIRCUIT INSTALLED, APPLY THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.
- LOCATIONS OF THE ADDITIONAL VERTICAL STRINGING LOADS SPECIFIED IN LOADING CASE V ARE INDEPENDENT OF THE LOCATIONS OF THE ADDITIONAL LONGITUDINAL STRINGING LOADS. APPLY ADDITIONAL LONGITUDINAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.

GENERAL NOTES

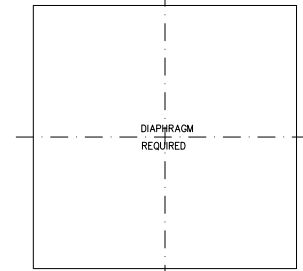
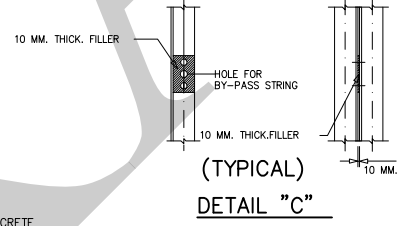
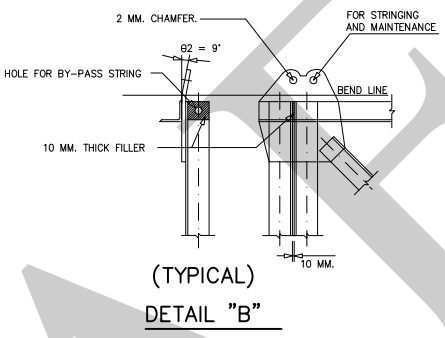
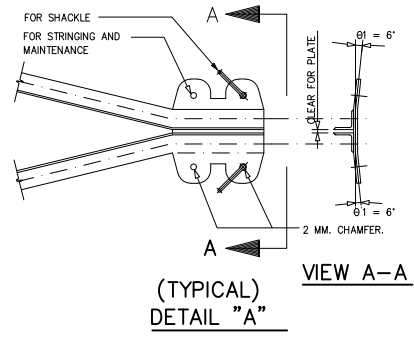
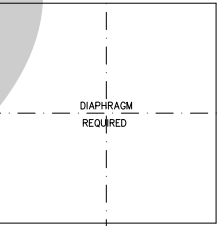
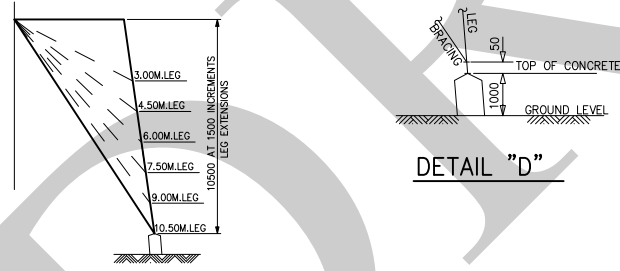
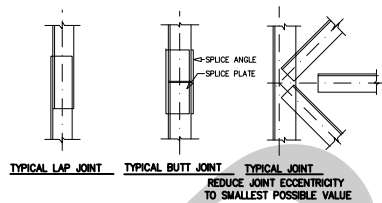
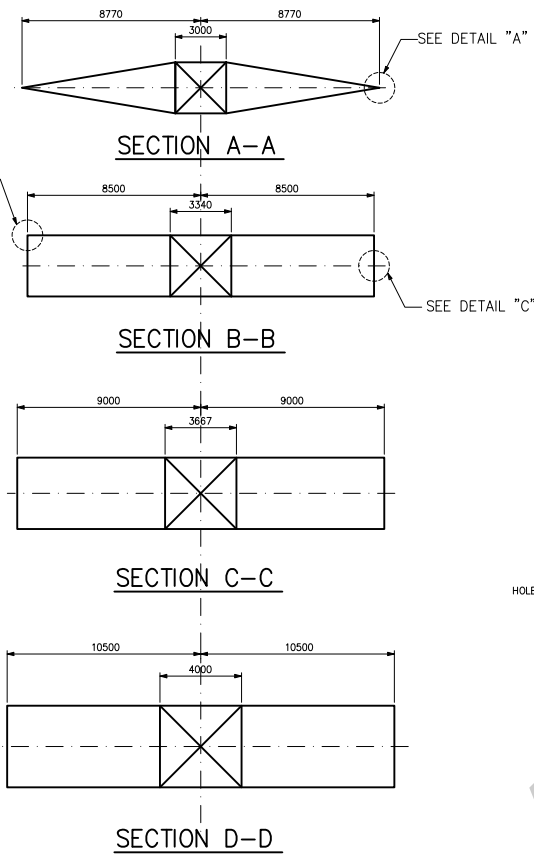
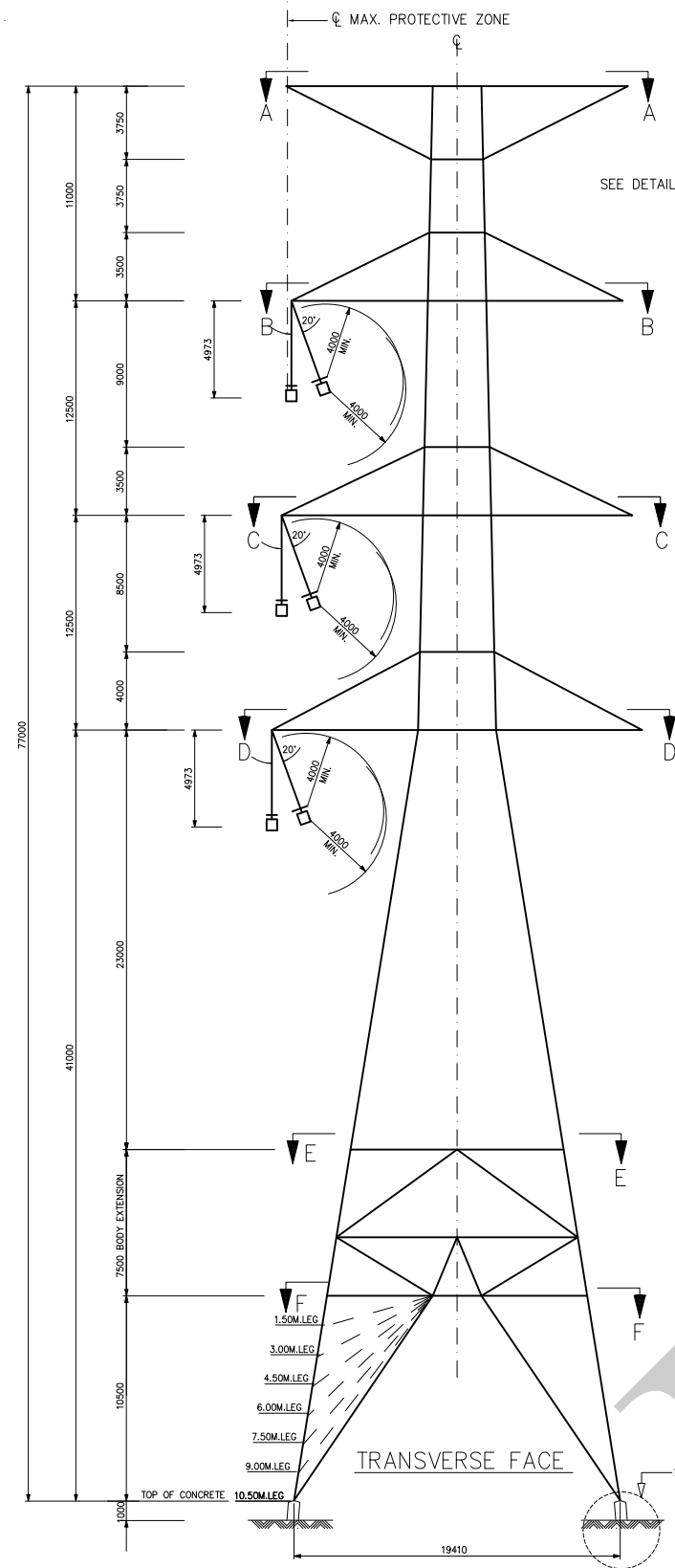
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGES OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR CONDUCTOR HARDWARE.
- ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
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- SHIELD WIRE DATA : 7 NO.8 ALUMINUM-CLAD STEEL, WT=0.39 KG/M, DIA=9.78 MM, RATED BREAKING STRENGTH=7,227 KG. OR 3/8 INCH EHS CLASS A , WT=0.406 KG/M, DIA=9.14 MM, RATED BREAKING STRENGTH=6,985 KG.
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TOWER APPLICATIONS

RULING SPAN = 440 M.
MAXIMUM WIND SPAN = 460 M. AT 40°
MAXIMUM WEIGHT SPAN = 690 M.
MAXIMUM DEVIATION ANGLE = 40°
DESIGN CRITERIA BASED ON RIGHT OF WAY = 60 M.
SHIELD WIRE ; 3/8 EHS CLASS A OR 7 NO.8 ALUMINUM-CLAD STEEL OR OPGW 36 CORES (13.5 MM. DIAMETER)
CONDUCTOR ; 4 x 1272 MCM. ACSR/GA

| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
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| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | | | |
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| DRAWN ARKET | | RECOMMENDED AND VALIDATED <i>Litipong</i> | | | DRAWING NAME 500 kV TRANSMISSION LINE | | DESCRIPTION OF DETAIL DRAWING CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQT40 | | | | | |
| DESIGNED P.sit | | CONCURRED CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | | | | | | | | | | |
| VERIFIED Vivat.m | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | | | | | | | | |
| APPROVED <i>Sornach</i> | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | DATE 24/04/2025 | | JOB NO. | | REPLACING DWG.NO. | DWG.NO. C01-050 | - | REV. |
| | | | | | | | | | | | - | - |



LOADING CASES

- EXTREME TRANSVERSE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSION. WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATORS. L.F.=1.15 (SEE NOTES B, D)
- EXTREME LONGITUDINAL WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS. WITH A LONGITUDINAL WIND OF 156 KG/M² ACTING ON TRANSVERSE FACES OF THE TOWER, NO WINDS ON WIRES. L.F.=1.15 (SEE NOTES B, D)
- EXTREME OBLIQUE WIND**
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATOR, WIND BLOWING AT 75°, 60° AND 45° TO LINE. L.F.=1.15 (SEE NOTES A, B, D)
- FAILURE CONTAINMENT**
ALL WIRES INTACT AT 27°C FINAL WIRES TENSIONS. WITH A TRANSVERSE WIND OF 91 KG/M² ON SHIELD WIRES, 76 KG/M² ON CONDUCTORS, 101.5 KG/M² ON TOWER AND INSULATOR, PLUS AN UNBALANCED LONGITUDINAL LOADS EQUAL TO 100% OF THE TENSION IN THE SHIELD WIRE OR CONDUCTOR PHASE BUNDLE. (SEE NOTE E) OF THE TENSION IN THE CONDUCTOR PHASE BUNDLE. (SEE NOTE E)
- STRINGING AND MAINTENANCE**
ALL WIRES INTACT AT 4°C INITIAL WIRE TENSIONS. WITH A TRANSVERSE WIND OF 27.5 KG/M² ACTING ON SHIELD WIRES, 23 KG/M² ON CONDUCTORS, 29.4 KG/M² ON TOWER AND INSULATORS. WITH AN ADDITIONAL VERTICAL LOAD AT ANT OR ALL OF THE WIRE ATTACHMENT POINTS OF EITHER ONE (BUT NOT BOTH) OF THE CIRCUITS. THE ADDITIONAL VERTICAL LOAD SHALL BE EQUAL TO 1,500 KG. PLUS 33% OF THE SHIELD WIRE OR PHASE TENSION, SIMULTANEOUSLY, ADDITIONAL LONGITUDINAL LOADS SHALL BE APPLIED AT ANY OR ALL OF THE WIRE ATTACHMENT POINTS OF THE SAME CIRCUIT EQUAL TO 100% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. (SEE NOTE F)
- HIGH INTENSITY**
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSIONS. PRESSURE OF 306.25 KG/M² ACTING ON TOWER AND INSULATORS WITH NO WIND ON SHIELD WIRE OR CONDUCTORS. WIND BLOWING AT 90°, 75°, 60°, 45°, 0° TO LINE. (SEE NOTE B)
- UPLIFT LOADS**
CROSSARM MEMBERS WILL BE DESIGNED TO WITHSTAND VERTICAL UPLIFT CLOADS EQUAL TO 100% OF THE DESIGN WEIGHT SPAN ACTING ON ALL ATTACHMENT, IN EACH LOADING CASE.

NOTES

- FOR WIND AT ANGLE β TO WIRES. WIND PRESSURE TO BE REDUCED BY $\sin^2(\beta)$
- WIND PRESSURE ON TOWER APPLIED ON 3.2 TIMES MOST EXPOSED FACE. FOR WIND AT AN ANGLE β TO A FACE PRESSURE HAS BEEN ADDITIONALLY INCREASED BY $[1+0.2 \times \sin^2(2\beta)]$; WIND LOAD IS ASSUMED IN THE DIRECTION OF THE WIND.
- ALL ELEMENT OF TOWER ARE TO BE DESIGNED TO 0.79 CAPACITY.
- L.F. DENOTED LOAD FACTOR APPLYING TO STATISTIC LOAD SUCH AS WIND LOADS.
- FOR LOADING CASES IV. AND V THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOADS MAY BE ASSUMED TO ACT AT ANY TWO WIRE ATTACHMENT LOCATIONS SIMULTANEOUSLY IN THE CASE OF BOTH CIRCUITS INSTALLED, IN THE CASE OF ONLY ONE CIRCUIT INSTALLED, APPLY THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.
- LOCATIONS OF THE ADDITIONAL VERTICAL STRINGING LOADS SPECIFIED IN LOADING CASE V ARE INDEPENDENT OF THE LOCATIONS OF THE ADDITIONAL LONGITUDINAL STRINGING LOADS. APPLY ADDITIONAL LONGITUDINAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.

GENERAL NOTES

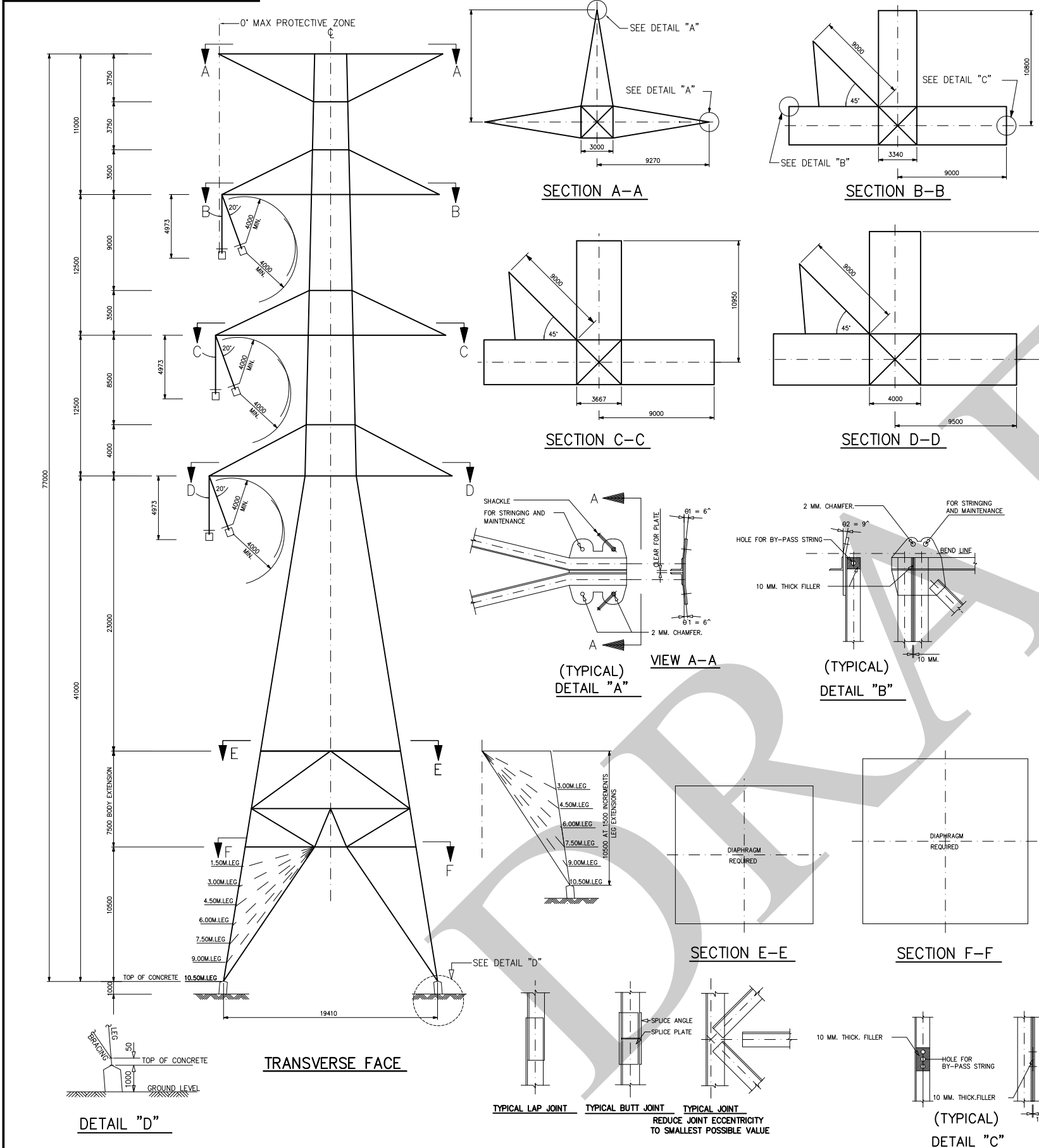
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGES OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR CONDUCTOR HARDWARE.
- ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
- ALL DIMENSIONS ON TOWER ARE TO THE WORKING LINES EXCEPT AS OTHERWISE NOTED.
- CONDUCTOR DATA : 1272 MCM, 42/7 ACSR/GA, WT=2.04 KG/M, DIA=33.91 MM, RATED BREAKING STRENGTH=14,050 KG. (4 SUB-CONDUCTORS PER PHASE BUNDLE)
- SHIELD WIRE DATA : 7 NO.8 ALUMINUM-CLAD STEEL, WT=0.39 KG/M, DIA=9.78 MM, RATED BREAKING STRENGTH=7,227 KG. OR 3/8 INCH EHS CLASS A , WT=0.406 KG/M, DIA=9.14 MM, RATED BREAKING STRENGTH=6,985 KG.
- TOWER SHALL BE DESIGNED FOR ONE OR BOTH CIRCUITS INSTALLED, FOR THE PURPOSES OF TOWER DESIGN, EACH CIRCUIT SHALL BE DEFINED AS THE THREE PHASE BUNDLES AND THE CORRESPONDING SHIELD WIRE VERTICALLY ADJACENT TO ONE ANOTHER ON ONE SIDE OF THE TOWER.
- TOWERS ARE DESIGNED FOR USE OF ANY COMBINATION OF LEG EXTENSION HEIGHTS RESULTING IN A MAXIMUM DIFFERENTIAL OF LEG HEIGHT OF SIX METERS BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

TOWER APPLICATIONS

RULING SPAN = 440 M.
MAXIMUM WIND SPAN = 460 M. AT 60°
MAXIMUM WEIGHT SPAN = 690 M.
MAXIMUM DEVIATION ANGLE = 60°
DESIGN CRITERIA BASED ON RIGHT OF WAY = 60 M.
SHIELD WIRE ; 3/8 EHS CLASS A 7 NO.8 ALUMINUM-CLAD STEEL OR OPGW 36 CORES (13.5 MM. DIAMETER)
CONDUCTOR ; 4 x 1272 MCM. ACSR/GA

| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
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| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|--|---------------------------|--|-------------------------------|--|--|--|---------|--|
| DRAWN ARKET | | RECOMMENDED AND VALIDATED | | DRAWING NAME | | 500 kV TRANSMISSION LINE | | | |
| DESIGNED P.sit | | CONCURRED | | DESCRIPTION OF DETAIL DRAWING | | CONFIGURATION AND DESIGN CRITERIA TOWER TYPE DQT60 | | | |
| VERIFIED Viwat.M | | APPROVED | | JOB NO. | | REPLACING DWG.NO. | | DWG.NO. | |
| DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | DATE 24/04/2025 | | C01-051 | | - REV. | | - REV. | |



LOADING CASES

- I. EXTREME TRANSVERSE WIND
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSION. WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATORS. L.F.=1.15 (SEE NOTES B, D)
- II. EXTREME LONGITUDINAL WIND
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS. WITH A LONGITUDINAL WIND OF 156 KG/M² ACTING ON TRANSVERSE FACES OF THE TOWER, NO WINDS ON WIRES. L.F.=1.15 (SEE NOTES B, D)
- III. EXTREME OBLIQUE WIND
ALL WIRES INTACT AT 27°C, FINAL WIRES TENSIONS WITH A TRANSVERSE WIND OF 140 KG/M² ACTING ON SHIELD WIRES, 115 KG/M² ON CONDUCTORS, 156 KG/M² ON TOWER AND INSULATOR, WIND BLOWING AT 75°, 60° AND 45° TO LINE. L.F.=1.15 (SEE NOTES A, B, D)
- IV. FAILURE CONTAINMENT
ALL WIRES INTACT AT 27°C FINAL WIRES TENSIONS. WITH A TRANSVERSE WIND OF 91 KG/M² ON SHIELD WIRES, 76 KG/M² ON CONDUCTORS, 101.5 KG/M² ON TOWER AND INSULATOR, PLUS AN UNBALANCED LONGITUDINAL LOADS EQUAL TO 100% OF THE TENSION IN THE SHIELD WIRE OR CONDUCTOR PHASE BUNDLE. (SEE NOTE E)
- V. STRINGING AND MAINTENANCE
ALL WIRES INTACT AT 4°C INITIAL WIRE TENSIONS. WITH A TRANSVERSE WIND OF 27.5 KG/M² ACTING ON SHIELD WIRES, 23 KG/M² ON CONDUCTORS, 29.4 KG/M² ON TOWER AND INSULATORS. WITH AN ADDITIONAL VERTICAL LOAD AT ANT OR ALL OF THE WIRE ATTACHMENT POINTS OF EITHER ONE (BUT NOT BOTH) OF THE CIRCUITS. THE ADDITIONAL VERTICAL LOAD SHALL BE EQUAL TO 1,500 KG. PLUS 33% OF THE SHIELD WIRE OR PHASE TENSION, SIMULTANEOUSLY, ADDITIONAL LONGITUDINAL LOADS SHALL BE APPLIED AT ANY OR ALL OF THE WIRE ATTACHMENT POINTS OF THE SAME CIRCUIT EQUAL TO 100% OF THE SHIELD WIRE OR PHASE BUNDLE TENSION. (SEE NOTE F)
- VI. HIGH INTENSITY
ALL WIRES INTACT AT 27°C, FINAL WIRE TENSIONS. PRESSURE OF 306.25 KG/M² ACTING ON TOWER AND INSULATORS WITH NO WIND ON SHIELD WIRE OR CONDUCTORS. WIND BLOWING AT 90°, 75°, 60°, 45°, 0° TO LINE. (SEE NOTE B)
- VII. UPLIFT LOADS
CROSSARM MEMBERS WILL BE DESIGNED TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO 100% OF THE DESIGN WEIGHT SPAN ACTING ON ALL ATTACHMENT, IN EACH LOADING CASE.

NOTES

- A. FOR WIND AT ANGLE β° TO WIRES. WIND PRESSURE TO BE REDUCED BY $\sin^2(\beta)$
- B. WIND PRESSURE ON TOWER APPLIED ON 3.2 TIMES MOST EXPOSED FACE. FOR WIND AT AN ANGLE β° TO A FACE PRESSURE HAS BEEN ADDITIONALLY INCREASED BY $[1 + 0.2 \times \sin^2(2\beta)]$; WIND LOAD IS ASSUMED IN THE DIRECTION OF THE WIND.
- C. ALL ELEMENT OF TOWER ARE TO BE DESIGNED TO 0.79 CAPACITY.
- D. L.F. DENOTED LOAD FACTOR APPLYING TO STATISTIC LOAD SUCH AS WIND LOADS.
- E. FOR LOADING CASED IV. AND V THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOADS MAY BE ASSUMED TO ACT AT ANY TWO WIRE ATTACHMENT LOCATIONS SIMULTANEOUSLY IN THE CASE OF BOTH CURCUITS INSTALLED, IN THE CASE OF ONLY ONE CIRCUIT INSTALLED, APPLY THE ADDITIONAL LONGITUDINAL AND / OR VERTICAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.
- F. LOCATIONS OF THE ADDITIONAL VERTICAL STRINGING LOADS SPECIFIED IN LOADING CASE V ARE INDEPENDENT OF THE LOCATIONS OF THE ADDITIONAL LONGITUDINAL STRINGING LOADS. APPLY ADDITIONAL LONGITUDINAL LOAD AT ANY ONE WIRE ATTACHMENT LOCATION.

GENERAL NOTES

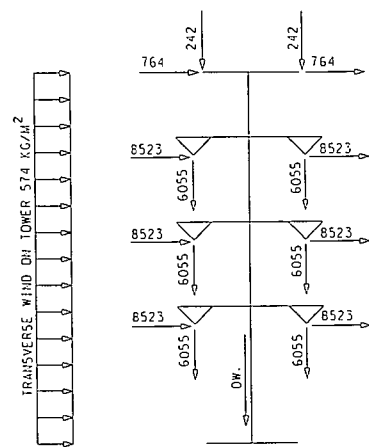
1. CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGES OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR CONDUCTOR HARDWARE.
2. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
3. ALL DIMENSIONS ON TOWER ARE TO THE WORKING LINES EXCEPT AS OTHERWISE NOTED.
4. CONDUCTOR DATA : 1272 MCM, 42/7 ACSR/GA, WT=2.04 KG/M, DIA=33.91 MM, RATED BREAKING STRENGTH=14,050 KG. (4 SUB-CONDUCTORS PER PHASE BUNDLE)
5. SHIELD WIRE DATA : 7 NO.8 ALUMINUM-CLAD STEEL, WT=0.39 KG/M, DIA=9.78 MM, RATED BREAKING STRENGTH=7,227 KG. OR 3/8 INCH EHS CLASS A, WT=0.406 KG/M, DIA=9.14 MM, RATED BREAKING STRENGTH=6,985 KG.
6. TOWER SHALL BE DESIGNED FOR ONE OR BOTH CIRCUITS INSTALLED, FOR THE PURPOSES OF TOWER DESIGN, EACH CIRCUIT SHALL BE DEFINED AS THE THREE PHASE BUNDLES AND THE CORRESPONDING SHIELD WIRE VERTICALLY ADJACENT TO ONE ANOTHER ON ONE SIDE OF THE TOWER.
7. TOWERS ARE DESIGNED FOR USE OF ANY COMBINATION OF LEG EXTENSION HEIGHTS RESULTING IN A MAXIMUM DIFFERENTIAL OF LEG HEIGHT OF SIX METERS BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

TOWER APPLICATIONS

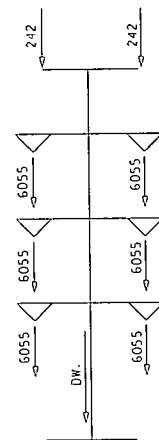
RULING SPAN = 440 M.
MAXIMUM WIND SPAN = 460 M. AT 90°
MAXIMUM WEIGHT SPAN = 690 M.
MAXIMUM DEVIATION ANGLE = 90°
DESIGN CRITERIA BASED ON RIGHT OF WAY = 60 M.
SHIELD WIRE : 3/8 EHS CLASS A OR 7 NO.8 ALUMINUM-CLAD STEEL OR OPGW 36 CORES (13.5 MM. DIAMETER)
CONDUCTOR : 4 x 1272 MCM. ACSR/GA

| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| | | | | | | | | | | |

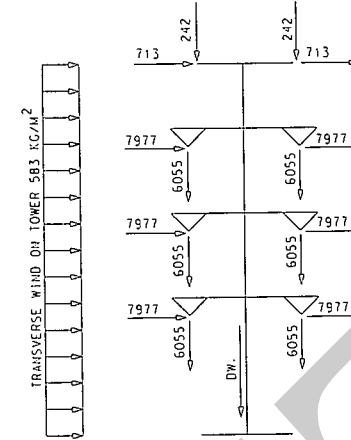
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|---------|--|-----------------------------------|-------------------|---------|---------|------|---|---|
| DRAWN | ARKET | RECOMMENDED AND VALIDATED | 500 kV TRANSMISSION LINE | | | | | | |
| DESIGNED | P.sit | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | CONFIGURATION AND DESIGN CRITERIA | | | | | | |
| VERIFIED | Visat.m | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | TOWER TYPE DQT90 | | | | | | |
| APPROVED | Spaich | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | JOB NO. | REPLACING DWG.NO. | DWG.NO. | C01-052 | REV. | - | - |
| | | DATE 24/04/2025 | | | | | | | |



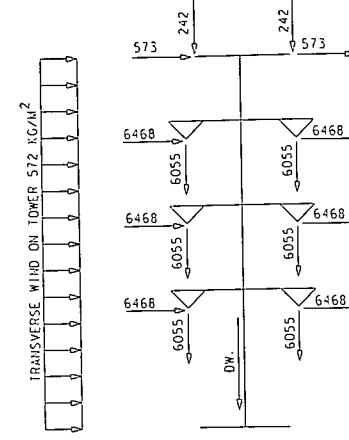
CASE I



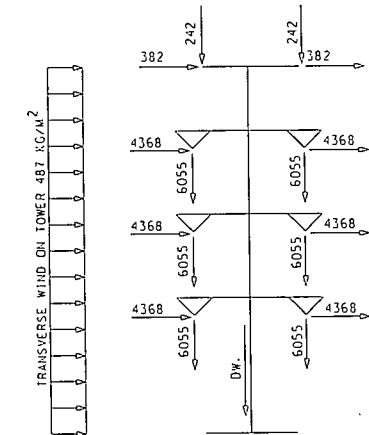
CASE II



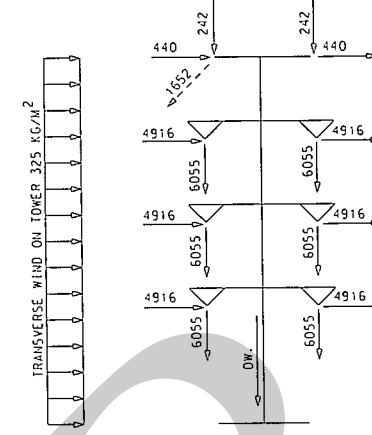
CASE III(1)



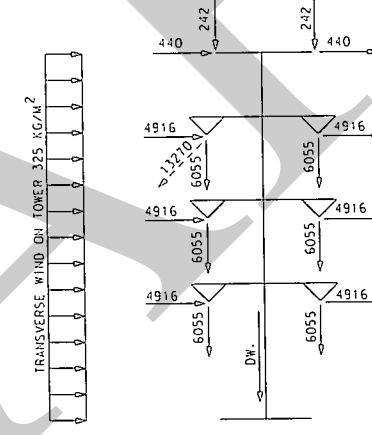
CASE III(2)



CASE III(3)



CASE IV(1)



CASE IV(2)

LOADING CASES

- CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
CASE III EXTREME OBLIQUE WIND
(1) $\beta = 75^\circ$
(2) $\beta = 60^\circ$
(3) $\beta = 45^\circ$
CASE IV FAILURE CONTAINMENT
(1) ANY ONE OF OHG. WIRE.
(2) ANY ONE OF CONDUCTOR.

NOTES

- ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
- THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER, RESPECTIVELY.
- ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.92 OF THEIR CAPACITIES.
- β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

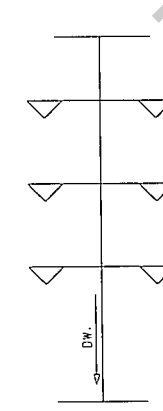
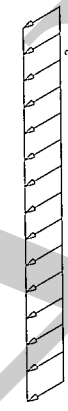
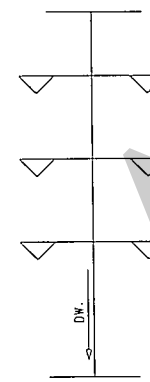
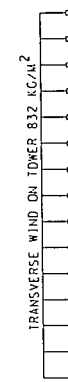
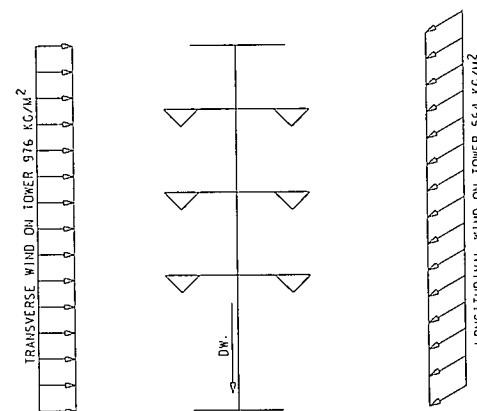
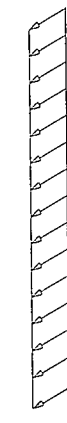
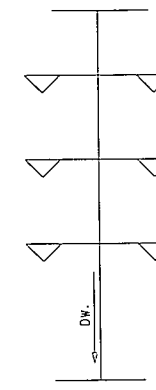
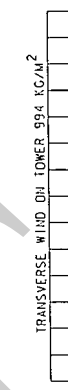
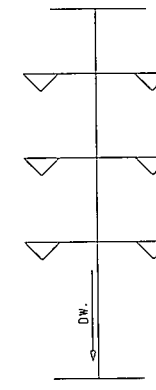
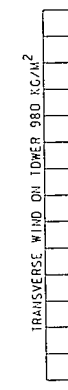
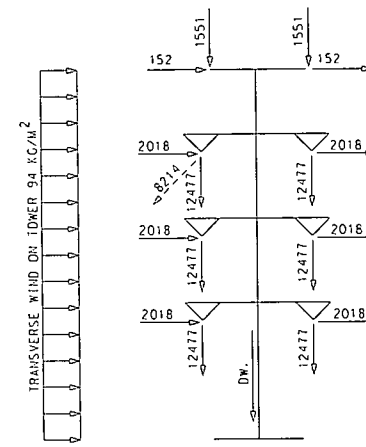
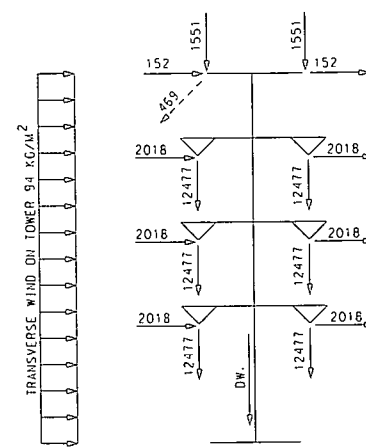
ELECTRICITY GENERATING AUTHORITY OF THAILAND

500 KV TRANSMISSION LINE

LOADING DIAGRAM
TOWER TYPE DOV3

DESIGNED BY: SAKUT
VERIFIED BY: Than
APPROVED BY: [Signature]
DATE: [Blank]

JOB NO. [Blank]
REPLACING DNG. NO. [Blank]
DNG. NO. C02 - 003
REV. [Blank]



LOADING CASES

CASE V STRINGING AND/OR MAINTENANCE

- (1) ANY ONE OF OHG. WIRE.
(2) ANY ONE OF CONDUCTOR.

CASE VI HIGH INTENSITY

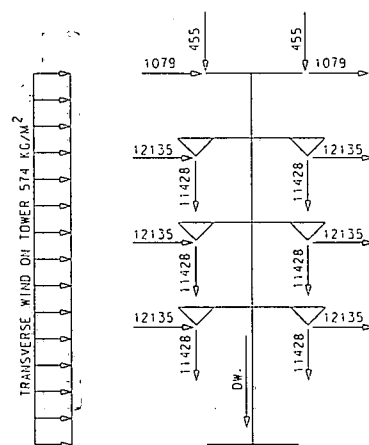
- (1) $\beta = 90^\circ$
- (2) $\beta = 75^\circ$
- (3) $\beta = 60^\circ$
- (4) $\beta = 45^\circ$
- (5) $\beta = 0^\circ$

NOTES

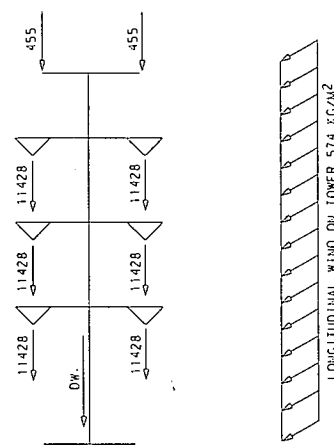
1. ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
2. THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER , RESPECTIVELY.
3. ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.92 OF THEIR CAPACITIES.
4. β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
5. OW. DENOTES DEAD WEIGHT OF THE TOWER.
6. THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

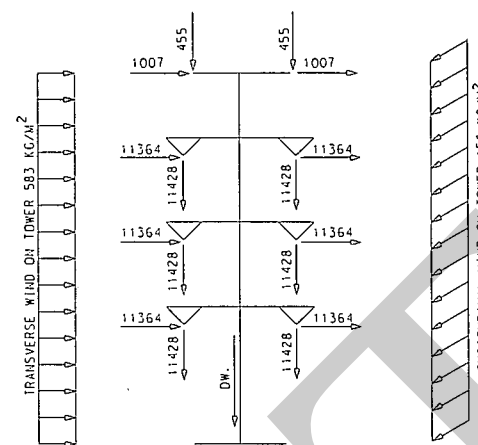
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|----------|---------|-------------|--------------------|--------------------------|------|
| ORIGIN | CHALCEE | VAL DATED | 7-28-00 | 500 kv TRANSMISSION LINE | |
| DESIGNED | SARUT | RECOMMENDED | | LOADING DIAGRAM | |
| VERIFIED | Shan | CONCURRED | | TOWER TYPE DOV3 | |
| APPROVED | | JOB NO. | REPLACING DWG. NO. | DWG. NO. | REV. |
| | | | | C02 - 004 | |



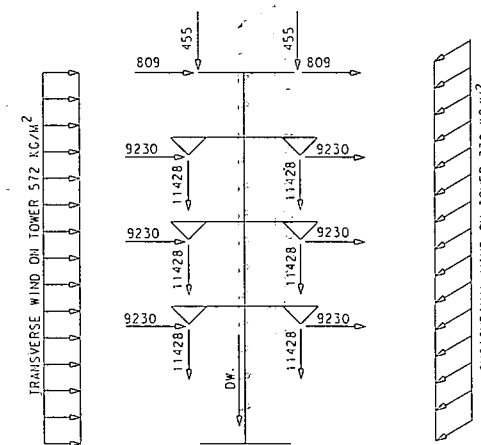
CASE VI(1)
CASE I



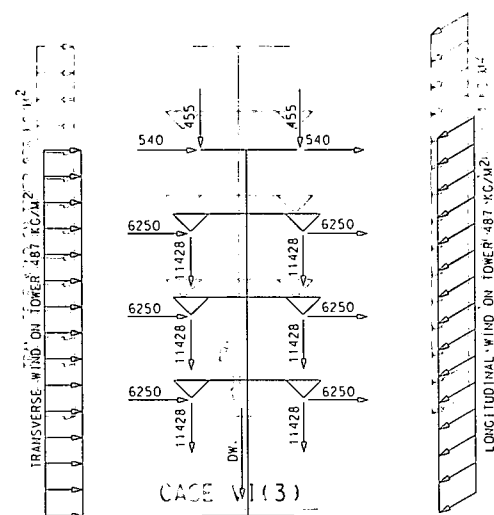
CASE VI(2)
CASE II



CASE VI(3)
CASE III(1)

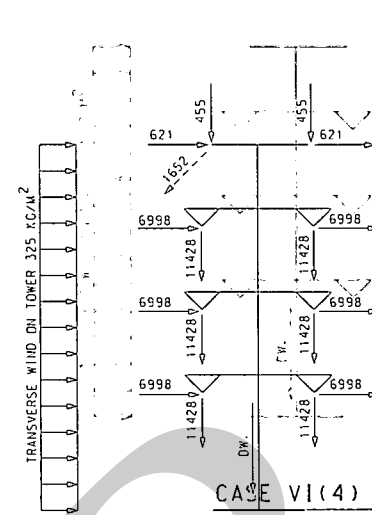


CASE VI(4)
CASE III(2)



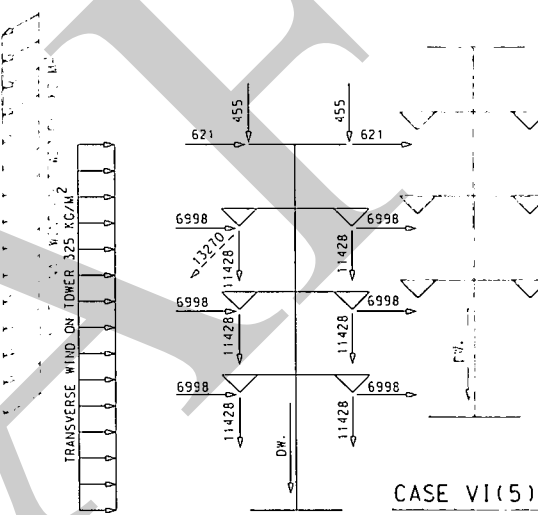
CASE VI(5)

CASE III(3)



CASE VI(6)

CASE IV(1)



CASE VI(7)

CASE IV(2)

LOADING CASES

CASE V - EXTREME MAINTENANCE

LOADING CASES

- CASE I - EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
- CASE II - EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
- CASE III - EXTREME OBLIQUE WIND
 - (1) $\beta = 75^\circ$
 - (2) $\beta = 60^\circ$
 - (3) $\beta = 45^\circ$

CASE IV - FAILURE CONTAINMENT

- (1) ANY ONE OF OHG. WIRE.
- (2) ANY ONE OF CONDUCTOR.

NOTES

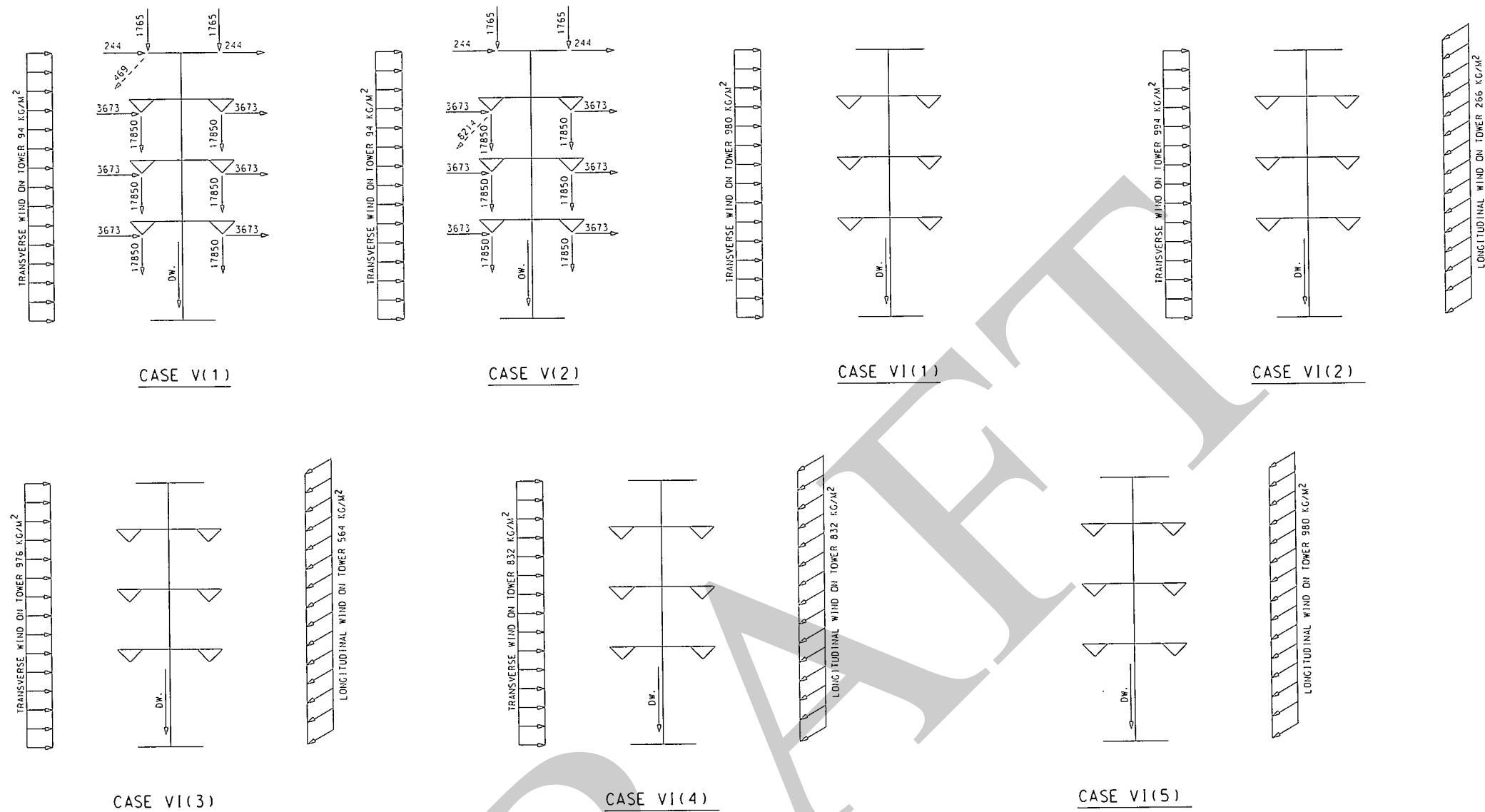
NOTES

1. ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
2. THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER, RESPECTIVELY.
3. ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.92 OF THEIR CAPACITIES.
4. β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
5. DW. DENOTES DEAD WEIGHT OF THE TOWER.
6. THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | |
|----------|-------|--------------------|---|--------------------------|
| DESIGNED | SAWIT | VALIDATED | 7. Chan 18 MAR 05 | 500 KV TRANSMISSION LINE |
| VERIFIED | Chan | RECOMMENDED | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | LOADING DIAGRAM |
| APPROVED | | CONCURRED | ASSISTANT CHIEF, TRANSMISSION SYSTEM ENGINEERING DIVISION | TOWER TYPE DOV9 |
| JOB NO. | | REPLACING DWG. NO. | | DWG. NO. |
| | | | | C02 - 005 |

REV. NO. JOB NO. JOB DESCRIPTION DRAWN DESIGNED VERIFIED VALIDATED RECOMMENDED CONCURRED APPROVED DATE



LOADING CASES

CASE V STRINGING AND/OR MAINTENANCE

- (1) ANY ONE OF OHG. WIRE.
- (2) ANY ONE OF CONDUCTOR.

CASE VI HIGH INTENSITY

- (1) $\beta = 90^\circ$
- (2) $\beta = 75^\circ$
- (3) $\beta = 60^\circ$
- (4) $\beta = 45^\circ$
- (5) $\beta = 0^\circ$

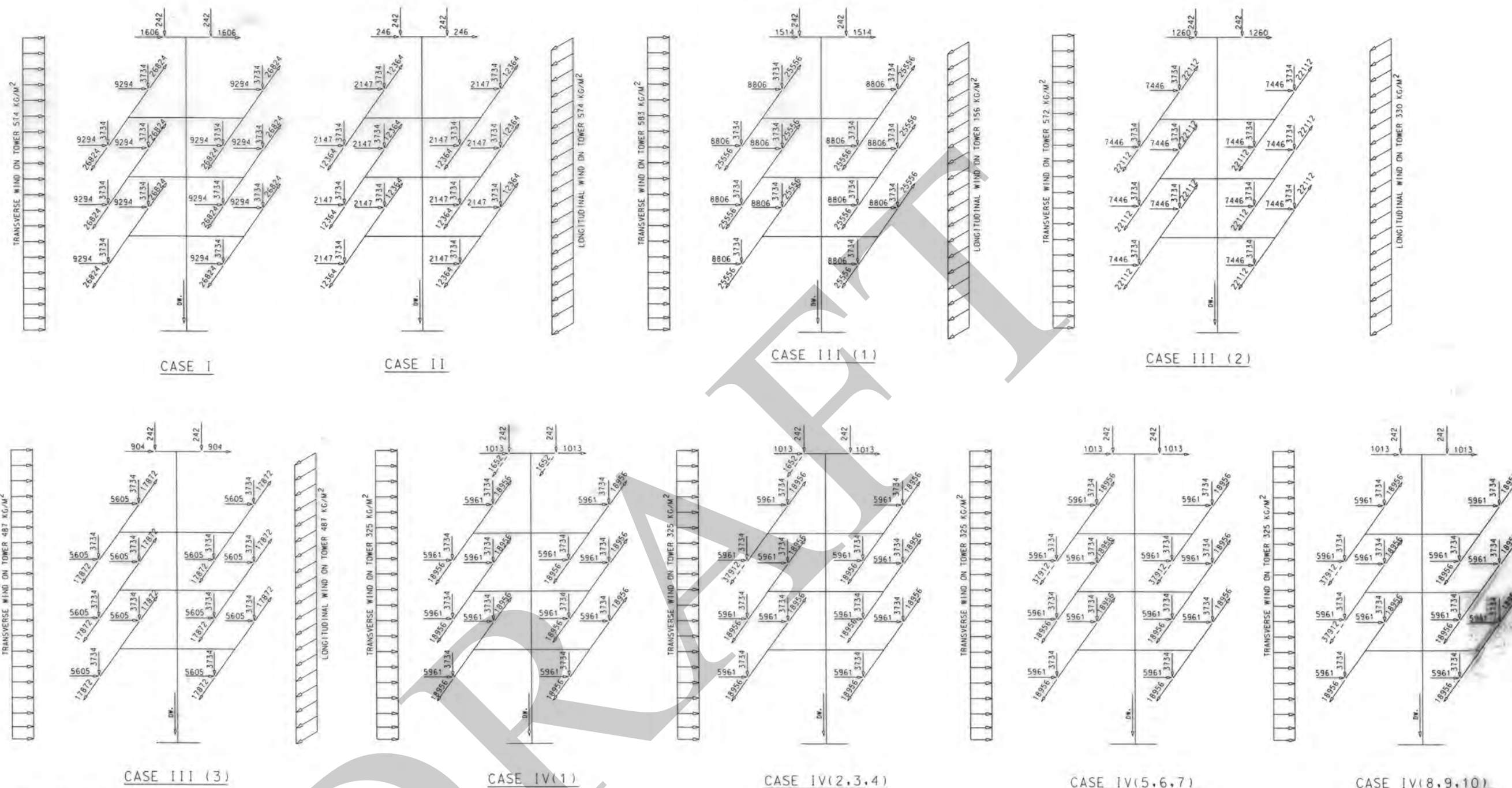
NOTES

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- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

9001
SEPTEMBER 2007

| | | | | | | | | | | |
|---|---------|-----------------|--------|----------|----------|-----------|-------------|-----------|----------|------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | |
| 500 KV TRANSMISSION LINE | | | | | | | | | | |
| LOADING DIAGRAM | | | | | | | | | | |
| TOWER TYPE DOV9 | | | | | | | | | | |
| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
| | | | CHALEE | SARUT | Than | | | | | |
| VALIDATED: <i>V. Chan</i> 18 Mar 07 RECOMMENDED: <i>Than</i> CONCURRED: <i>Than</i> | | | | | | | | | | |
| JOB NO. _____ REPLACING DWG. NO. _____ DWG. NO. C02 - 006 ASSISTANT GOVERNOR - TRANSMISSION SYSTEM ENGINEERING | | | | | | | | | | |

4x1272 MCM ACSR/GA, RULING SPAN 440 m.



LOADING CASES

CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
 CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
 CASE III EXTREME OBLIQUE WIND

- (1) $\beta = 75^\circ$
 (2) $\beta = 60^\circ$
 (3) $\beta = 45^\circ$

CASE IV FAILURE CONTAINMENT

- (1) TWO OHG. WIRES.
 (2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.
 (3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.
 (4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.

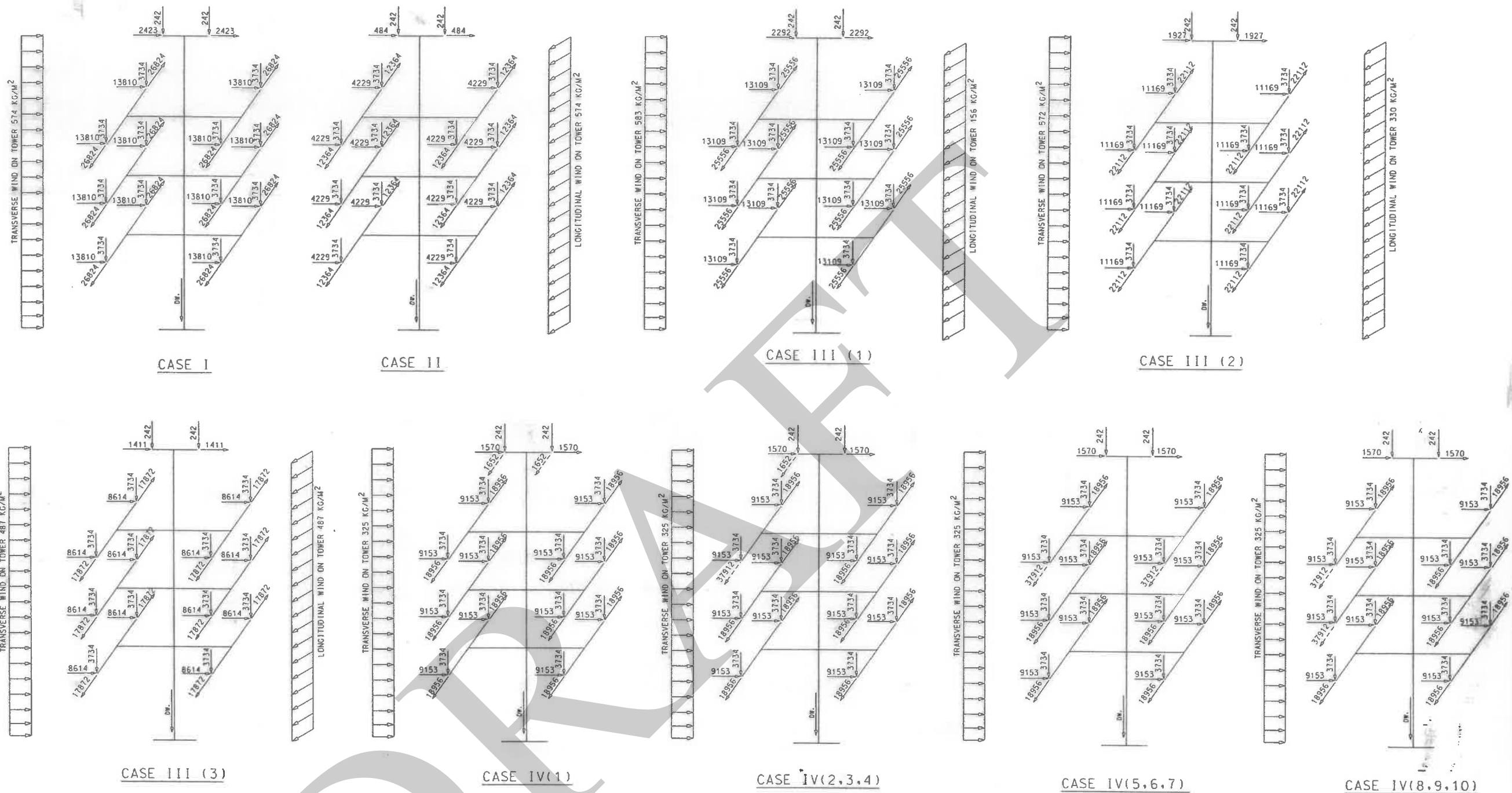
- (5) TOP CONDUCTORS.
 (6) MIDDLE CONDUCTORS.
 (7) BOTTOM CONDUCTORS.
 (8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
 (9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
 (10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.

NOTES

- ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
- THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER, RESPECTIVELY.
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- β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|----------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| | | | | | | | | | | |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|--|--|--|--|--------------------------|--|--|--|--|
| DRAWN | | | | | 500 KV TRANSMISSION LINE | | | | |
| DESIGNED | | | | | LOADING DIAGRAM | | | | |
| VERIFIED | | | | | TOWER TYPE DOT20 | | | | |
| APPROVED | | | | | | | | | |



LOADING CASES

- CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
CASE III EXTREME OBLIQUE WIND

- (1) $\beta = 75^\circ$
(2) $\beta = 60^\circ$
(3) $\beta = 45^\circ$

CASE IV

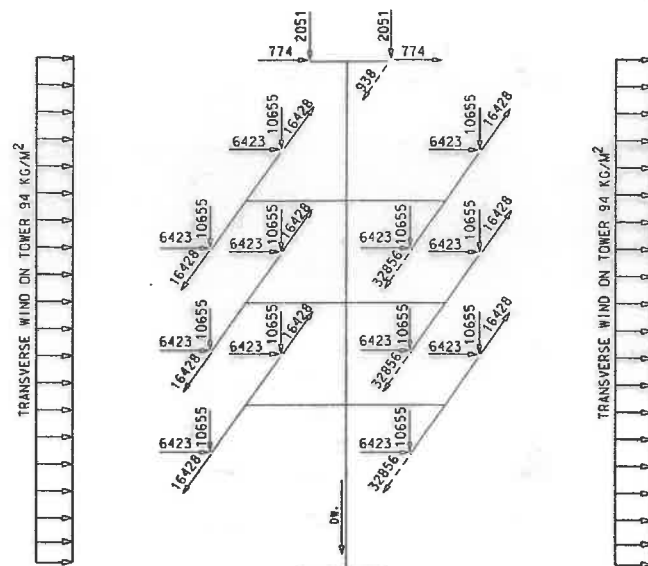
- FAILURE CONTAINMENT
(1) TWO OHG. WIRES.

- (2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.
(3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.
(4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.

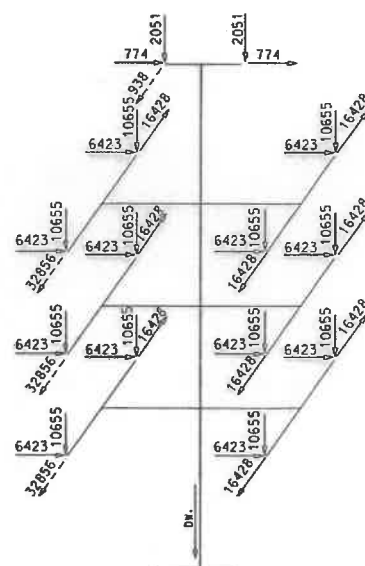
- (5) TOP CONDUCTORS.
(6) MIDDLE CONDUCTORS.
(7) BOTTOM CONDUCTORS.
(8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
(9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
(10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.

NOTES

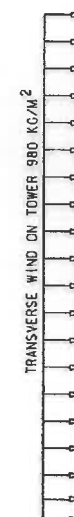
- ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
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- β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.



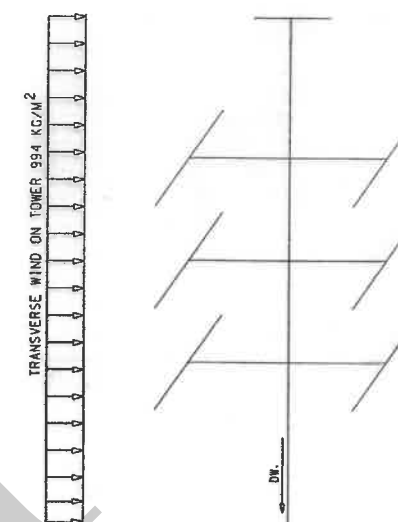
CASE V(1)



CASE V(2)



CASE VI(1)



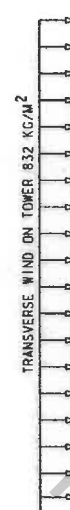
CASE VI(2)



CASE VI(3)



CASE VI(4)



CASE VI(6)



CASE VI(7)



LOADING CASES

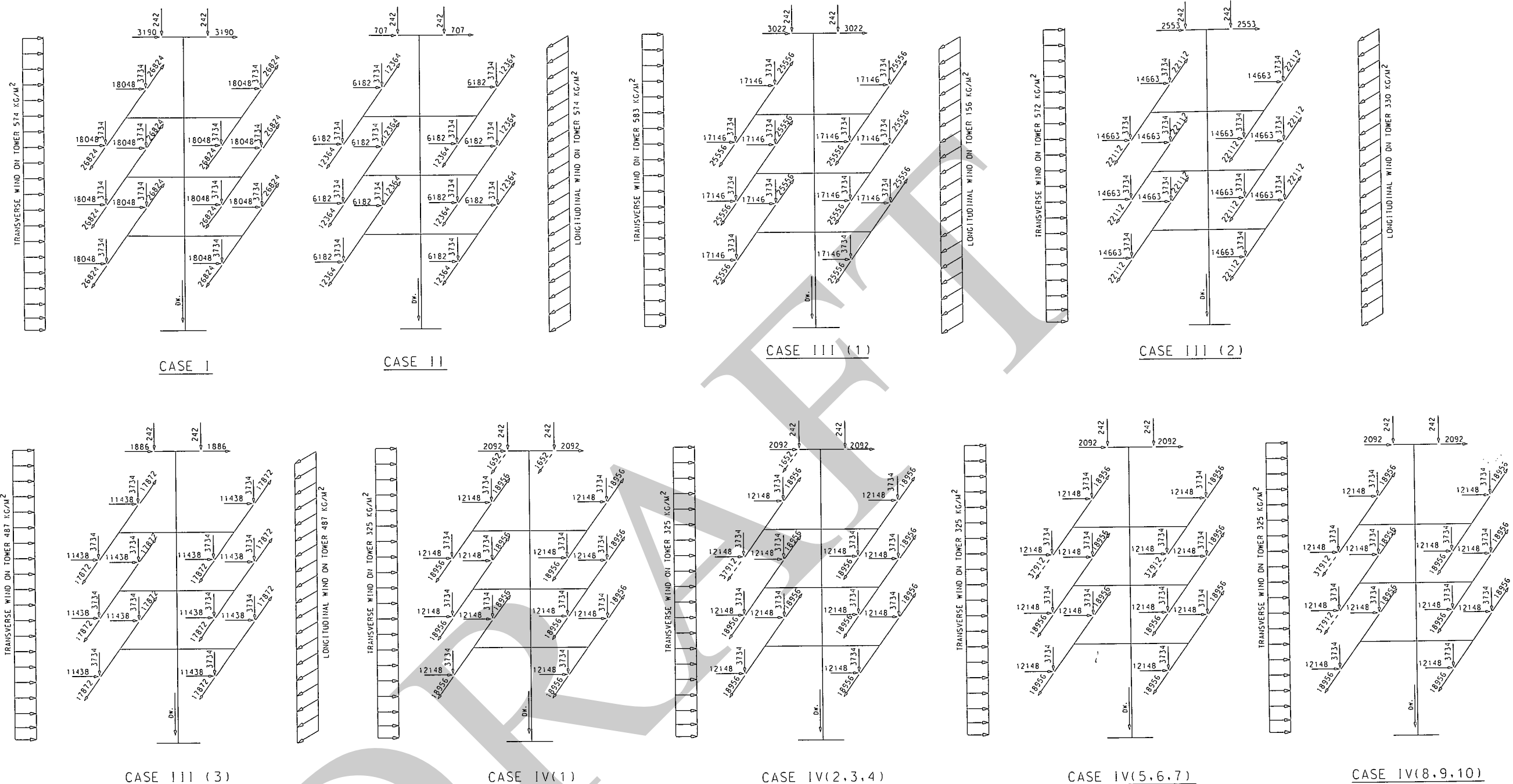
CASE V STRINGING AND/OR MAINTENANCE
(1) ONE-CIRCUIT RIGHT SIDE.
(2) ONE-CIRCUIT LEFT SIDE

CASE VI HIGH INTENSITY WIND
(1) $\beta = 90^\circ$
(2) $\beta = 75^\circ$
(3) $\beta = 60^\circ$
(4) $\beta = 45^\circ$
(5) $\beta = 0^\circ$

CASE VII UPLIFT (SEE NOTES 7.)

NOTES

1. ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS-EXCEPT AS OTHERWISE INDICATED.
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7. ALL ELEMENTS OF TOWER SHALL BE CAPABLE TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO DOWNWARD VERTICAL LOADS SPECIFIED IN EACH LOADING CASE.



LOADING CASES

- CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
- CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
- CASE III EXTREME OBLIQUE WIND
- (1) $\beta = 75^\circ$
- (2) $\beta = 60^\circ$
- (3) $\beta = 45^\circ$
- CASE IV FAILURE CONTAINMENT
- (1) TWO OHG. WIRES.
- (2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.
- (3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.
- (4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.
- (5) TOP CONDUCTORS.
- (6) MIDDLE CONDUCTORS.
- (7) BOTTOM CONDUCTORS.
- (8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
- (9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
- (10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.

NOTES

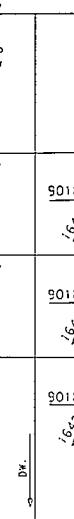
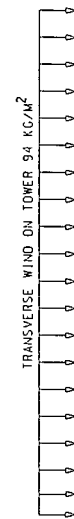
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ELECTRICITY GENERATING AUTHORITY OF THAILAND

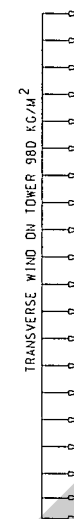
500 kV TRANSMISSION LINE
LOADING DIAGRAM
TOWER TYPE DOT60

| | | | |
|----------|--------|-------------|--|
| DRAWN | CHALEE | VALIDATED | 18 Mar 01 |
| DESIGNED | SPRUT | RECOMMENDED | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT |
| VERIFIED | SKAN | CONCURRED | ASST. DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION |
| APPROVED | | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION |

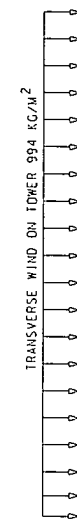
| | | | |
|---------|--------------------|-----------|------|
| JOB NO. | REPLACING DWG. NO. | DWG. NO. | REV. |
| | | C02 - 011 | |



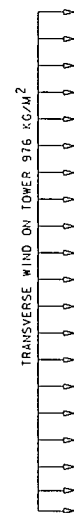
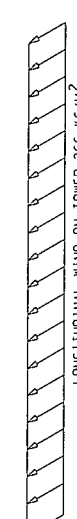
SE V(2)



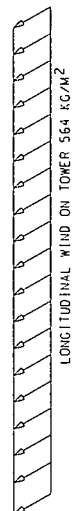
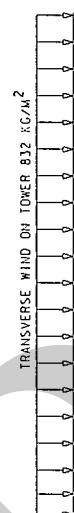
CASE VI(1)



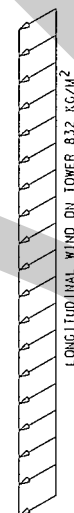
CASE VI(2)



CASE VI(3)

LONGITUDINAL WIND ON TOWER 564 KG/M²

CASE VI(4)



CASE VI(5)

LONGITUDINAL WIND ON TOWER 980 KG/M²

LOADING CASES

- CASE V STRINGING AND/OR MAINTENANCE
(1) ONE-CIRCUIT RIGHT SIDE.
(2) ONE-CIRCUIT LEFT SIDE

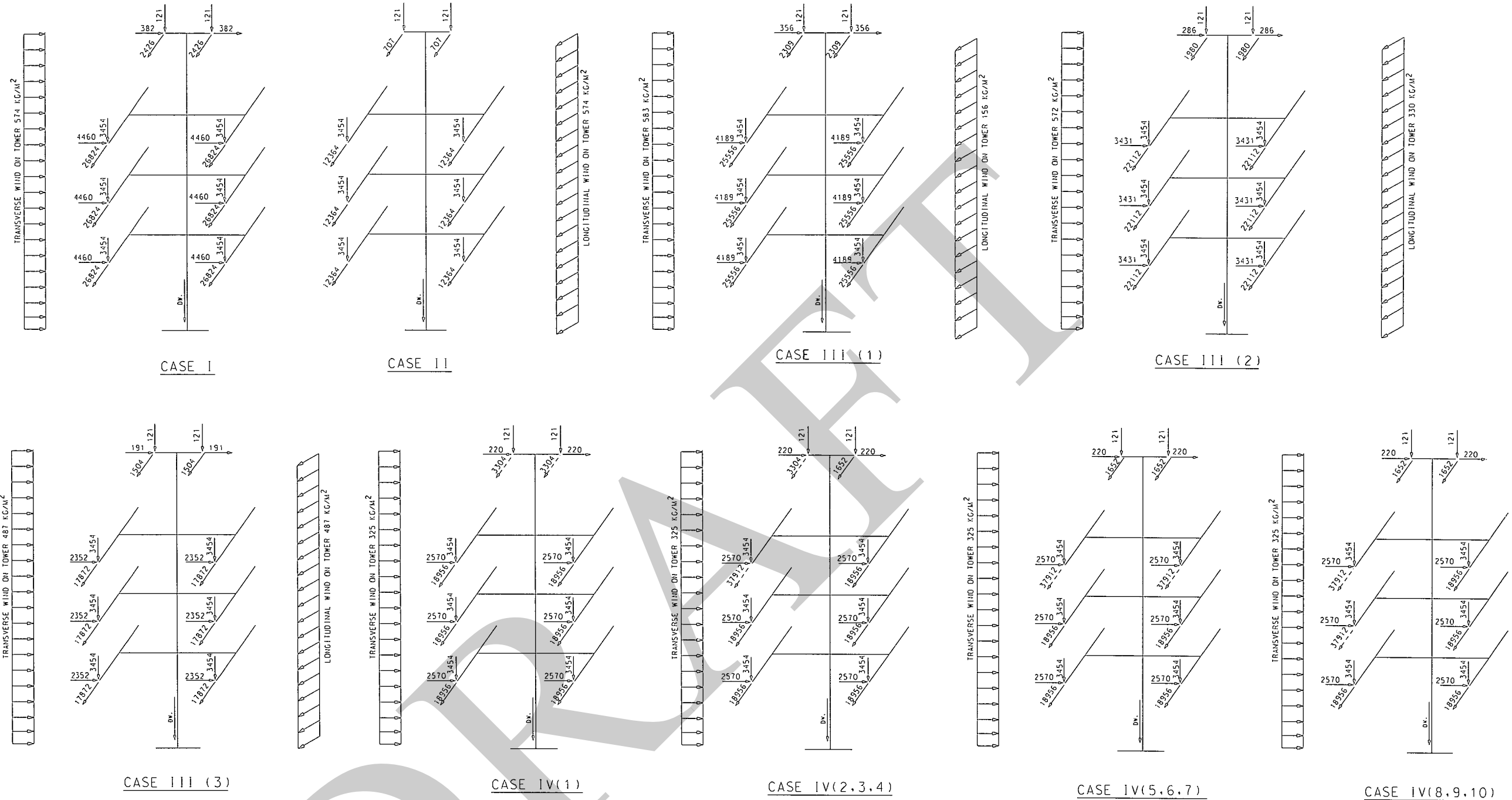
- CASE VI HIGH INTENSITY WIND
- (1) $\beta = 90^\circ$
 - (2) $\beta = 75^\circ$
 - (3) $\beta = 60^\circ$
 - (4) $\beta = 45^\circ$
 - (5) $\beta = 0^\circ$

CASE VII UPLIFT (SEE NOTES 7.)

NOTES

1. ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
2. THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER , RESPECTIVELY.
3. ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.79 OF THEIR CAPACITIES.
4. β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
5. DW. DENOTES DEAD WEIGHT OF THE TOWER.
6. THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.
7. ALL ELEMENTS OF TOWER SHALL BE CAPABLE TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO DOWNWARD VERTICAL LOADS SPECIFIED IN EACH LOADING CASE.

[illegible]



LOADING CASES

- CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
CASE III EXTREME OBLIQUE WIND
(1) $\beta = 75^\circ$
(2) $\beta = 60^\circ$
(3) $\beta = 45^\circ$
CASE IV FAILURE CONTAINMENT
(1) TWO OHG. WIRES.
(2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.
(3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.
(4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.

- (5) TOP CONDUCTORS.
(6) MIDDLE CONDUCTORS.
(7) BOTTOM CONDUCTORS.
(8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
(9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
(10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.

NOTES

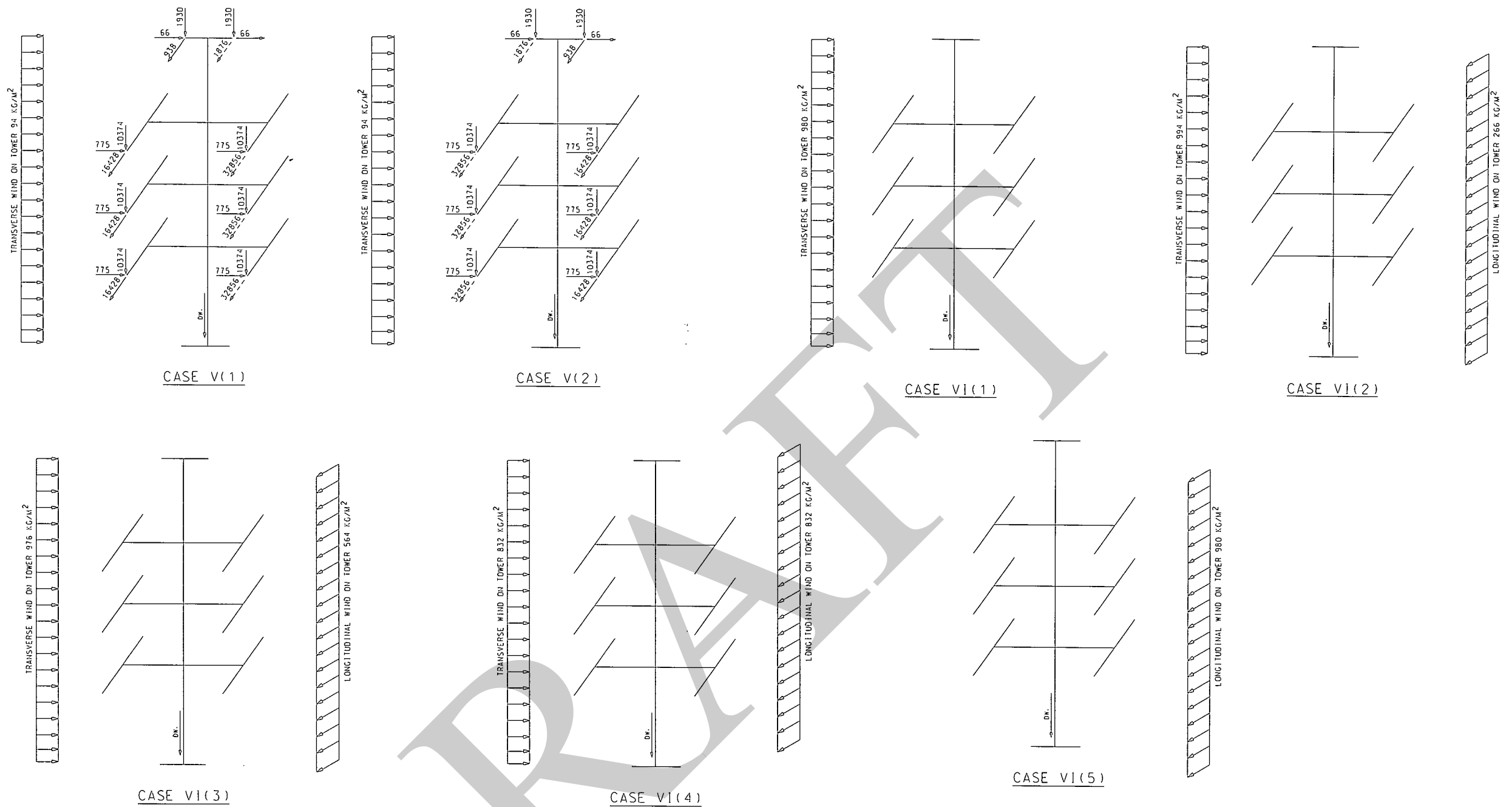
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FOR 0° + COMPLETE DEADEND CASE

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | |
|----------|--------|-------------|--------|--------------------------|
| DESIGNED | CHALEE | VALIDATED | CHALEE | 500 kV TRANSMISSION LINE |
| DESIGNED | SARUT | RECOMMENDED | CHALEE | LOADING DIAGRAM |
| VERIFIED | THAN | CONCURRED | CHALEE | TOWER TYPE DOT60 |
| APPROVED | | | | |
| REVISION | | | | |

| | | | | | | | | | | | | | | |
|----------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|---------|--------------------|----------|------|
| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | JOB NO. | REPLACING DWG. NO. | DWG. NO. | REV. |
| | | | | | | | | | | | | | | |



LOADING CASES

CASE V STRINGING AND/OR MAINTENANCE
(1) ONE-CIRCUIT RIGHT SIDE.
(2) ONE-CIRCUIT LEFT SIDE

CASE VI HIGH INTENSITY WIND
(1) $\beta = 90^\circ$
(2) $\beta = 75^\circ$
(3) $\beta = 60^\circ$
(4) $\beta = 45^\circ$
(5) $\beta = 0^\circ$

CASE VII UPLIFT (SEE NOTES 7.)

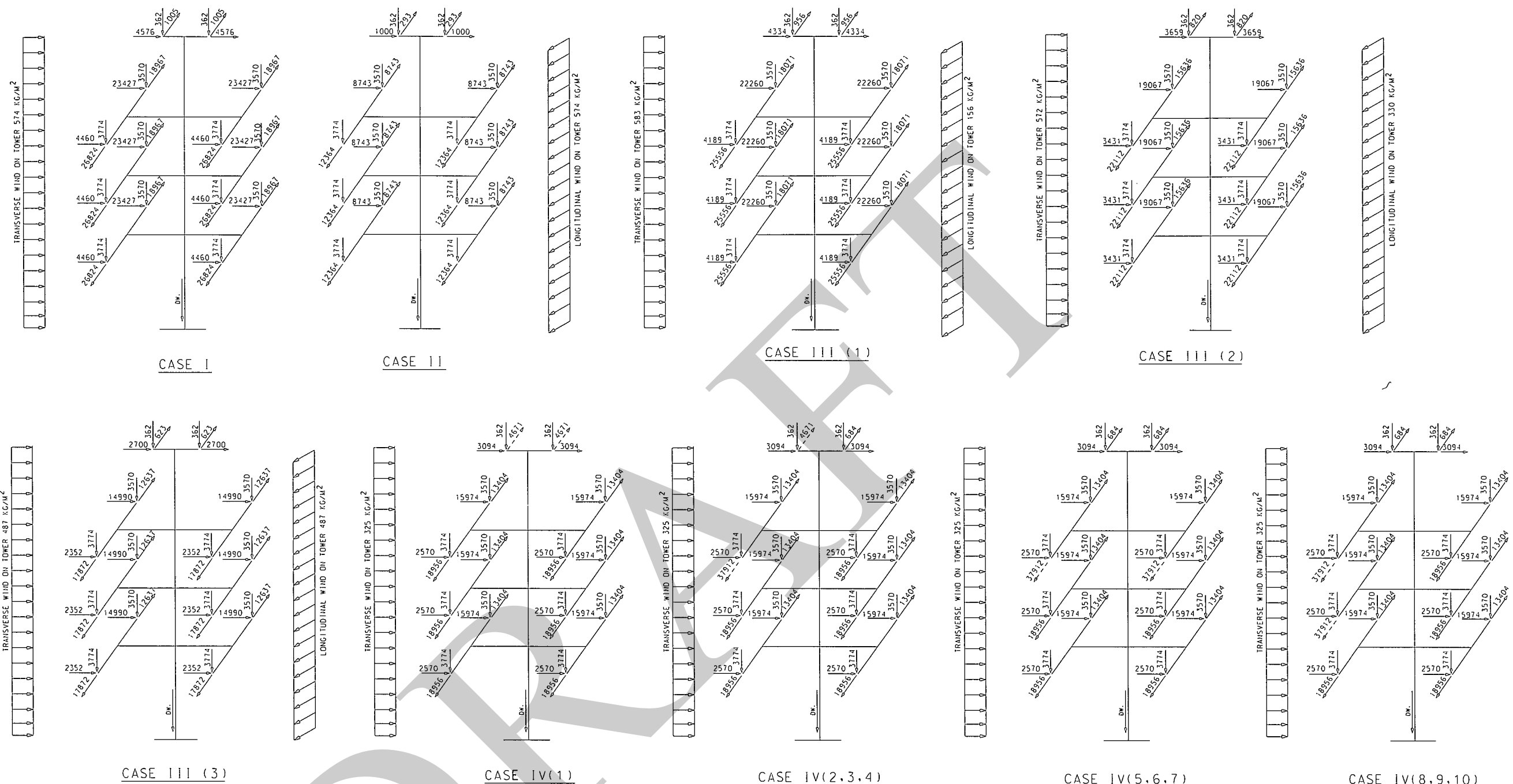
FOR 0° + COMPLETE DEADEND CASE

NOTES

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- DW. DENOTES DEAD WEIGHT OF THE TOWER.
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ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | | |
|--|--|--------------------------------------|--|--|--|
| DRAWN CHALEE | | VALIDATED <i>T. Chalee 18 Mar 65</i> | | 500 KV TRANSMISSION LINE | |
| DESIGNED SARUT | | RECOMMENDED | | LOADING DIAGRAM | |
| VERIFIED <i>Than</i> | | CONCURRED | | TOWER TYPE DOT60 | |
| APPROVED | | DATE | | JOB NO. REPLACING Dwg. NO. Dwg. NO. REV. | |
| ASSISTANT GOVERNOR - TRANSMISSION SYSTEM ENGINEERING | | | | C02 - 014 | |



LOADING CASES

- CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
CASE III EXTREME OBLIQUE WIND
(1) $\beta = 75^\circ$
(2) $\beta = 60^\circ$
(3) $\beta = 45^\circ$
CASE IV FAILURE CONTAINMENT
(1) TWO OHG. WIRES.
(2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.
(3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.
(4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.

- (5) TOP CONDUCTORS.
(6) MIDDLE CONDUCTORS.
(7) BOTTOM CONDUCTORS.
(8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
(9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
(10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.

NOTES

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FOR $0^\circ + 45^\circ$ SLACK SPAN CASE

ELECTRICITY GENERATING AUTHORITY OF THAILAND

500 kV TRANSMISSION LINE

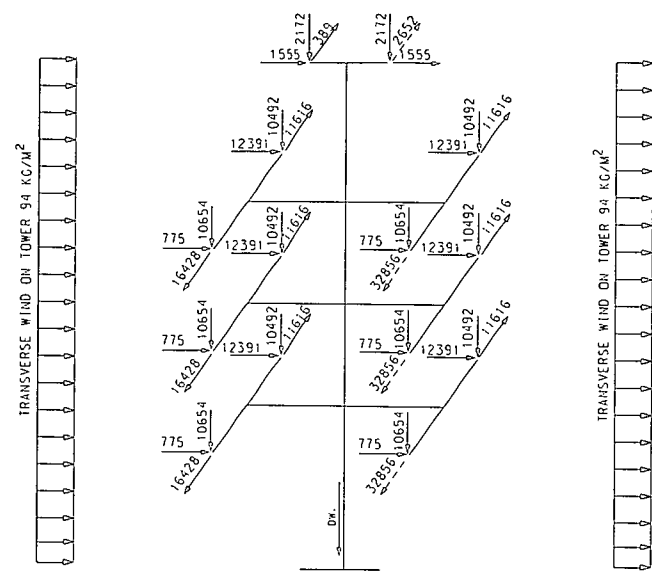
LOADING DIAGRAM

TOWER TYPE DOT60

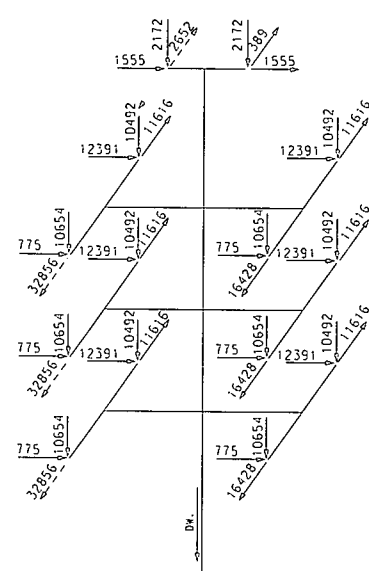
| | |
|--------------------|--------------------------|
| DESIGNED CHALCE | VALIDATED 18 Nov 05 |
| DESIGNED SARUT | RECOMMENDED 18 Nov 05 |
| VERIFIED Than | CONCURRED 18 Nov 05 |
| APPROVED | |

| | | | |
|---------|--------------------|----------|------|
| JOB NO. | REPLACING DWG. NO. | DWG. NO. | REV. |
| | | | |

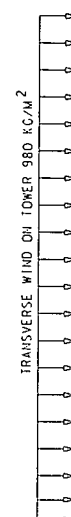
| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|----------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
|----------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|



CASE V(1)



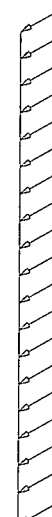
CASE V(2)



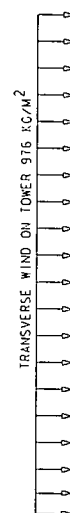
CASE VI(1)



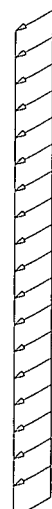
CASE VI(2)



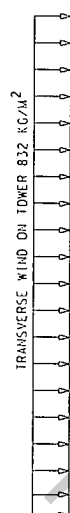
LONGITUDINAL WIND ON TOWER 266 KG/M²



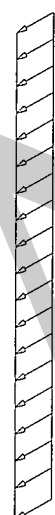
CASE VI(3)



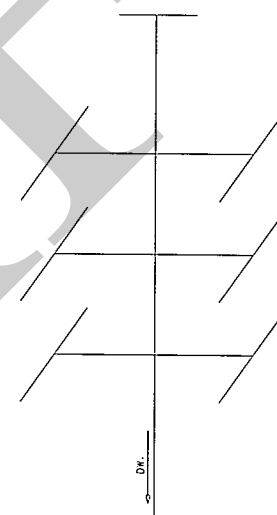
LONGITUDINAL WIND ON TOWER 564 KG/M²



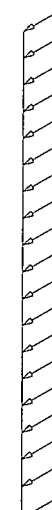
CASE VI(4)



LONGITUDINAL WIND ON TOWER 832 KG/M²



CASE VI(5)



LONGITUDINAL WIND ON TOWER 980 KG/M²

LOADING CASES

CASE V STRINGING AND/OR MAINTENANCE
(1) ONE-CIRCUIT RIGHT SIDE.
(2) ONE-CIRCUIT LEFT SIDE

CASE VI HIGH INTENSITY WIND
(1) $\beta = 90^\circ$
(2) $\beta = 75^\circ$
(3) $\beta = 60^\circ$
(4) $\beta = 45^\circ$
(5) $\beta = 0^\circ$

CASE VII UPLIFT (SEE NOTES 7.)

FOR $0^\circ + 45^\circ$ SLACK SPAN CASE

NOTES

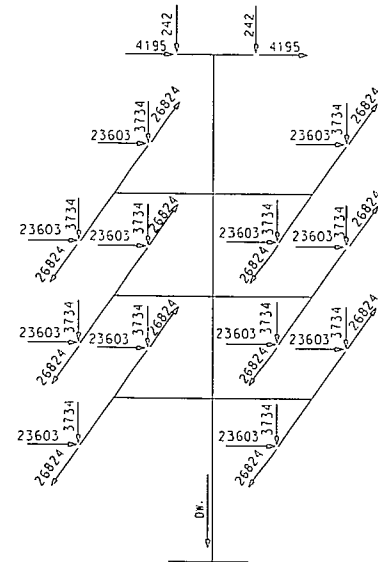
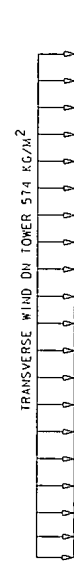
- ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
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- ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.79 OF THEIR CAPACITIES.
- β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.
- ALL ELEMENTS OF TOWER SHALL BE CAPABLE TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO DOWNWARD VERTICAL LOADS SPECIFIED IN EACH LOADING CASE.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

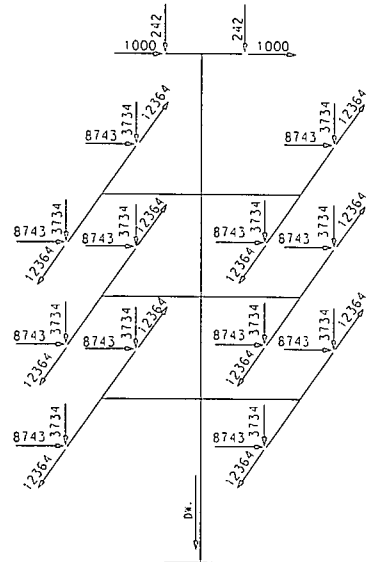
500 kV TRANSMISSION LINE
LOADING DIAGRAM
TOWER TYPE DOT60

REPLACING DWG. NO. 1
DATE

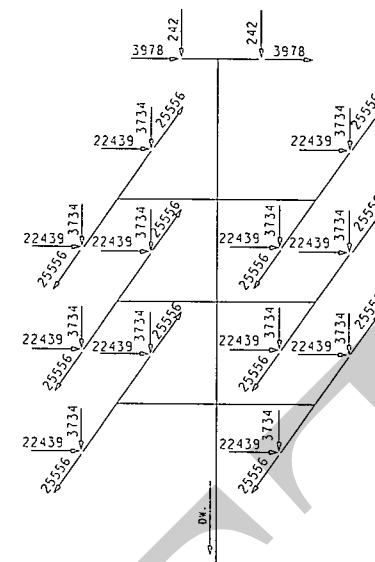
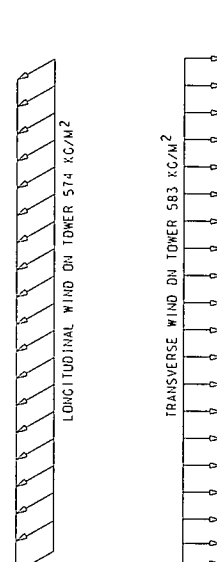
REV. 1
C02 - 016



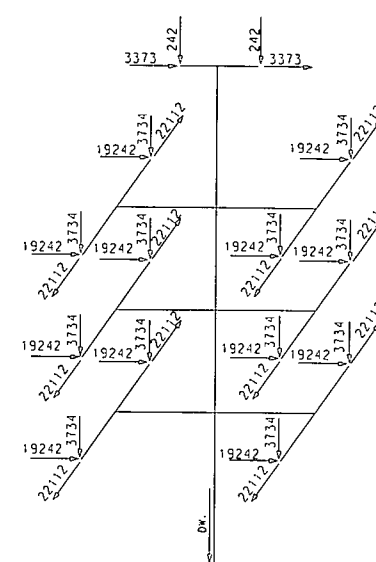
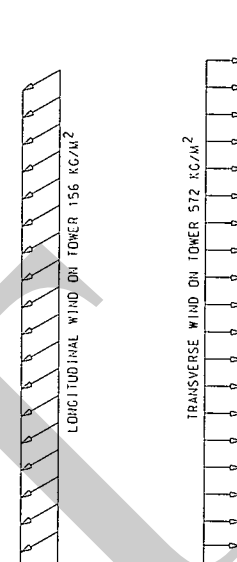
CASE I



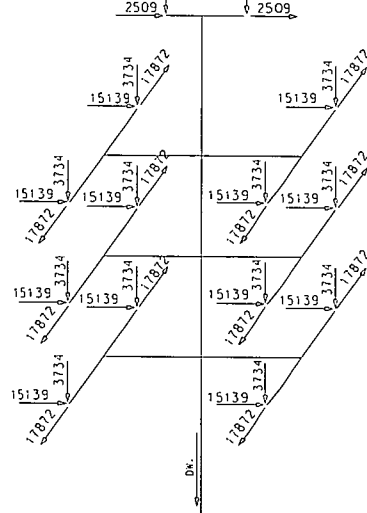
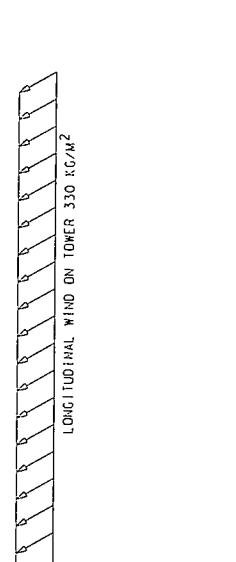
CASE II



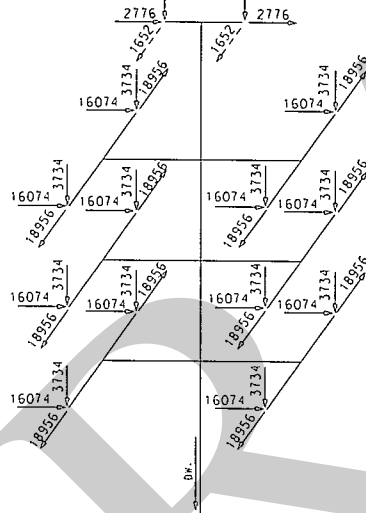
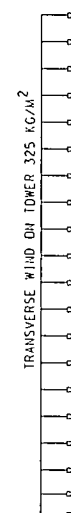
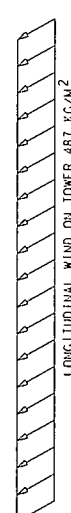
CASE III (1)



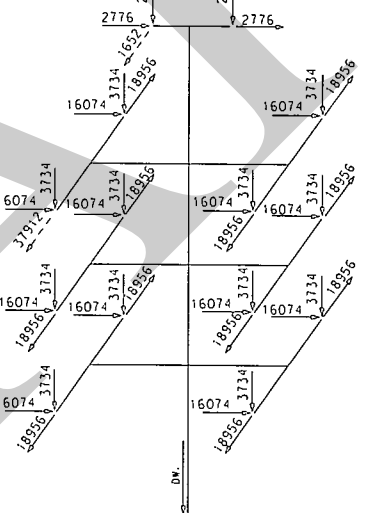
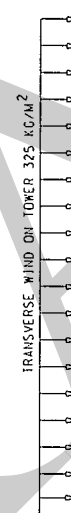
CASE III (2)



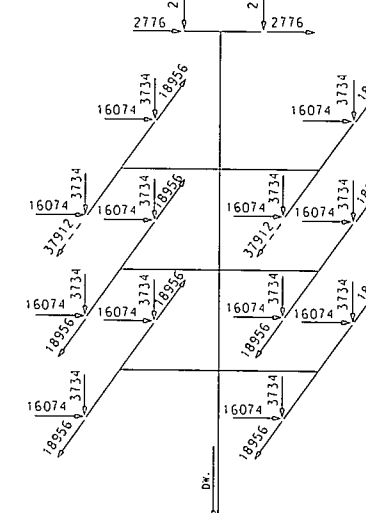
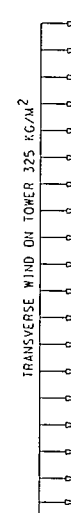
CASE III (3)



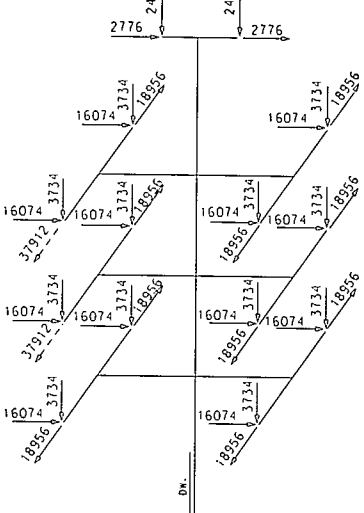
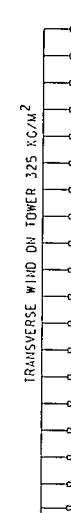
CASE IV (1)



CASE IV (2,3,4)



CASE IV (5,6,7)



CASE IV (8,9,10)

LOADING CASES

- CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
- CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
- CASE III EXTREME OBLIQUE WIND
 - (1) $\beta = 75^\circ$
 - (2) $\beta = 60^\circ$
 - (3) $\beta = 45^\circ$
- CASE IV FAILURE CONTAINMENT
 - (1) TWO OHG. WIRES.
 - (2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.
 - (3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.
 - (4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.

- (5) TOP CONDUCTORS.
- (6) MIDDLE CONDUCTORS.
- (7) BOTTOM CONDUCTORS.
- (8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
- (9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
- (10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.

NOTES

- ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
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- β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

500 KV TRANSMISSION LINE

LOADING DIAGRAM

TOWER TYPE DOT90

DRAWN CHALEE
DESIGNED SARUT
VERIFIED THAN
APPROVED

VALIDATED
RECOMMENDED
CONCURRED
DATE

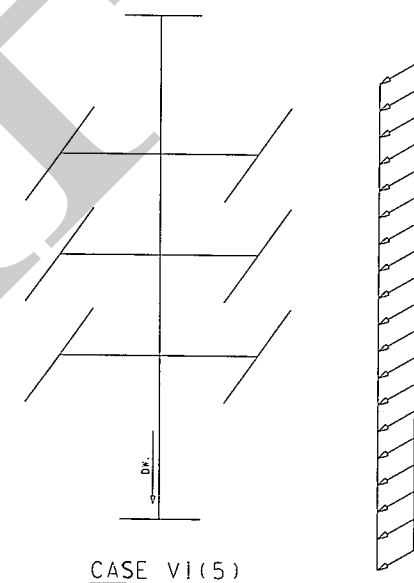
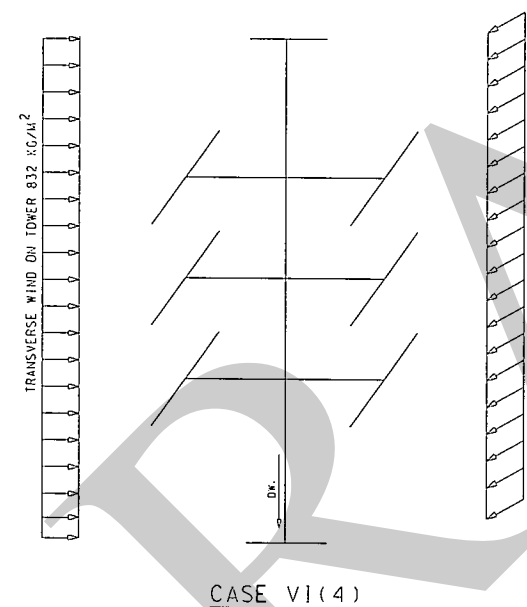
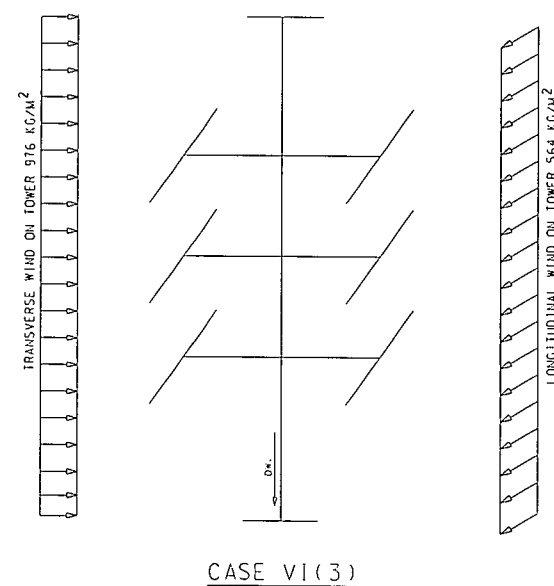
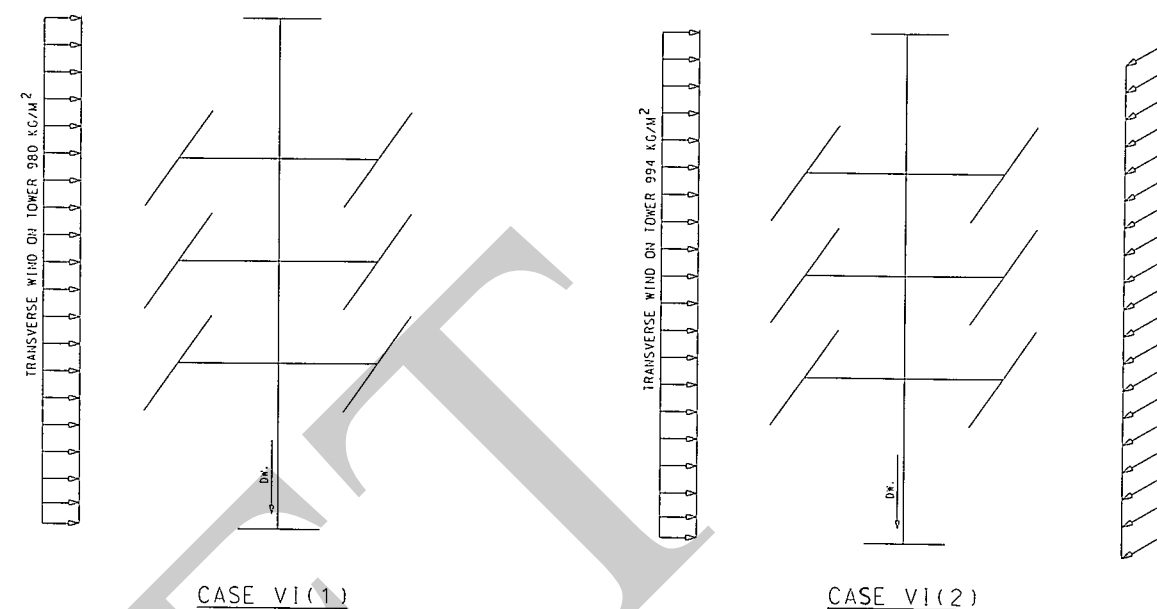
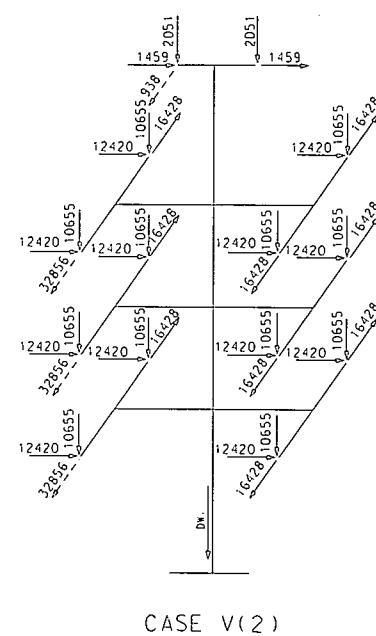
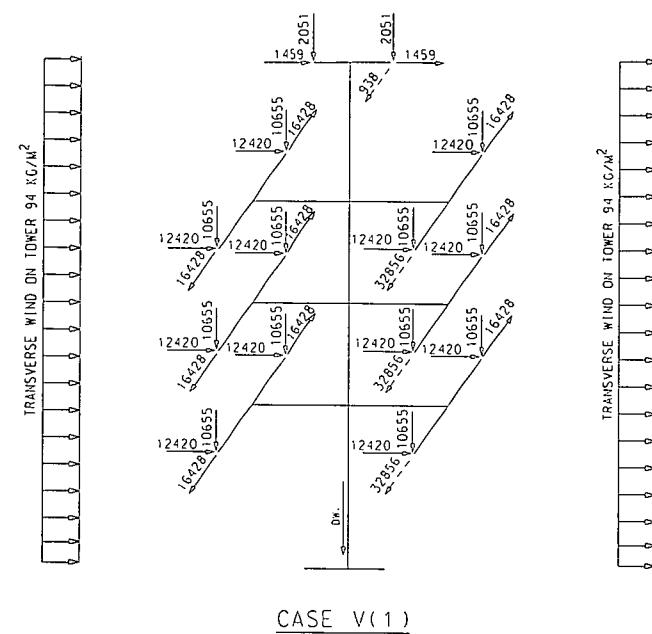
JOB NO. REPLACING DWG. NO. DWG. NO.

ASSISTANT CHIEF - TRANSMISSION SYSTEM ENGINEERING

DATE

REV.

C02 - 017



LOADING CASES

CASE V STRINGING AND/OR MAINTENANCE
(1) ONE-CIRCUIT RIGHT SIDE.
(2) ONE-CIRCUIT LEFT SIDE

CASE VI HIGH INTENSITY WIND

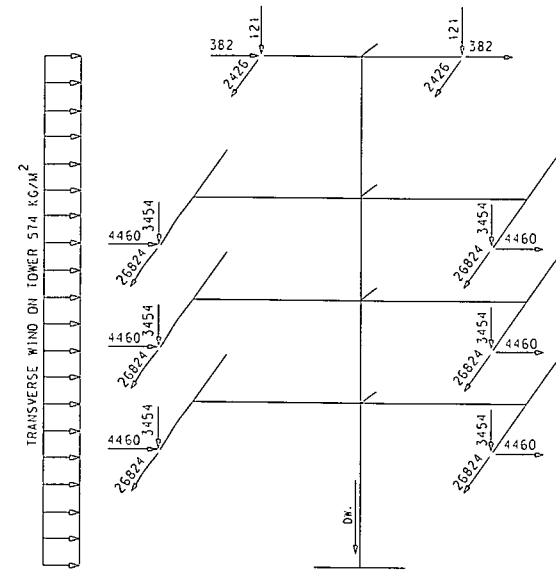
- (1) $\beta = 90^\circ$
- (2) $\beta = 75^\circ$
- (3) $\beta = 60^\circ$
- (4) $\beta = 45^\circ$
- (5) $\beta = 0^\circ$

CASE VII UPLIFT (SEE NOTES 7.)

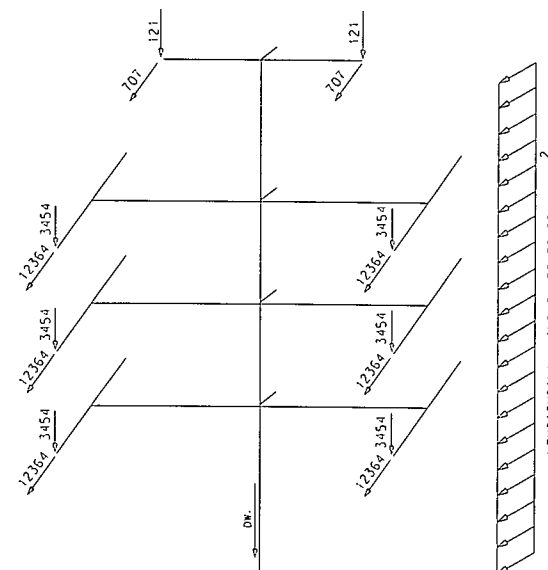
NOTES

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2. THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER, RESPECTIVELY.
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4. β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
5. DW. DENOTES DEAD WEIGHT OF THE TOWER.
6. THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.
7. ALL ELEMENTS OF TOWER SHALL BE CAPABLE TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO DOWNWARD VERTICAL LOADS SPECIFIED IN EACH LOADING CASE.

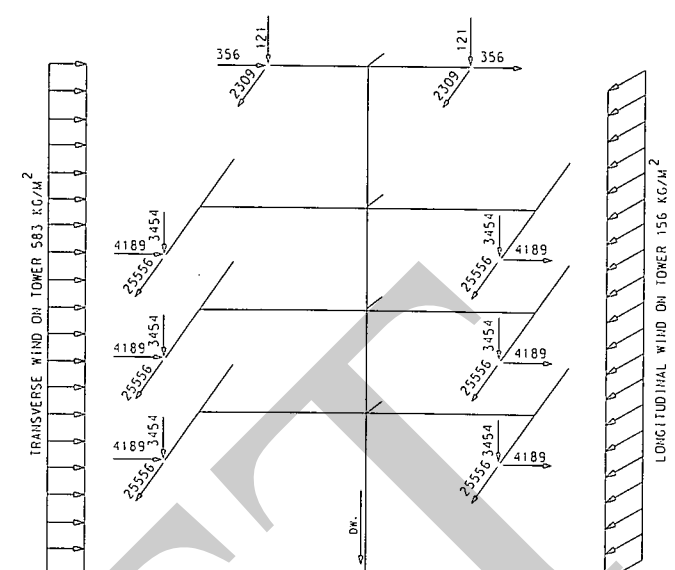
| | | | | | | | | | | | | | |
|---|--|--|--|--|--|--|--|--|--|---|--|--|--|
| <div style="display: flex; justify-content: space-between;"> <div> <p>REV. NO. JOB NO. JOB DESCRIPTION</p> </div> <div> <p>DRAWN DESIGNED VERIFIED VALIDATED RECOMMENDED CONCURRED APPROVED DATE</p> </div> </div> | | | | | | | | | | <div style="text-align: center;"> <p>ELECTRICITY GENERATING AUTHORITY OF THAILAND</p> <p>500 kV TRANSMISSION LINE</p> <p>LOADING DIAGRAM</p> <p>TOWER TYPE DOT90</p> </div> | | | |
| <div style="display: flex; justify-content: space-between;"> <div> <p>4x1272 MCW ACSR/GA - RULING SPAN 440M.</p> </div> <div> <p>11902</p> </div> </div> | | | | | | | | | | <div style="display: flex; justify-content: space-between;"> <div> <p>DRAWN: CHALCEE</p> <p>DESIGNED: <i>SAOUT</i></p> <p>VERIFIED: <i>Shan</i></p> <p>APPROVED: _____</p> <p>ASSISTANT ENGINEER - TRANSMISSION SYSTEM ENGINEERING</p> </div> <div> <p>VALIDATED: <i>18 Mar 85</i></p> <p>RECOMMENDED: _____</p> <p>CONCURRED: _____</p> <p>DATE: _____</p> </div> <div> <p>CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT</p> <p>ASST. DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION</p> <p>DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION</p> </div> </div> | | | |
| | | | | | | | | | | <div style="display: flex; justify-content: space-between;"> <div> <p>JOB NO. REPLACING DWG. NO. DWG. NO. RE</p> </div> <div> <p>C02 - 018</p> </div> </div> | | | |



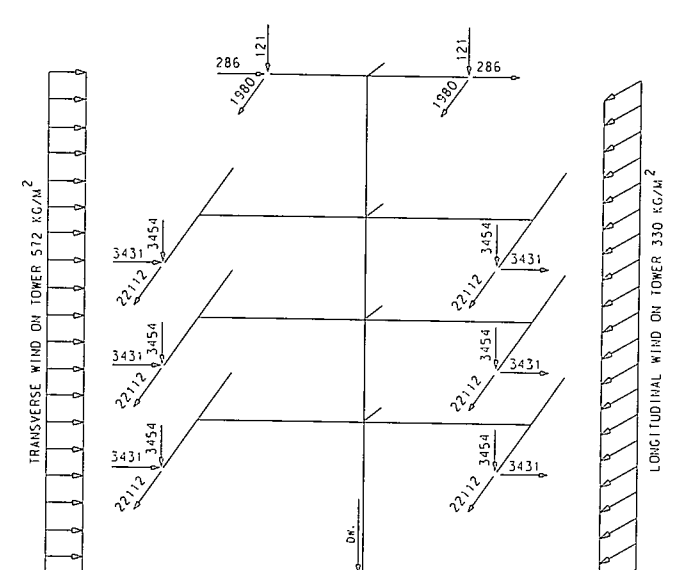
CASE I



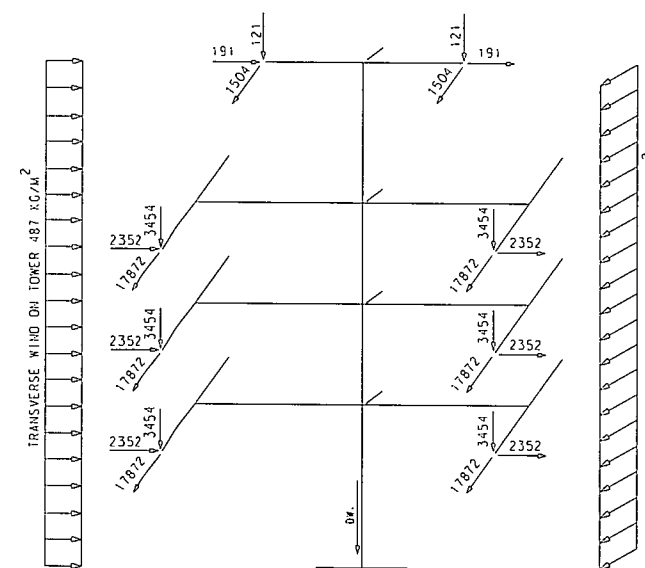
CASE II



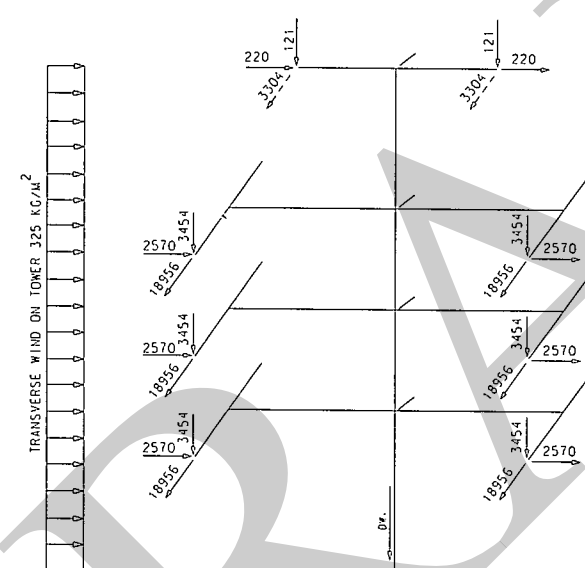
CASE III(1)



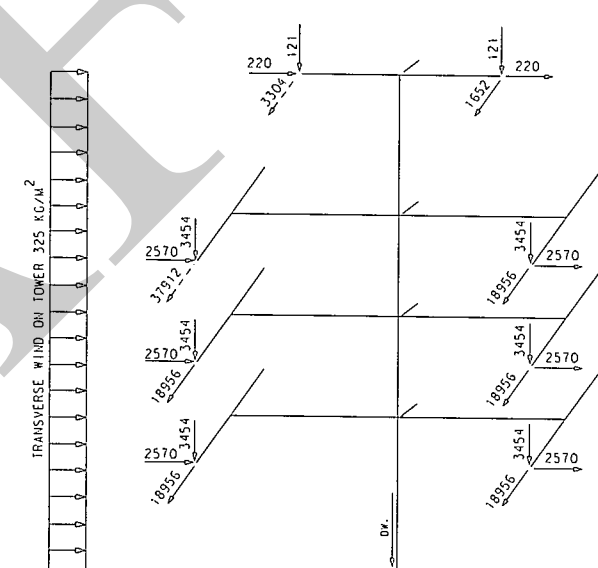
CASE III(2)



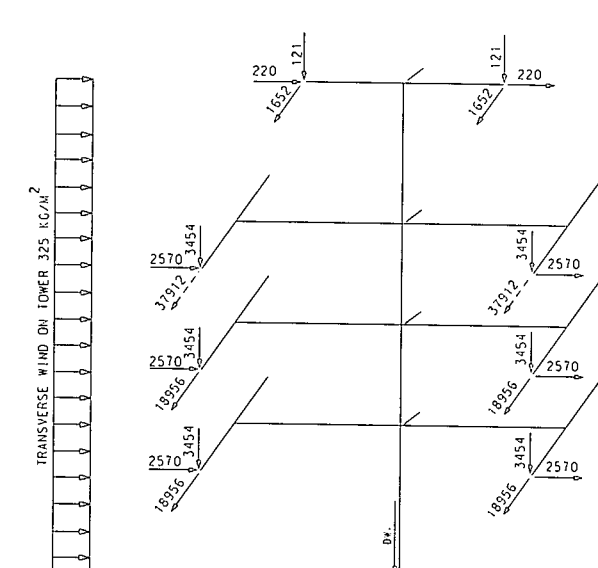
CASE III(3)



CASE IV(1)



CASE IV(2,3,4)



CASE IV(5,6,7)

LOADING CASES

- CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)
CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)
CASE III EXTREME OBLIQUE WIND
(1) $\beta = 75^\circ$
(2) $\beta = 60^\circ$
(3) $\beta = 45^\circ$
CASE IV FAILURE CONTAINMENT
(1) TWO OHG. WIRES.
(2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.
(3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.
(4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.

- (5) TOP CONDUCTORS.
(6) MIDDLE CONDUCTORS.
(7) BOTTOM CONDUCTORS.

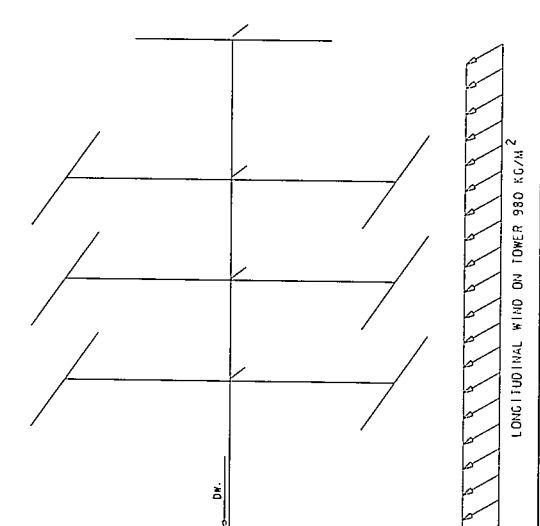
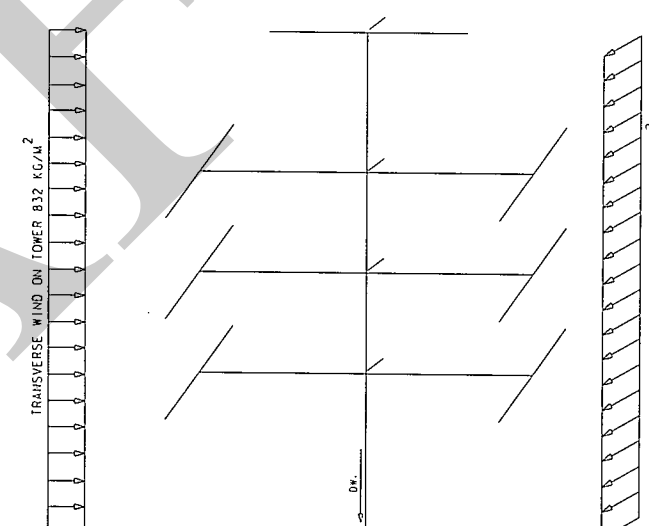
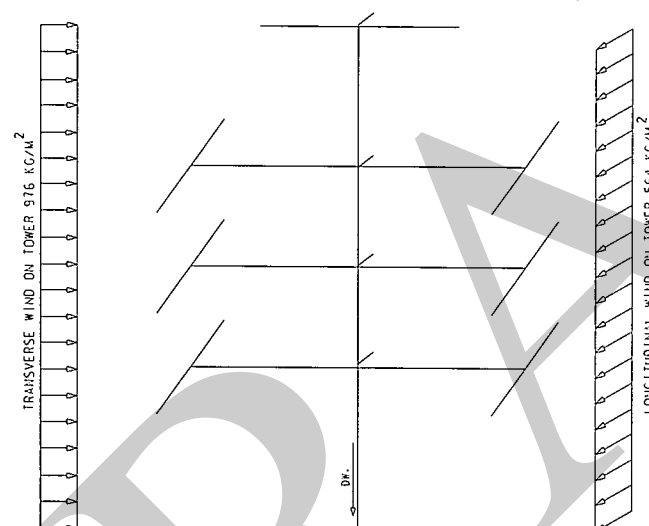
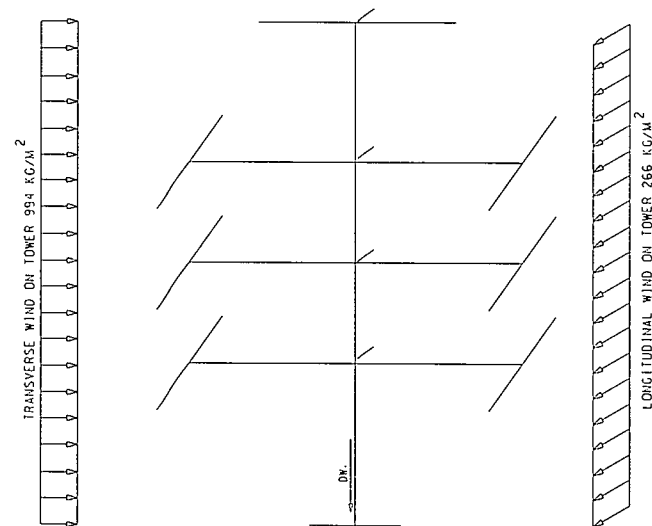
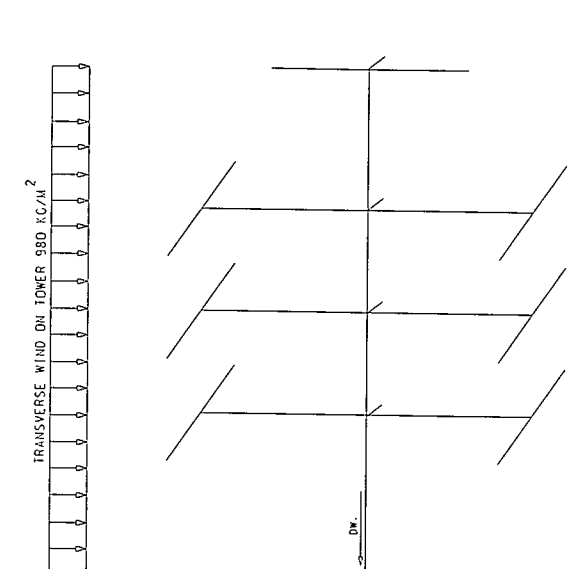
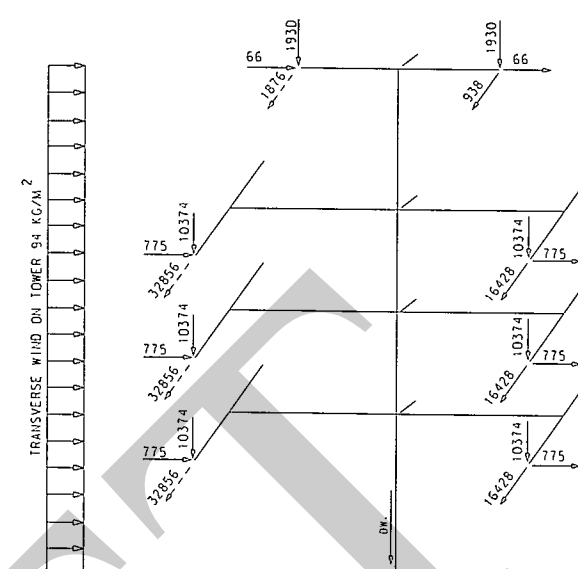
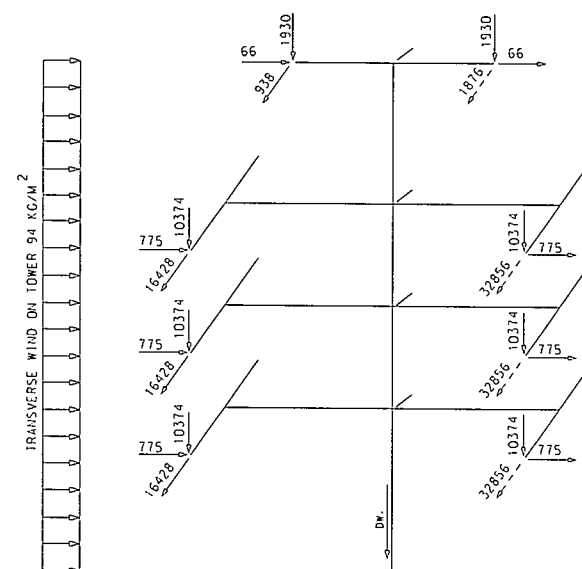
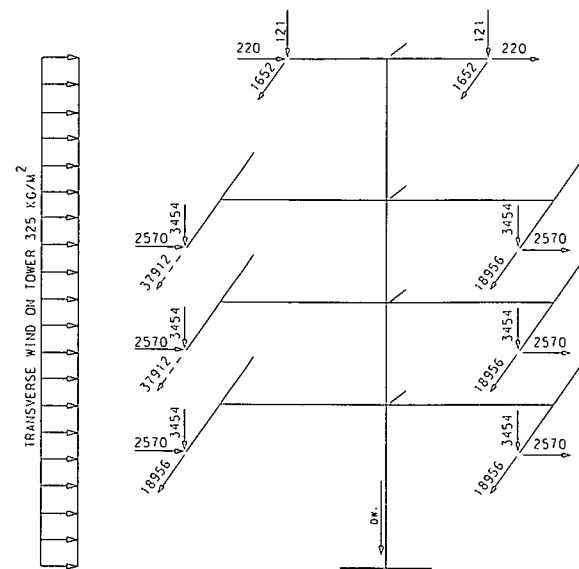
NOTES

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- β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

FOR 0° + COMPLETE DEADEND CASE



| | | | | | | | | | | |
|--|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | |
| 500 kV TRANSMISSION LINE | | | | | | | | | | |
| LOADING DIAGRAM | | | | | | | | | | |
| TOWER TYPE DOT90 | | | | | | | | | | |
| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
| | | | | | | | | | | |



LOADING CASES

- (8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
(9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
(10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.
- CASE V STRINGING AND/OR MAINTENANCE
(1) ONE CURCOIT RIGHT SIDE.
(2) ONE CURCOIT LEFT SIDE.

CASE VI: HIGH INTENSITY WIND

- (1) $\beta = 90^\circ$
- (2) $\beta = 75^\circ$
- (3) $\beta = 60^\circ$
- (4) $\beta = 45^\circ$
- (5) $\beta = 0^\circ$

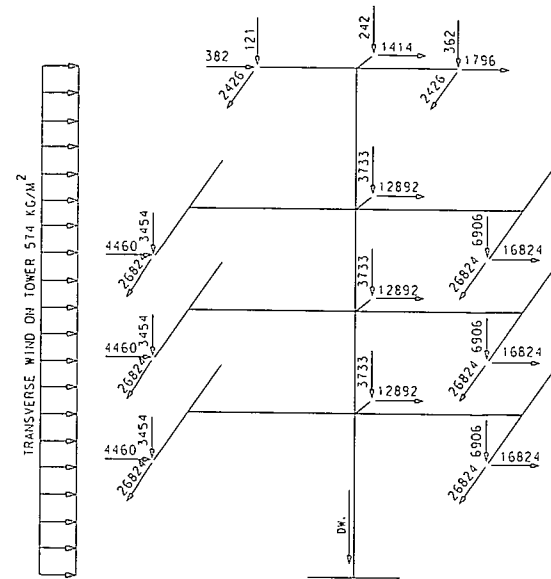
CASE VII UPLIFT (SEE NOTES 7.)

NOTES

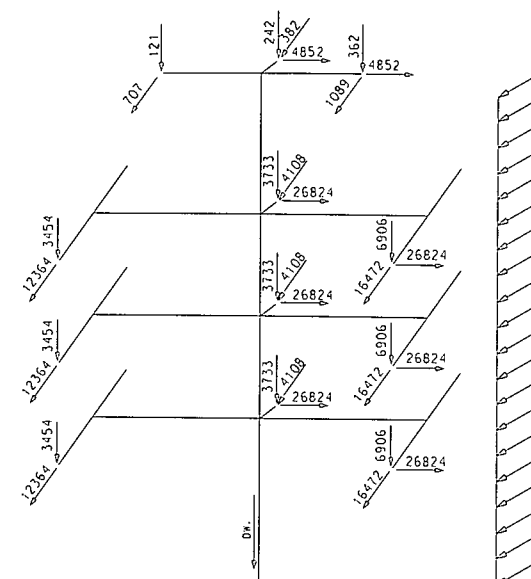
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5. DW. DENOTES DEAD WEIGHT OF THE TOWER.
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7. ALL ELEMENTS OF TOWER SHALL BE CAPABLE TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO DOWNWARD VERTICAL LOADS SPECIFIED IN EACH LOADING CASE.

FOR 0° + COMPLETE DEADEND CASE

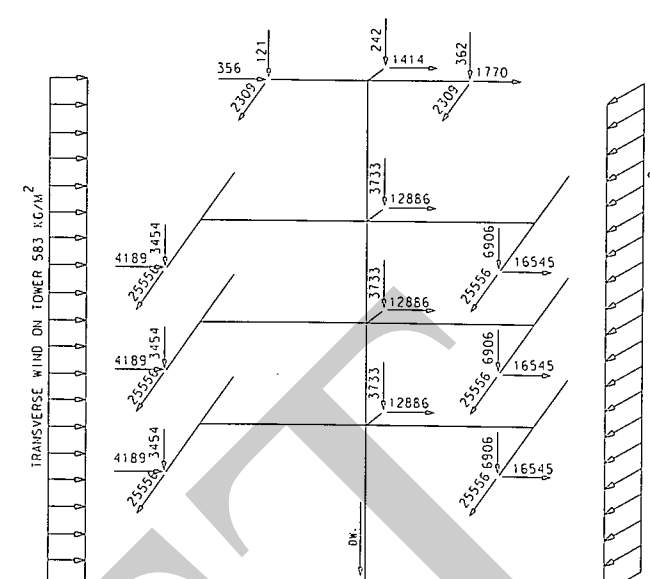
| | | | | |
|---|--------|-------------|--------------------------|----------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | |
| DRAWN | CHALEE | VALIDATED | 500 KV TRANSMISSION LINE | |
| DESIGNED | SARUT | RECOMMENDED | LOADING DIAGRAM | |
| VERIFIED | Than | CONCURRED | TOWER TYPE DOT90 | |
| APPROVED | | | JOB NO. | REV. |
| *ASSISTANT ENGINEER - TRANSMISSION SYSTEM ENGINEERING | | | REPLACING DWG. NO. | DWG. NO. |
| DATE | | | C02 - 020 | |



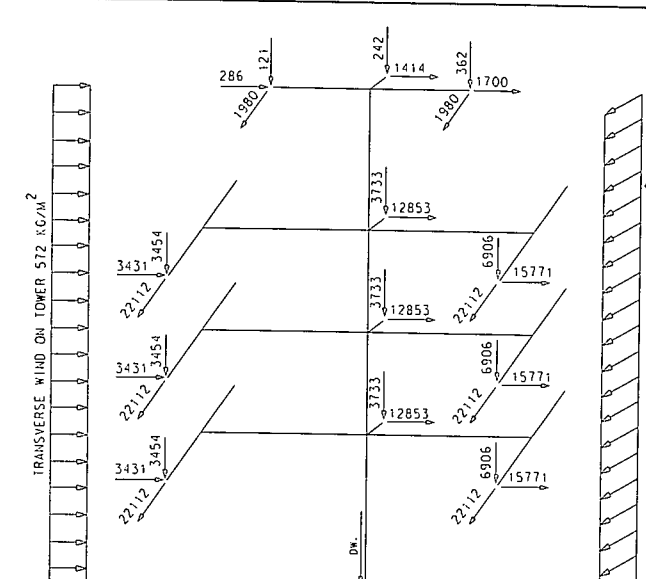
CASE I



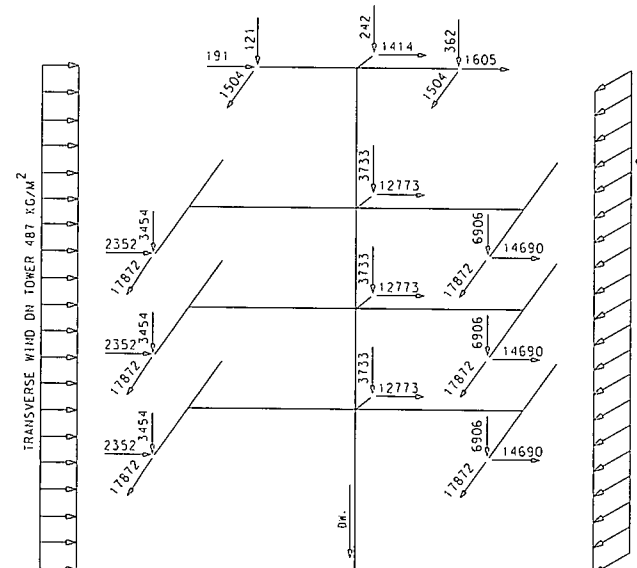
CASE II



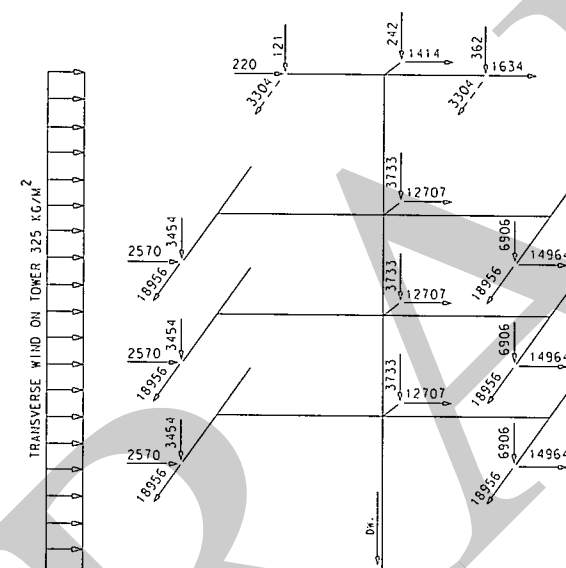
CASE III(1)



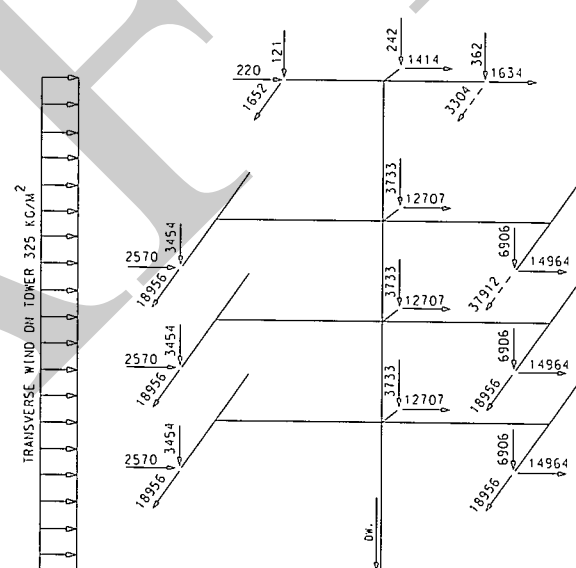
CASE III(2)



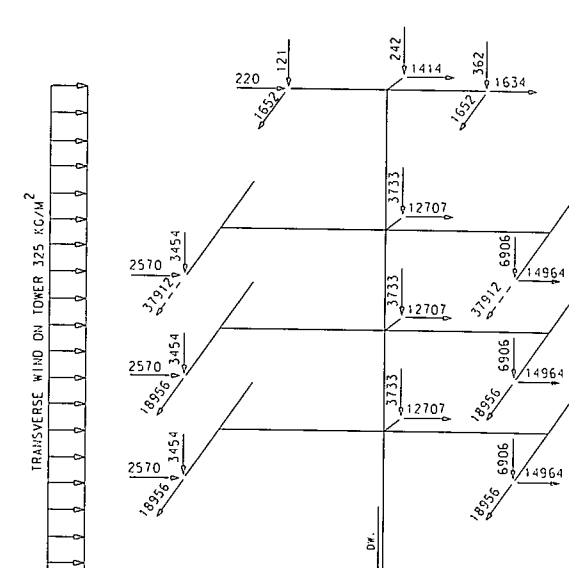
CASE III(3)



CASE IV(1)



CASE IV(2,3,4)



CASE IV(5,6,7)

LOADING CASES

CASE I EXTREME TRANSVERSE WIND ($\beta = 90^\circ$)

CASE II EXTREME LONGITUDINAL WIND ($\beta = 0^\circ$)

CASE III EXTREME OBLIQUE WIND

(1) $\beta = 75^\circ$

(2) $\beta = 60^\circ$

(3) $\beta = 45^\circ$

CASE IV FAILURE CONTAINMENT

(1) TWO OHG. WIRES.

(2) ONE OHG. WIRE AND ANY ONE OF TOP CONDUCTORS.

(3) ONE OHG. WIRE AND ANY ONE OF MIDDLE CONDUCTORS.

(4) ONE OHG. WIRE AND ANY ONE OF BOTTOM CONDUCTORS.

(5) TOP CONDUCTORS.

(6) MIDDLE CONDUCTORS.

(7) BOTTOM CONDUCTORS.

NOTES

- ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
- THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER, RESPECTIVELY.
- ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.79 OF THEIR CAPACITIES.
- β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
- DW. DENOTES DEAD WEIGHT OF THE TOWER.
- THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

FOR $0^\circ + 90^\circ$ SLACK SPAN CASE

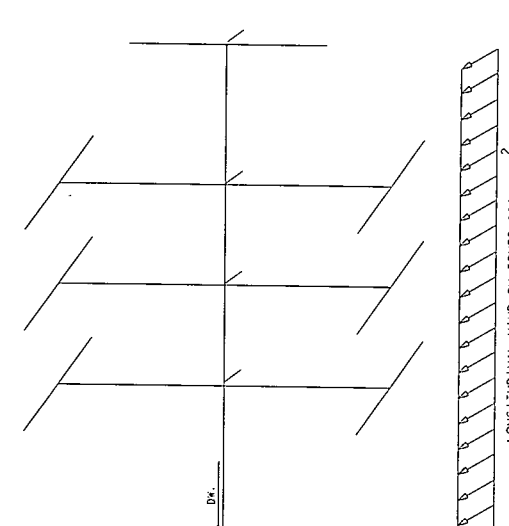
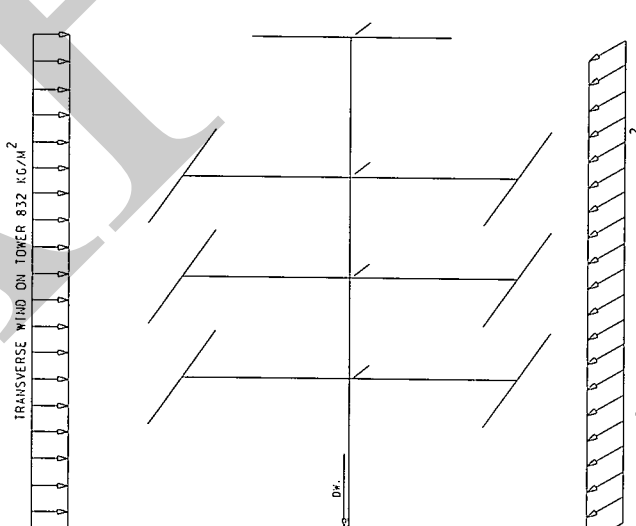
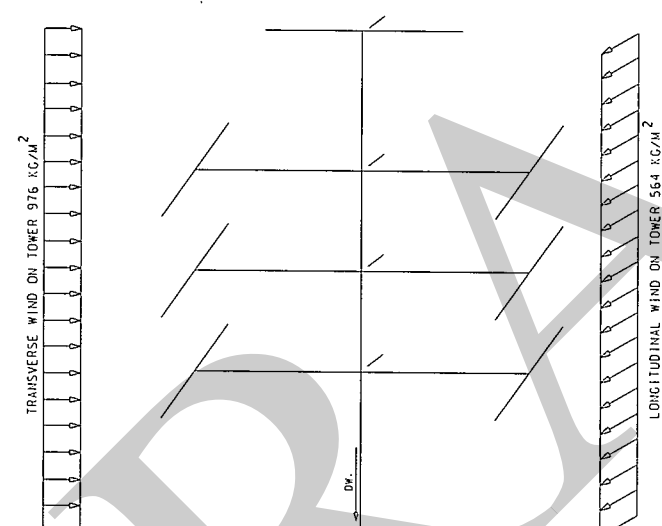
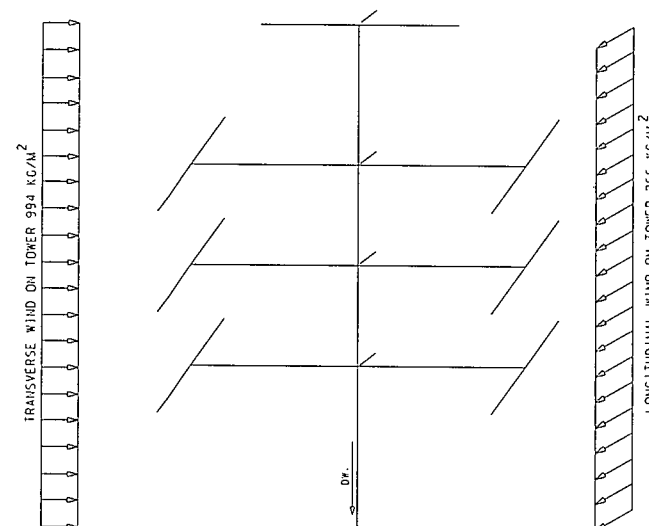
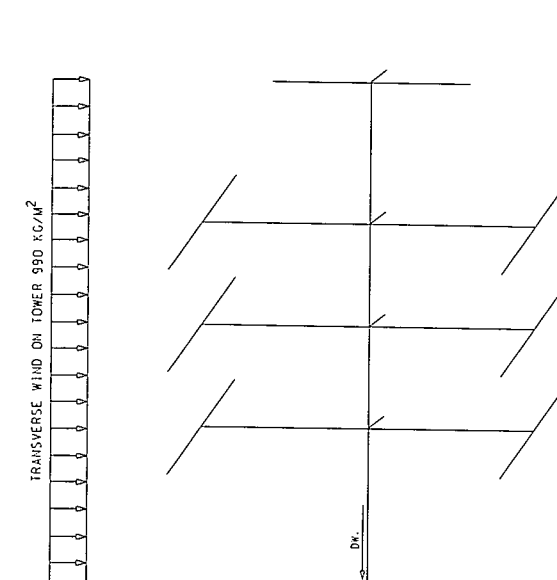
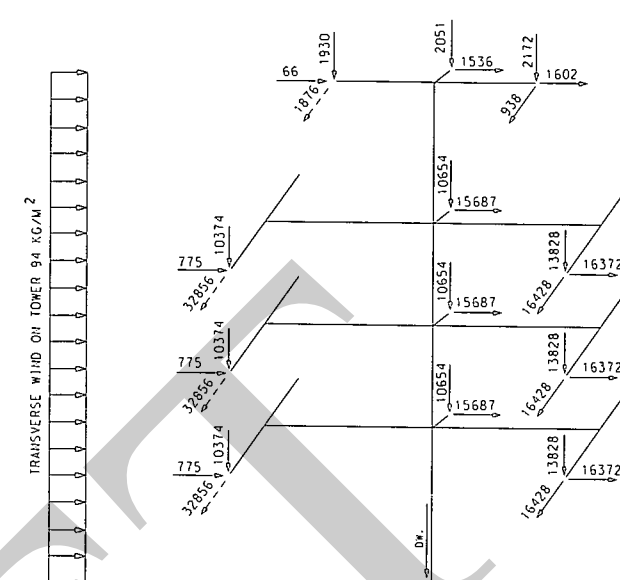
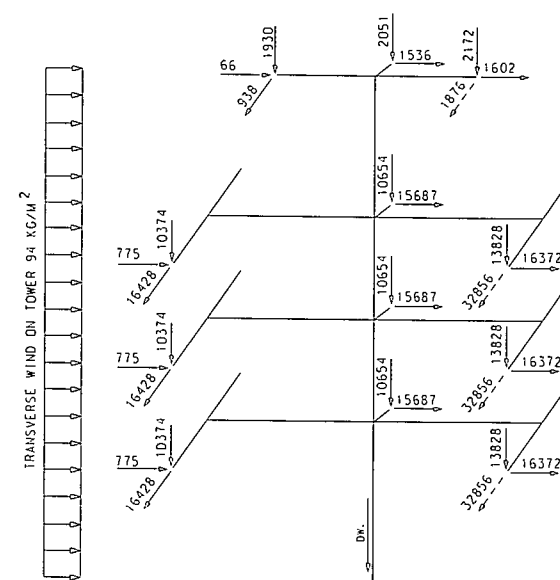
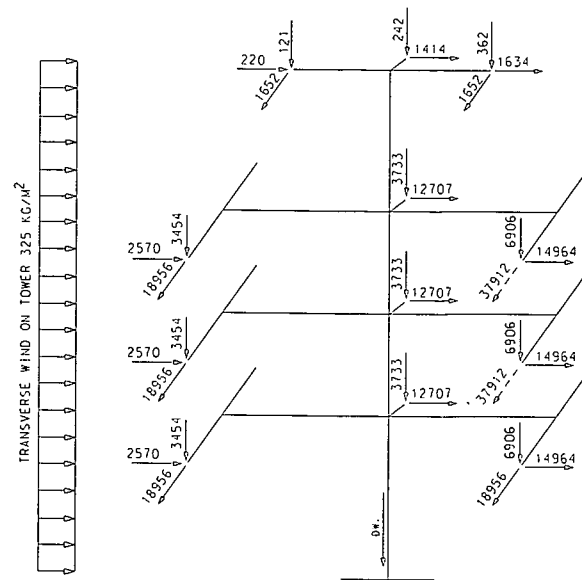
9001

| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|----------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| | | | | | | | | | | |

| | | | | | | | | | |
|--|--------|-----------|---|-------------|---|---------|--------------------|----------|------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
| 500 kV TRANSMISSION LINE | | | | | | | | | |
| LOADING DIAGRAM | | | | | | | | | |
| TOWER TYPE DOT90 | | | | | | | | | |
| DRAWN | CHALEE | VALIDATED | Y. Chaiy 18/11/65 | RECOMMENDED | CHIEF, TRANSMISSION LINE ENGINEERING DIVISION | JOB NO. | REPLACING DWG. NO. | DWG. NO. | REV. |
| DESIGNED | SARUT | CONCURRED | CHIEF, TRANSMISSION SYSTEM ENGINEERING DIVISION | DATE | | | | | |
| VERIFIED | Than | | | | | | | | |
| APPROVED | | | | | | | | | |

4x1272 MCM ACSR/GA - RULING SPAN 440 M.

C02 - 021



LOADING CASES

- (8) TOP AND MIDDLE CONDUCTORS ON THE SAME SIDE.
(9) TOP AND BOTTOM CONDUCTORS ON THE SAME SIDE.
(10) MIDDLE AND BOTTOM CONDUCTORS ON THE SAME SIDE.

- CASE V STRINGING AND/OR MAINTENANCE
 (1) ONE-CIRCUIT RIGHT SIDE.
 (2) ONE-CIRCUIT LEFT SIDE.

- ## CASE VI: HIGH INTENSITY WIND

- (1) $\beta = 90^\circ$
- (2) $\beta = 75^\circ$
- (3) $\beta = 60^\circ$
- (4) $\beta = 45^\circ$
- (5) $\beta = 0^\circ$

- CASE VII UPLIFT (SEE NOTES 7.)

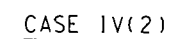
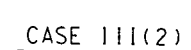
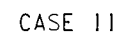
NOTES

1. ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
2. THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER, RESPECTIVELY.
3. ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.79 OF THEIR CAPACITIES.
4. β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
5. DW. DENOTES DEAD WEIGHT OF THE TOWER.
6. THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.
7. ALL ELEMENTS OF TOWER SHALL BE CAPABLE TO WITHSTAND VERTICAL UPLIFT LOADS EQUAL TO DOWNWARD VERTICAL LOADS SPECIFIED IN EACH LOADING CASE.

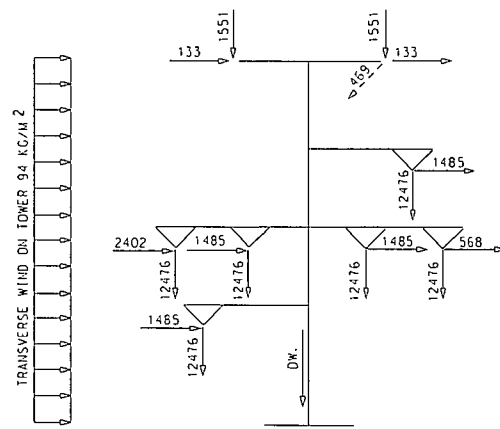
FOR $0^\circ + 90^\circ$ SLACK SPAN CASE

2001
JAN 10 2001
FEB 10 2001
MAR 10 2001
APR 10 2001
MAY 10 2001
JUN 10 2001
JUL 10 2001
AUG 10 2001
SEP 10 2001
OCT 10 2001
NOV 10 2001
DEC 10 2001

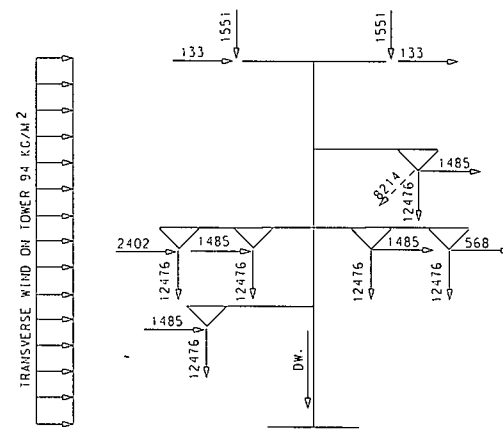
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| | | | | | | | | | | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | |
| | | | | | | | | | | DRAWN CHALEE | | VALIDATED <i>V. Chay 18 Mar 67</i> | | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | |
| | | | | | | | | | | DESIGNED <i>SATUT</i> | | RECOMMENDED | | 500 kV TRANSMISSION LINE | |
| | | | | | | | | | | VERIFIED <i>Than</i> | | CONCURRED | | LOADING DIAGRAM | |
| | | | | | | | | | | APPROVED | | DIRECTION, TRANSMISSION SYSTEM ENGINEERING DIVISION | | TOWER TYPE DOT90 | |
| | | | | | | | | | | DATE | | JOB NO. | | REPLACING DWG. NO. | |
| | | | | | | | | | | ASSISTANT GOVERNOR - TRANSMISSION SYSTEM ENGINEERING | | | | DWG. NO. | |
| | | | | | | | | | | | | | | C02 - 022 | |



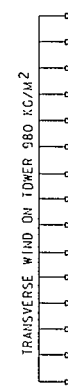
66



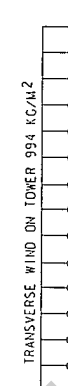
CASE V(1)



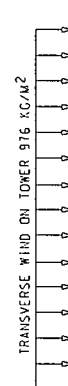
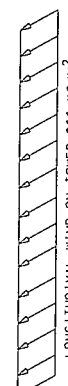
CASE V(2)



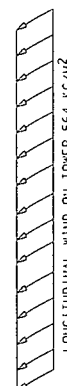
CASE VI(1)



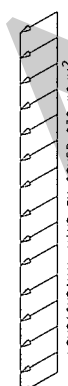
CASE VI(2)



CASE VI(3)



CASE VI(4)



CASE VI(5)



LOADING CASES

CASE V STRINGING AND/OR MAINTENANCE

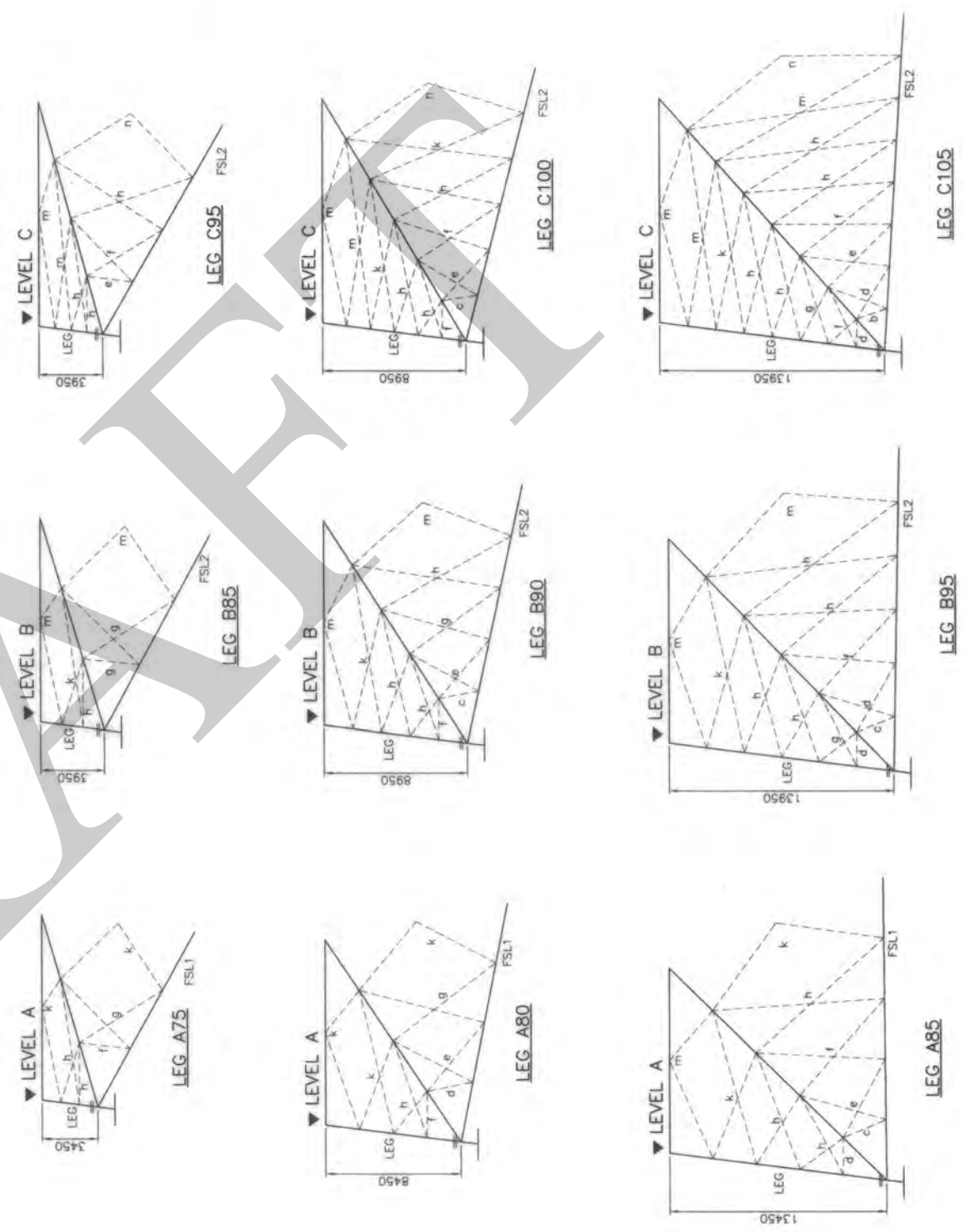
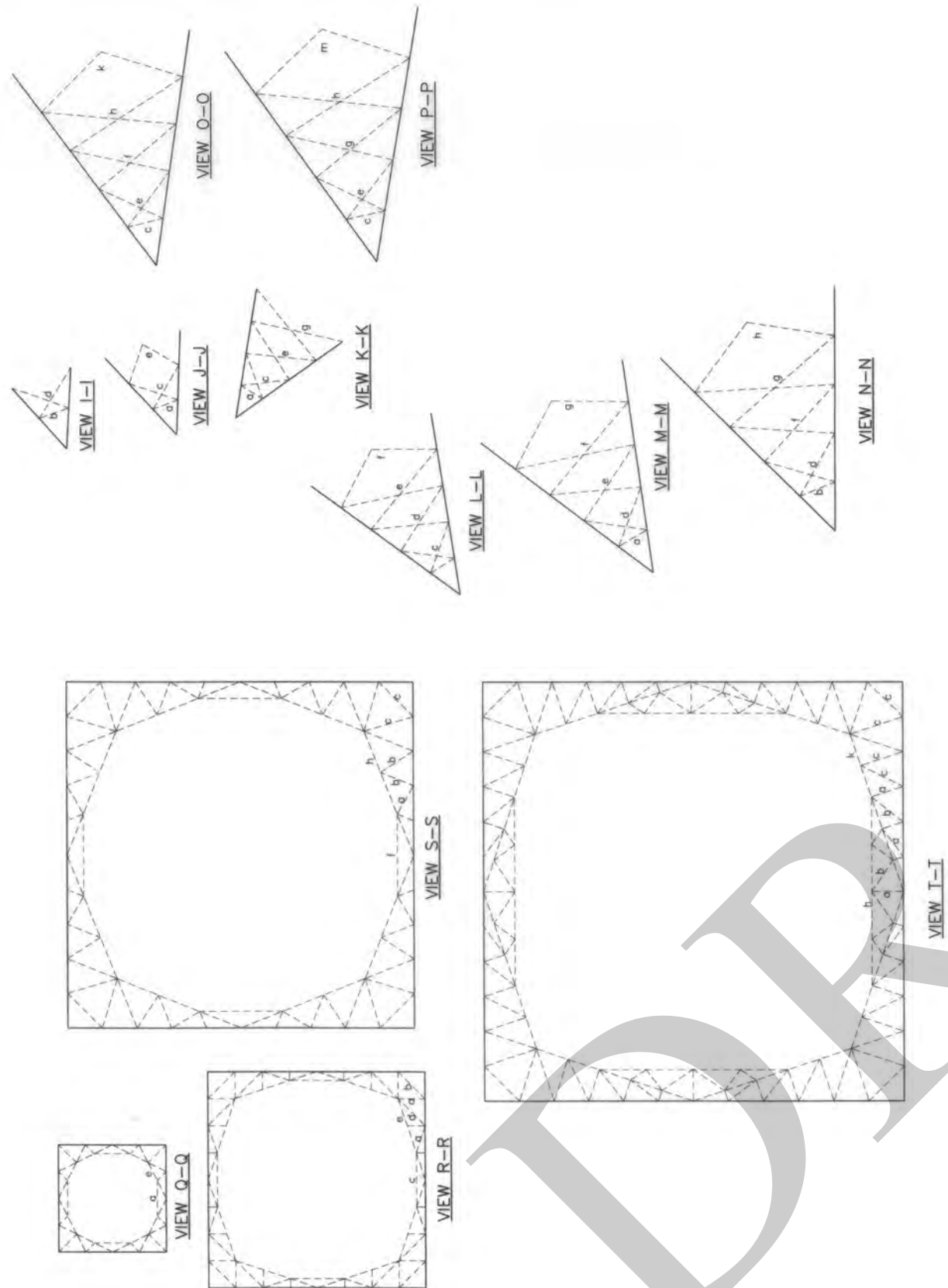
- (1) ANY ONE OF OHG. WIRE.
- (2) ANY ONE OF CONDUCTOR.

CASE VI HIGH INTENSITY WIND

- (1) $\beta = 90^\circ$
- (2) $\beta = 75^\circ$
- (3) $\beta = 60^\circ$
- (4) $\beta = 45^\circ$
- (5) $\beta = 0^\circ$

NOTES

1. ALL SPECIFIED LOADS ARE DESIGN LOADS (INCLUDING LOAD FACTORS) IN KILOGRAMS EXCEPT AS OTHERWISE INDICATED.
2. THE SPECIFIED TRANSVERSE AND/OR LONGITUDINAL WIND ON TOWER SHALL ACT ON THE PROJECTED AREA OF ONE LONGITUDINAL FACE AND/OR ONE TRANSVERSE FACE OF THE TOWER, RESPECTIVELY.
3. ALL ELEMENTS OF TOWER, BOTH MEMBERS AND CONNECTIONS, SHALL BE DESIGNED TO 0.92 OF THEIR CAPACITIES.
4. β IS THE ANGLE BETWEEN THE WIND DIRECTION AND THE LONGITUDINAL AXIS OF THE TOWER.
5. DW. DENOTES DEAD WEIGHT OF THE TOWER.
6. THE TOWER SHALL BE DESIGNED FOR USE WITH ANY COMBINATION OF DIFFERENT LEG EXTENSIONS, RESULTING IN A MAXIMUM DIFFERENTIAL OF SIX METERS IN HEIGHT, BETWEEN ADJACENT OR DIAGONALLY OPPOSITE LEGS.

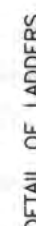
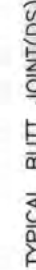
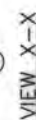


NOTES
 1. A, B & C DENOTE LEVEL.
 2. 75 TO 105 DENOTE SPOTTING HEIGHT IN METERS.

| | | | | | | | | | | | | | | | | | |
|---------|---------|-----------------|--|--|-------|----------|----------|-----------|-------------|-----------|--|---|------------------------------------|-------------------|--------------------|--------|-----------|
| | | | | | | | | | | | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | |
| | | | | | | | | | | | DRAWN <i>ApS</i> | VALIDATED <i>P. Pithak</i> | 500 kV TRANSMISSION LINE | | | | |
| | | | | | | | | | | | DESIGNED <i>ApS</i> | RECOMMENDED <i>So. Jongsri</i> | STRUCTURAL DESIGN TOWER TYPE HDQV3 | | | | |
| | | | | | | | | | | | VERIFIED <i>Kunmadee</i> | CONCURRED <i>So. Jongsri</i> | | | | | |
| - | - | - | | | | | | | | | APPROVED <i>26/2/19</i> | DIRECTOR, TRANSMISSION DESIGN DEVELOPMENT <i>12/6/19</i> | JOB NO. | REPLACING DWG.NO. | DWG.NO. C03-108 | 2 3 | REV. - |
| REV.NO. | JOB NO. | JOB DESCRIPTION | | | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | | | | | |

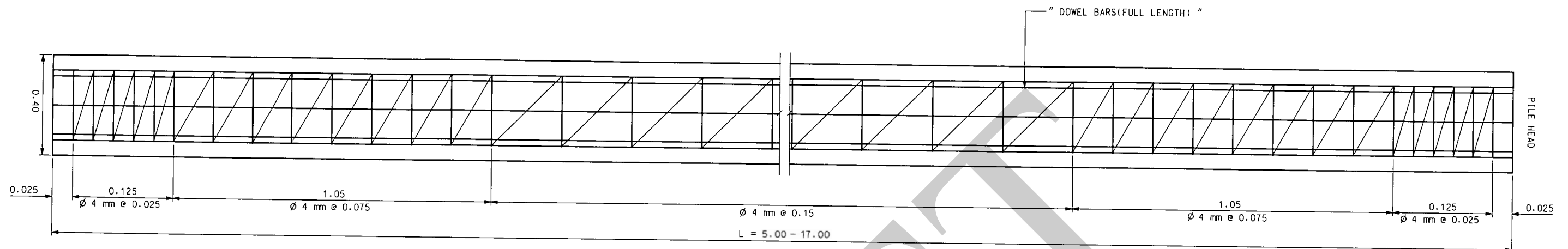
| MEMBER | SECTION | NO. OF BOLTS |
|--------|--------------|--------------|
| L1 | HL120X120X8 | 2-M24 (DS) |
| L2 | HL120X120X8 | 2-M24 (DS) |
| L3 | HL175X175X12 | 4-M24 (DS) |
| L4 | HL175X175X12 | 4-M24 (DS) |
| L5 | HL175X175X15 | 5-M24 (DS) |
| L6 | HL175X175X15 | 5-M24 (DS) |
| L7 | HL200X200X25 | 10-M24 (DS) |
| L8 | HL200X200X25 | 10-M24 (DS) |

| | | |
|-----|--------------|-------------|
| L12 | HL250X250X25 | 13-M24 (OS) |
| L13 | HL250X250X25 | 17-M24 (OS) |
| L14 | HL250X250X25 | 17-M24 (OS) |
| L15 | HL250X250X25 | 17-M24 (OS) |
| L16 | HL250X250X25 | 17-M24 (OS) |
| L17 | HL250X250X35 | 22-M24 (OS) |
| L18 | HL250X250X35 | 22-M24 (OS) |
| L19 | HL250X250X35 | 22-M24 (OS) |
| L20 | HL250X250X35 | 22-M24 (OS) |
| L21 | HL250X250X35 | 22-M24 (OS) |
| LEG | HL250X250X35 | 24-M24 (OS) |
| HF1 | HL80XB0X6 | 2-M20 |
| HF2 | HL80XB0X6 | 3-M20 |
| HF3 | HL130X130X8 | 5-M20 |

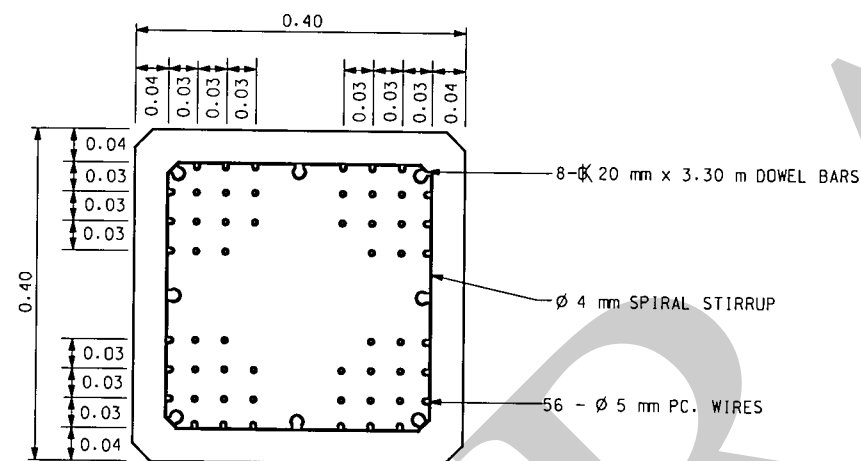


7. GUSSET PLATES SHALL HAVE A MINIMUM THICKNESS OF 6 mm (SEE

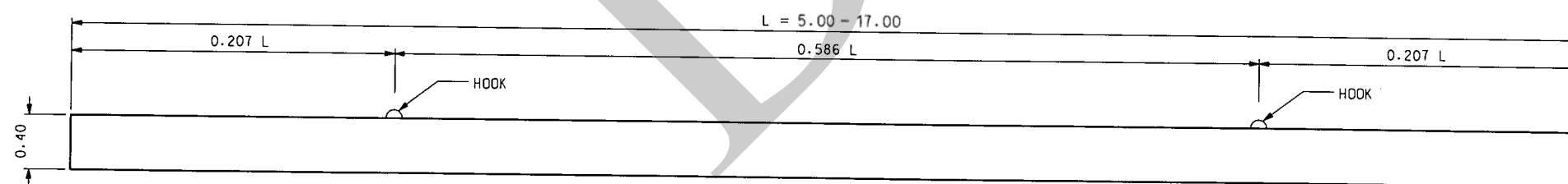
7



LONGITUDINAL SECTION



CROSS SECTION



LIFTING POINTS

NOTES :

1. ALL DIMENSIONS ARE IN METERS, UNLESS OTHERWISE STATED.
2. CONCRETE CYLINDRICAL COMPRESSIVE STRENGTH SHALL NOT BE LESS THAN 250 KSC. AND 350 KSC AT TRANSFER AND WORKING STAGE, RESPECTIVELY.
3. PRESTRESSING REINFORCEMENT SHALL BE P.C. WIRE ϕ 5 mm ACCORDING TO TIS 95-2540 OR UNCOATED SEVENWIRE STRESS RELIEVE 270 K GRADE STEEL STRAND WIRE CONFORMING TO ASTM A-416.
4. INITIAL STRESSING SHALL BE 70 % OF ULTIMATE TENSILE STRENGTH
5. MILD STEEL REINFORCEMENT SHALL BE GRADE SR 24 AND SD 40 IN ACCORDANCE WITH TIS 20-2527 AND TIS 24-2536 FOR PLAIN AND DEFORMED BARS, RESPECTIVELY.
6. TYPE OF PORTLAND CEMENT SHALL BE USED OF TYPE I OR TYPE V.

LEGEND :

1. \otimes DENOTES DEFORMED BARS.
2. ϕ DENOTES PLAIN BARS.

| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|----------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| - | - | - | - | - | - | - | - | - | - | - |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|------------|-------------|-----------|-------------------------------------|--------------------|----------|---------|---|------|
| DRAWN | CHALEE | VALIDATED | P. Pithak | DETAIL OF PRESTRESSED CONCRETE PILE | | | | | |
| DESIGNED | PATTARAWAN | RECOMMENDED | 2/2/17 | ϕ 0.40 x 0.40 x 5.00 - 17.00 m | | | | | |
| VERIFIED | Kunwadee | CONCURRED | 3/5/17 | JOB NO. | REPLACING DWG. NO. | DWG. NO. | C11-945 | - | REV. |
| APPROVED | V. R. P. | DATE | 3/5/17 | | | | | | |

FOUNDATIONS SHALL BE PROPORTIONED SUCH THAT THEY MEET THE FOLLOWING REQUIREMENTS:

| FOUNDATION TYPE | RESISTANCE TO UPLIFT | RESISTANCE TO OVERTURNING & UPLIFT | LIMITING SOIL BEARING PRESSURE | RESISTANCE TO OVERTURNING & COMPRESSION |
|-----------------|-----------------------------|---|---|--|
| PAD | $W_c + \phi_u W_s \geq T_u$ | $\phi_u M_{rs} + M_{rc} + \phi_u M_{rp} \geq M_{ou}$ | <p>WHEN $e \leq B/6$, $(\frac{Q_z + W_c}{B^2})(1 + \frac{6e}{B}) \leq \phi_c \sigma$</p> <p>WHEN $e > B/6$, $\frac{2(Q_z + W_c)}{3B(B/2 - e)} \leq \phi_c \sigma$</p> <p>NOTE: $e = M_{oc}/(Q_z + W_c)$</p> | <p>$E \leq B/6$</p> <p>WHERE $E = M_{oc}/(Q_z + \phi_c W_{sv} + W_c)$</p> |
| ROCK | $W_c + F_r \geq T_u$ | $M_{rc} + \phi_u M_{rp} + M_{rf} \geq M_{ou}$ | _____ | _____ |
| RAFT | _____ | $\phi_u M_{rs} + M_{rc} \geq M_o$ | <p>WHEN $e \leq B/6$, $(\frac{Q_z + W_c}{B^2})(1 + \frac{6e}{B}) \leq \phi_c \sigma$</p> <p>WHEN $e > B/6$, $\frac{2(Q_z + W_c)}{3B(B/2 - e)} \leq \phi_c \sigma$</p> | <p>$E \leq B/6$</p> <p>WHERE $E = M_o/(\geq T_u + \geq Q_z + \phi_c W_{sv} + W_c)$</p> |
| PILE | _____ | $P_u = \frac{T_u - W_c - W_{sv}}{n} + \frac{M_{up} \times d_o}{\sum d^2} \leq 1.5 P_{ua}$ | _____ | $P_c = \frac{Q_z + W_c}{n} + \frac{M_{cp} \times d_o}{\sum d^2} \leq 1.5 P_{ca}$ |

NOMENCLATURE:

Wc = EFFECTIVE WEIGHT OF CONCRETE FOUNDATION.

W8 = EFFECTIVE WEIGHT OF SOIL IN INVERTED TRUNCATED PYRAMID (EXCLUDING VOLUME OF CONCRETE EMBEDDED THEREIN) EXTENDING UPWARD FROM TOP EDGE OF FOUNDATION PAD TOWARD THE GROUND SURFACE. PYRAMID VOLUME IS DEFINED BY APPLICABLE "ANGLE OF REPOSE" THE CRITICAL SURFACE AT GROUND LEVEL OF THE PYRAMID VOLUME IS DEFINED AS SQUARE WITH A QUARTER OF CIRCLE AT CORNER.

W_{SV} = EFFECTIVE WEIGHT OF RECTANGULAR BLOCK OF SOIL (EXCLUDING VOLUME OF CONCRETE EMBEDDED THEREIN) LYING DIRECTLY ABOVE FOUNDATION PAD.

Fr = ULTIMATE FRICTIONAL RESISTANCE WHICH CAN BE MOBILIZED AROUND THE PERIPHERY OF A ROCK FOUNDATION.

Tu = ULTIMATE AXIAL FOUNDATION DESIGN LOAD IN UPLIFT.

Qz = ULTIMATE AXIAL FOUNDATION DESIGN LOAD IN COMPRESSION.

P_{ua} = ALLOWABLE CAPACITY OF DRIVEN PILE IN TENSION.

P_{ca} = ALLOWABLE CAPACITY OF DRIVEN PILE IN COMPRESSION.

M_{rs} = RESISTING MOMENT (ABOUT TOE OF PAD) CAUSED BY EFFECTIVE WEIGHT OF SOIL ABOVE FOUNDATION PAD.

M_{rc} = RESISTING MOMENT (ABOUT TOE OF PAD) CAUSED BY EFFECTIVE WEIGHT OF FOUNDATION CONCRETE.

M_{rp} = RESISTING MOMENT (ABOUT TOE OF PAD) CAUSED BY PASSIVE EARTH PRESSURE ACTING ON VERTICAL SURFACES OF FOUNDATION CONCRETE FROM 0.5 METER BELOW GROUNDLINE TO BASE OF FOUNDATION.

M_{rf} = RESISTING MOMENT (ABOUT TOE OF PAD) CAUSED BY VERTICAL FRICTIONAL FORCES WHICH CAN BE MOBILIZED AROUND THE PERIPHERY OF A FOOTING PAD OR ROCK FOUNDATION.

MOU = ULTIMATE OVERTURNING MOMENT (ABOUT TOE OF PAD) CAUSED BY FOUNDATION DESIGN LOADS (AXIAL UPLIFT AND HORIZONTAL WEB SHEARS) APPLIED AT THE TOP OF THE FOUNDATION.

M_{oc} = ULTIMATE OVERTURNING MOMENT (ABOUT CENTER LINE OF BOTTOM FACE OF THE PAD) CAUSED BY FOUNDATION DESIGN LOADS (VERTICAL COMPRESSION AND HORIZONTAL WEB SHEARS) APPLIED AT THE TOP OF THE FOUNDATION.

M_{up} = ULTIMATE OVERTURNING MOMENT (ABOUT C.G. OF PILE GROUP) WHICH IS CAUSED BY FOUNDATION DESIGN LOADS (VERTICAL UPLIFT AND HORIZONTAL SHEARS) APPLIED AT THE TOP OF THE FOUNDATION.

M_{cp} = ULTIMATE OVERTURNING MOMENT (ABOUT C.G. OF PILE GROUP) WHICH IS CAUSED BY FOUNDATION DESIGN LOADS (AXIAL COMPRESSION AND HORIZONTAL WEB SHEARS) APPLIED AT THE TOP OF THE FOUNDATION.

M_o = ULTIMATE OVERTURNING MOMENT (ABOUT CENTER LINE OF THE BASE OF THE RAFT FOUNDATION) CAUSED BY ALL FOUNDATION DESIGN LOADS ACTING ON THE FOUNDATION.

n = NUMBER OF DRIVEN PILES IN A GIVEN PILE GROUP.

d_o = DISTANCE FROM C.G. OF PILE GROUP TO OUTERMOST PILE.

d = DISTANCE FROM C.G. OF PILE GROUP TO ANY GIVEN PILE IN THE GROUP.

B = WIDTH OF FOOTING PAD.

σ = APPLICABLE NET ULTIMATE BEARING CAPACITY OF THE SOIL.

E = ECCENTRICITY OF THE GROSS BEARING PRESSURE DISTRIBUTION ON THE BASE OF A PAD WITH RESPECT TO THE C.G. OF THE PAD.

e = ECCENTRICITY OF THE NET BEARING PRESSURE DISTRIBUTION ON THE BASE OF A PAD WITH RESPECT TO THE C.G. OF THE PAD.

Pu = ULTIMATE LOAD ON INDIVIDUAL PILE IN TENSION.

P_c = ULTIMATE LOAD ON INDIVIDUAL PILE IN COMPRESSION.

NOTES:

1. FOUNDATION DESIGN LOADS SHALL BE COMPUTED ON THE BASIS OF THE MAXIMUM AXIAL AND HORIZONTAL TOWER BASE REACTIONS (INCLUDING ALL SPECIFIED TOWER DESIGN LOAD FACTORS) AND FURTHER MULTIPLIED BY THE FACTORS SPECIFIED BELOW
- MAXIMUM FOUNDATION SHEAR FORCE FROM ANY LOAD COMBINATION FOR THE DOWNLOAD LEG WILL BE ASSUMED TO ACT SIMULTANEOUSLY WITH THE MAXIMUM FOUNDATION COMPRESSION FORCE. MAXIMUM FOUNDATION SHEAR FORCE FROM ANY LOAD COMBINATION FOR THE UPLIFT LEG WILL BE ASSUMED TO ACT SIMULTANEOUSLY WITH THE MAXIMUM FOUNDATION UPLIFT FORCE.

| <u>TOWER TYPE</u> | <u>FOUNDATION DESIGN LOAD FACTOR</u> |
|-------------------|--------------------------------------|
| SUSPENSION | 1.00 |
| TENSION/DEADEND | 1.00 |

ALL COMBINATIONS OF TOWER AND LEG EXTENSION HEIGHTS, AS STATED IN THE TOWER DESIGN SPECIFICATION, SHALL BE CONSIDERED IN DETERMINING THE MAXIMUM TOWER BASE REACTIONS.

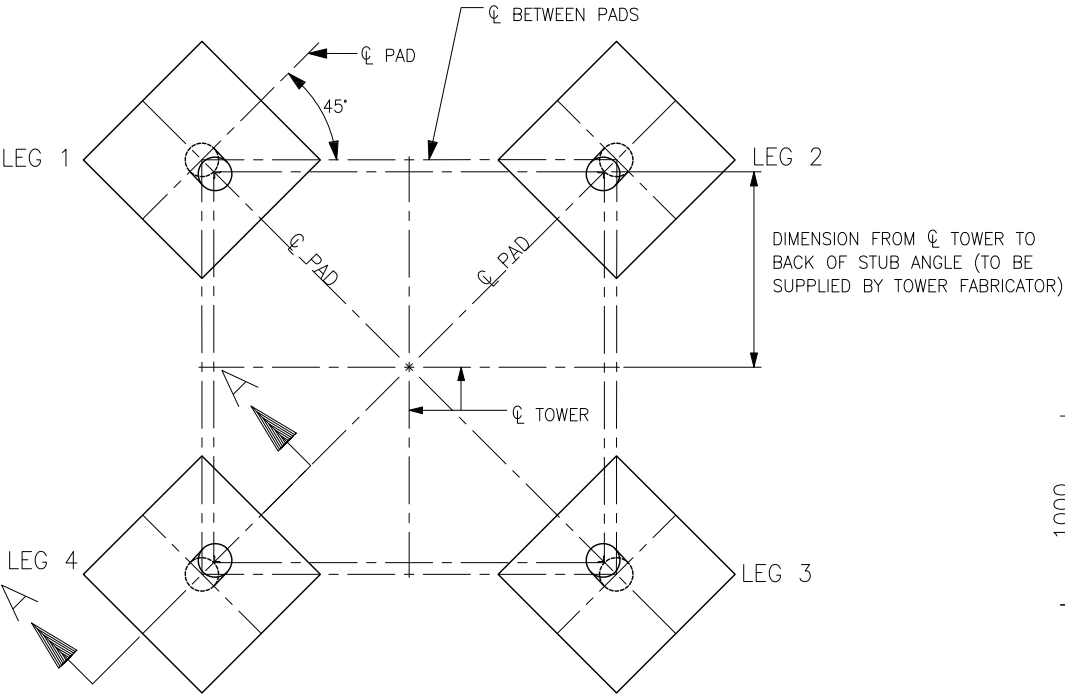
2. THE STRENGTH REDUCTION FACTORS FOR SOIL STRENGTH SHALL BE SPECIFIED AS FOLLOWS:

| LOWER TYPE | COMPRESSION CASE (ϕ_c) | UPLIFT CASE (ϕ_u) |
|-----------------|-------------------------------|--------------------------|
| SUSPENSION | 0.54 | 0.71 |
| TENSION/DEADEND | 0.47 | 0.61 |

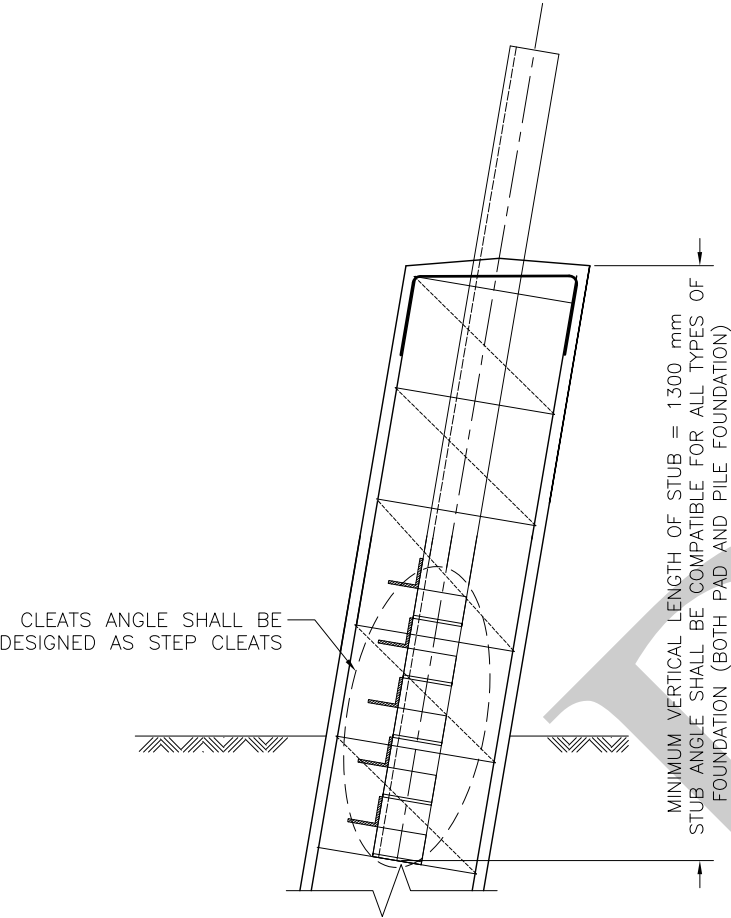
3. FOUNDATIONS SHALL BE PROPORTIONED TO RESIST THESE FOUNDATION DESIGN LOADS IN ACCORDANCE WITH THE FORMULAS SHOWN ABOVE. REINFORCED CONCRETE FOUNDATION COMPONENTS SHALL BE DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF ACI STANDARD 318, LATEST REVISION. NO ADDITIONAL LOAD FACTORS NEED BE APPLIED (IN EXCESS OF THOSE MENTIONED ABOVE) ; HOWEVER, APPROPRIATE ACI "CAPACITY REDUCTION FACTORS" SHALL BE CONSIDERED IN THE DESIGN.
4. FOR PEDESTAL DESIGN, THE CONCRETE AND STEEL REINFORCEMENT SHALL BE CAPABLE OF RESISTING THE BENDING MOMENT ABOUT TWO AXES CAUSED BY THE MAXIMUM HORIZONTAL WEB SHEARS BOTH IN TRANSVERSE AND LONGITUDINAL DIRECTIONS. HOWEVER THE BENDING MOMENT CAN BE REDUCED BY THE EFFECTIVE LATERAL EARTH PRESSURE, IN SUCH CASE, THE PASSIVE EARTH PRESSURE SHALL BE EQUAL TO $\gamma_s \tan^2(45^\circ + \phi/2)$ FROM 0.5 METER BELOW GROUND LINE. WHERE γ_s IS UNIT WEIGHT OF SOIL AND ϕ IS ANGLE OF REPOSE OF SOIL. IF CIRCULAR SHAPE PEDESTAL IS EMPLOYED, THE STEEL REINFORCEMENT MAY BE CALCULATED ON THE ASSUMPTION THAT THEY ARE DISTRIBUTED AS CIRCULAR TUBE EMBEDDED IN CONCRETE.
5. THE DETERMINATION OF PILE LENGTH FOR PILE TYPE FOUNDATION, P_u AND P_c SHALL NOT BE GREATER THAN 49 PER CENT FOR SUSPENSION TOWER TYPE AND 41 PERCENT FOR TENSION/DEADEND TOWER TYPE OF THE CORRESPONDING ULTIMATE STRENGTH OF SOIL OBTAINED FROM SUB-SOIL TEST.

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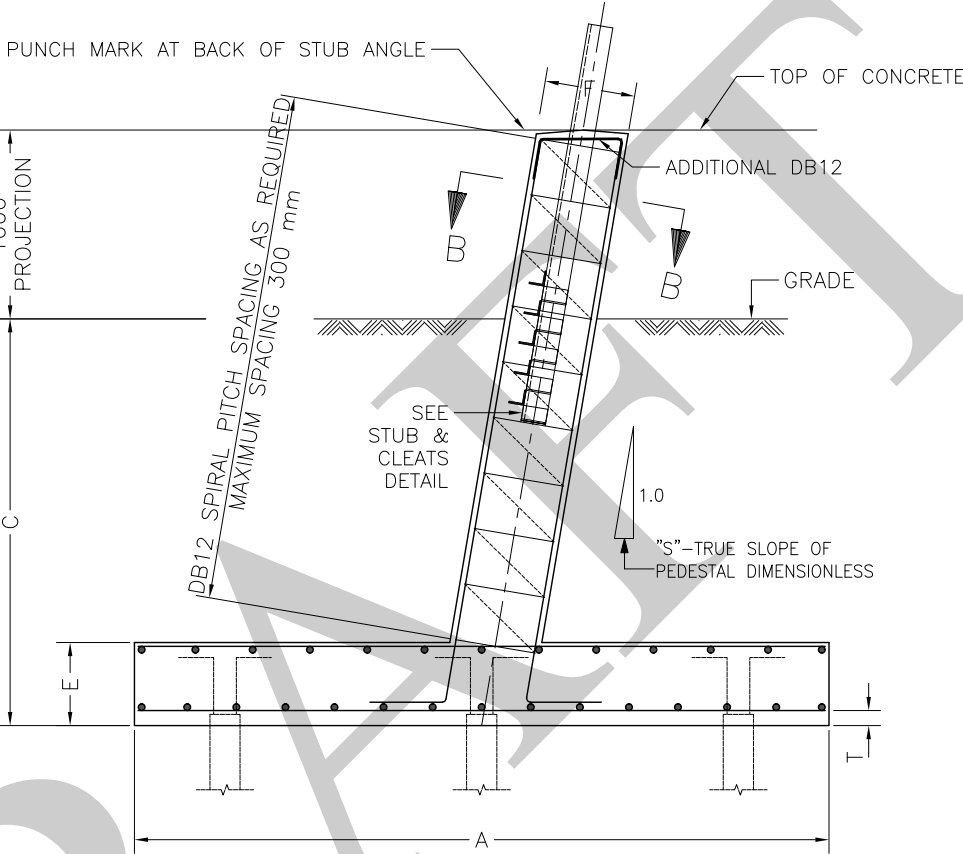
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|---|---|--|---|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | |
| DRAWN CHALEE DESIGNED Kunwadee VERIFIED Supakorn APPROVED Shantana | VALIDATED RECOMMENDED CONCURRED DATE 12 Nov 07 | 500 KV TRANSMISSION LINE FOUNDATION DESIGN CRITERIA | JOB NO. REPLACING DWG. NO. DWG. NO. 021-011 |



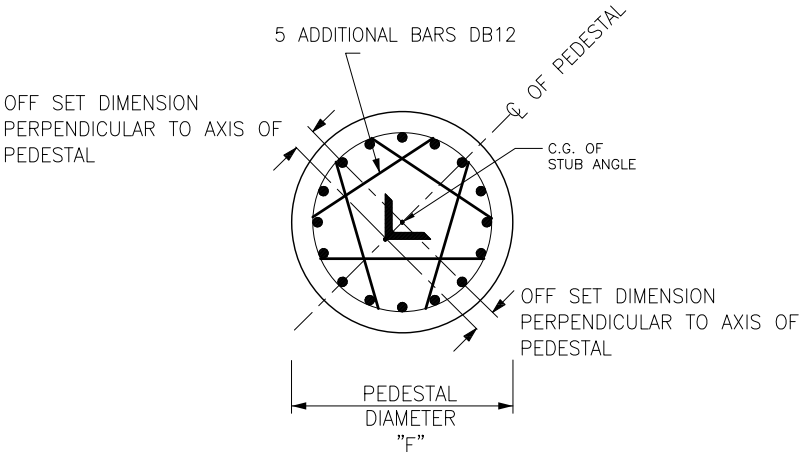
ORIENTATION OF FOUNDATION
(NOT TO SCALE)



STUB & CLEATS DETAIL
(NOT TO SCALE)



SECTION A-A
(NOT TO SCALE)



SECTION B-B
(NOT TO SCALE)

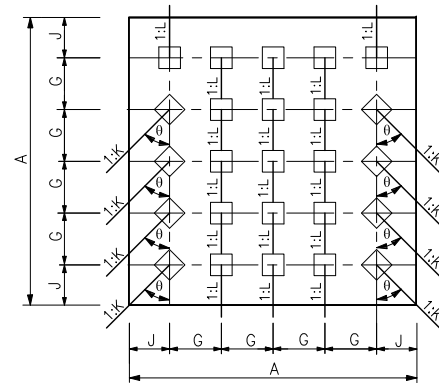
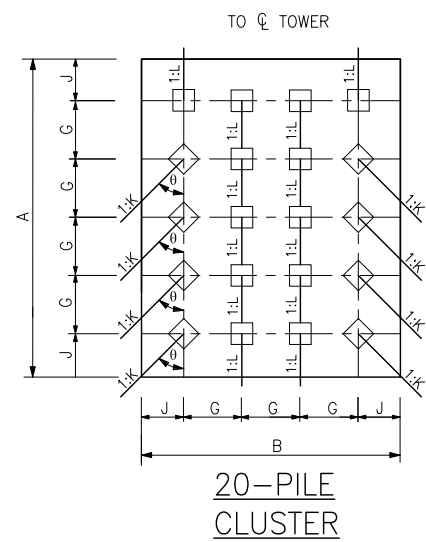
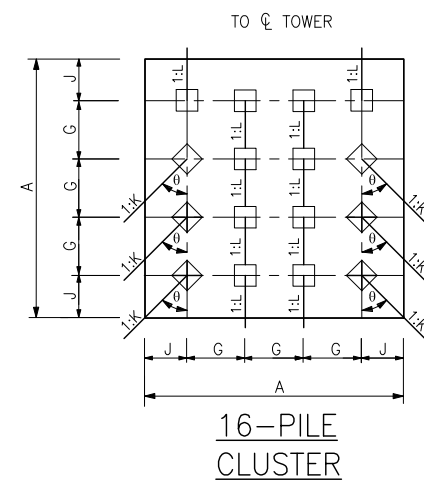
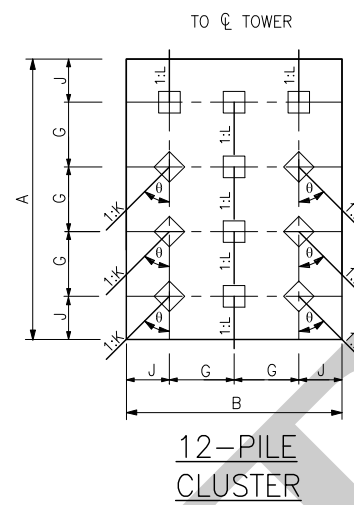
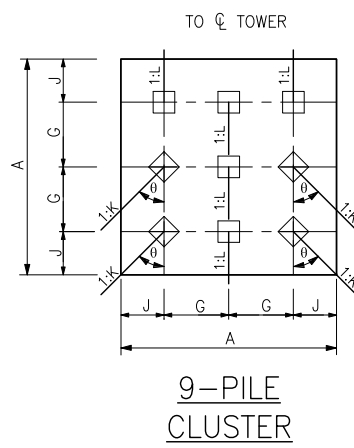
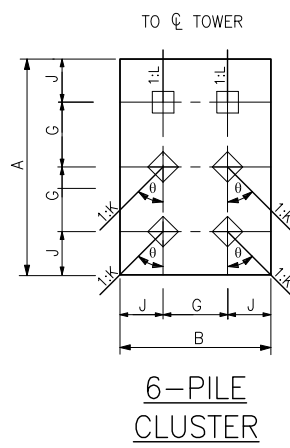
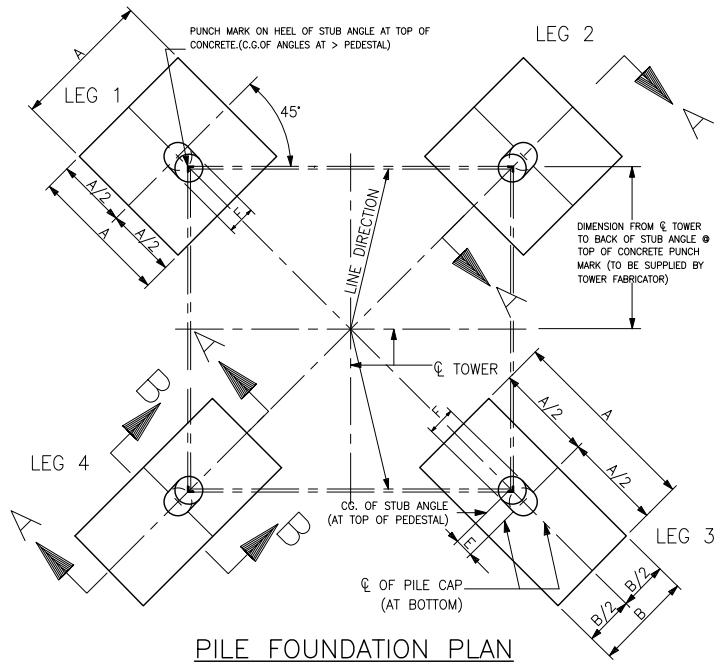
| MINIMUM DIMENSIONS | | |
|--------------------|----------|-----------|
| ITEM | PAD TYPE | PILE TYPE |
| A | 3000 | 3000 |
| F | 800 | 800 |
| C | 3000 | 1250 |
| E | 800 | 800 |
| T | 75 | 200 |

NOTES

- ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT AS NOTED.
- ALL REINFORCING BARS SHALL BE DEFORMED BARS CONFORMING TO THAI STANDARD FOR STEEL BARS FOR REINFORCED CONCRETE TIS-24-2559 GRADE SD-40.
- CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 210 kg/cm² AT 28 DAYS (CYLINDER TEST).
- REINFORCING TIE WIRES SHALL BE 16 GAGE (1.58 mm) MINIMUM.
- FOUNDATIONS SHALL BE PLACED ON UNDISTURBED SOIL. BOTTOMS OF ALL FOUNDATION SHALL BE LEVEL.
- STUB ANGLES SHALL BE SET TO TRUE POSITION USING STUB ANGLE SETTING TEMPLATE.
- CONCRETE COVER OVER REINFORCING SHALL BE 50 mm EXCEPT AS SPECIFIED.
- REINFORCEMENT SHALL BE SET AND MAINTAINED WITHIN 26 mm OF THE CENTER-TO-CENTER SPACING INDICATED.
- PILES SHALL BE PROVIDED IF REQUIRED. NUMBER AND LENGTH OF PILE SHALL BE DESIGNED BY THE CONTRACTOR.
- MATERIAL AND CONSTRUCTION SHALL BE AS SPECIFIED IN LATEST EDITION OF SPECIFICATION NO. L-500 kV.
- STUB OF TOWER SHALL BE THE SAME LENGTH OF EVERY TYPE OF FOUNDATION (PAD AND PILE FOUNDATION) AND THE MINIMUM LENGTH = 1300 mm.

| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| - | - | - | - | - | - | - | - | - | - | - |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|--|--|--|--------------|--|----------------------------|--|---------|--|
| DRAWN | | RECOMMENDED AND VALIDATED | | DRAWING NAME | | 500 kV TRANSMISSION LINE | | | |
| DESIGNED | | CONCURRED | | DESCRIPTION | | TYPICAL FOUNDATION OUTLINE | | | |
| VERIFIED | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | | REPLACING DWG.NO. | | DWG.NO. | |
| APPROVED | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | DATE | | - | | C213025 | |
| | | | | | | | | | |



| | |
|--------------------|--|
| LINE VOLTAGE, kV | 500 |
| CONDUCTOR SIZE | 1272 MCM |
| NUMBER OF CIRCUITS | 1 OR 2 OR 4 |
| F | MINIMUM 800 |
| E | MINIMUM 800 |
| J | 1.5 TIMES PILE DIAMETER OR LARGEST SIDE |
| G | 3 TIMES PILE DIAMETER OR LARGEST SIDE |
| H | 1500 (FOR PEDESTAL TYPE B = 1000) 2000 (FOR PEDESTAL TYPE C = 1500) |
| K | 4 |
| L | 5.5 |
| θ | 45° |

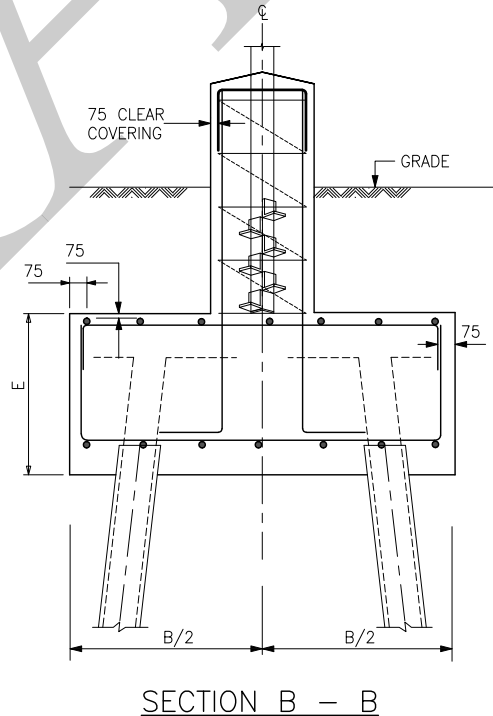
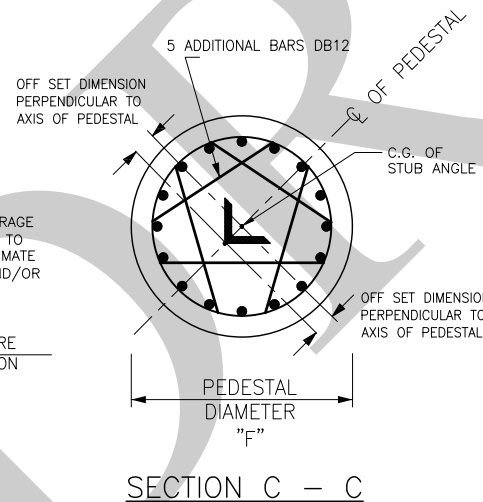
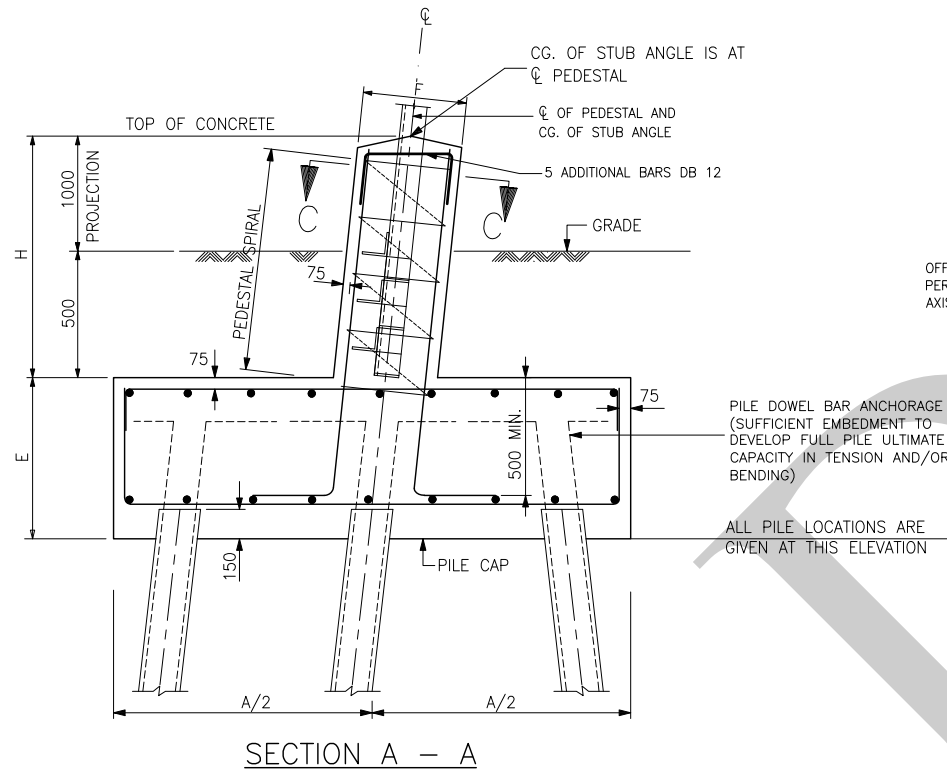
CAPACITY OF PILES

| PILE TYPE | ALLOWABLE TENSION (kg) | ALLOWABLE COMPRESSION (kg) | ALLOWABLE BENDING (kg-m) |
|--|------------------------|----------------------------|--------------------------|
| * CAST-IN-PLACE CONCRETE PILE (50 cm DIAMETER) | 35,000 | 70,000 | 7,500 |
| PRESTRESSED CONCRETE PILE (160 cm EFFECTIVE PERIMETER) | 35,000 | 70,000 | 5,200 |

* LONGITUDINAL STEEL REINFORCEMENT IN CAST-IN-PLACE BORE PILE SHALL BE CAPABLE FOR ABOVE SPECIFIED CAPACITY THROUGH OUT THE LENGTH OF THE PILE.

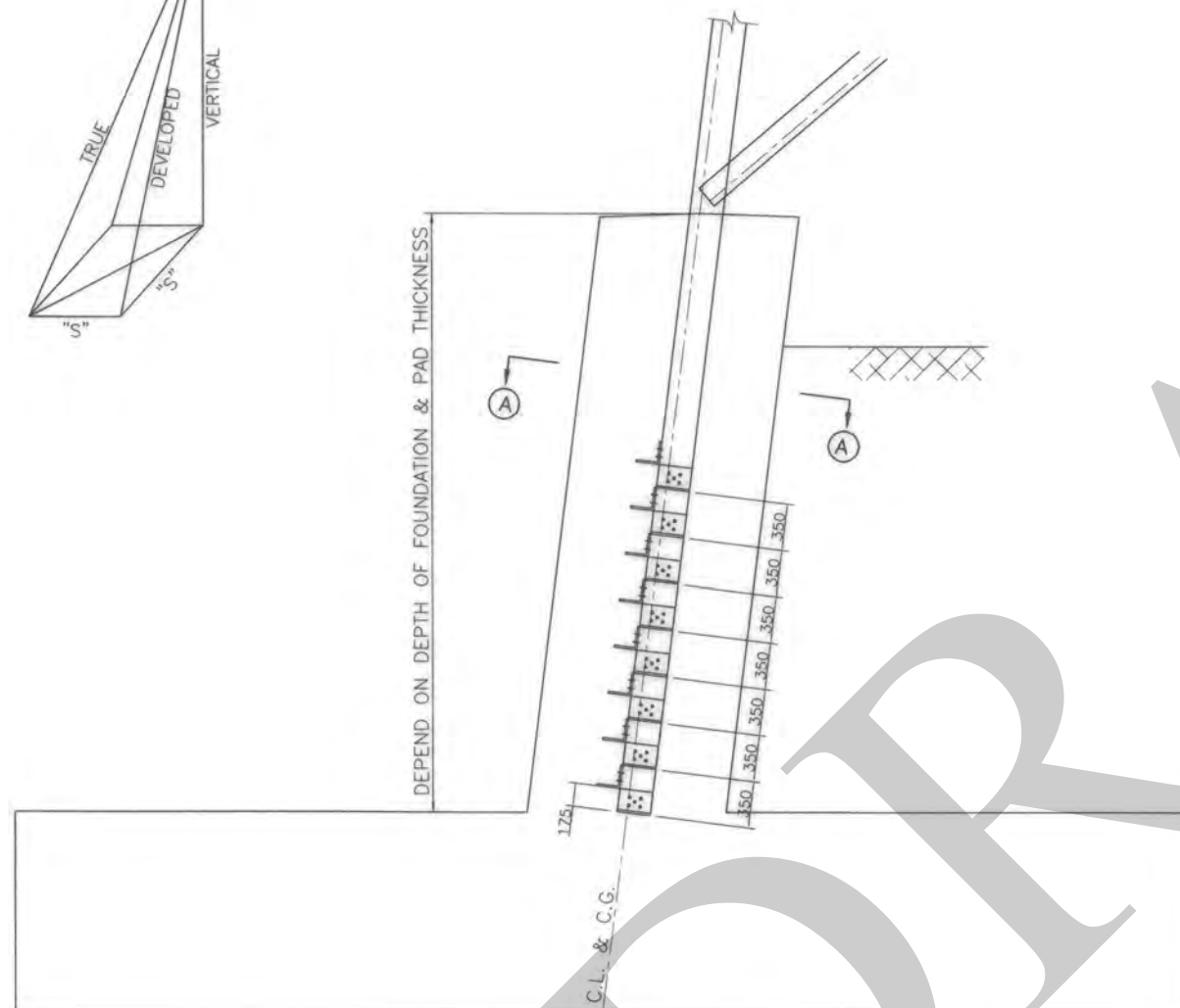
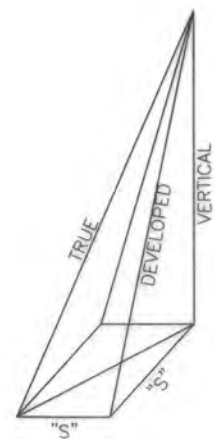
NOTES

- ALL DIMENSIONS ARE MINIMUM ALLOWANCES AND SHALL BE IN mm.
- EACH TYPE OF PILE FOUNDATION SHALL BE DESIGNED SO THAT IT CAN BE USED WITH SPECIFIED NUMBER OF PILES.
- STUB-ANGLES SHALL BE SET TO TRUE POSITION USING STUB ANGLE SETTING TEMPLATE.
- PEDESTAL IS CIRCULAR SHAPE.
- MAIN STEEL REINFORCEMENT IN PEDESTAL AND PAD SHALL NOT BE SMALLER THAN 20 mm SPIRALS SHALL NOT BE SMALLER THAN 12 mm. DEFORMED BARS SHALL TERMINATE IN STANDARD HOOKS.
- UNDER EACH BASE PAD, THERE SHALL BE LEAN CONCRETE SUB-BASE ON COMPACTED GRAVEL OR COMPACTED SAND SUB-BASE, EACH LAYER SHALL BE 100 mm THICK.
- THE STRENGTH REDUCTION FACTORS FOR REINFORCED CONCRETE SHALL BE AS SPECIFIED IN ACI-318.
- ANGLE θ IS GIVEN IN DEGREES.
- SOIL CLASSES ARE DESCRIBED ON DRAWING NO. C21-001.
- ESTIMATED PILE LENGTHS ARE SUBJECT TO VERIFICATION BY SOIL INVESTIGATION AND INDIVIDUAL PILE LOAD TEST.
- PILE SLOPES ARE GIVEN IN FROM 1:K OR 1:L WHEREIN 1 IS THE HORIZONTAL DIMENSION AND K OR L IS THE VERTICAL DIMENSION. ALL PILE SLOPES GIVEN ARE AS SEEN IN A TRUE VIEW OF THE PILE.
- ALL PILES SHALL BE OF SOLID SQUARE CROSS-SECTION. PILES SHALL BE MANUFACTURED OF CONCRETE HAVING A 28 DAY STRENGTH f_c' OF 350 kg/cm², AND SHALL HAVE AN EFFECTIVE PRESTRESSED (AFTER LOSSES) OF AT LEAST 70.00 kg/cm² (0.2 f_c'). DETAIL OF PRESTRESSED CONCRETE PILE IS SHOWN ON DRAWING NO. C11-004.
- PILE CAP MATERIAL :
 - CONCRETE SHALL HAVE MINIMUM 28 DAY STRENGTH f_c' OF 210 kg/cm² (CYLINDER TEST).
 - REINFORCEMENT MARKED DB SHALL BE DEFORMED BARS CONFORMING TO TIS 24-2559
" STANDARD FOR STEEL BARS FOR REINFORCED CONCRETE : DEFORMED BARS," GRADE SD 40.
 - TIE WIRES SHALL BE MINIMUM 16 GAGE (1.58 mm).
- CONCRETE COVER OVER REINFORCING SHALL BE 75 mm (± 7 mm), UNLESS OTHERWISE INDICATED.
- FOUNDATION SHALL BE CONSTRUCTED IN A CONTINUOUS POUR (NO " COLD JOINT " WILL BE ALLOWED BETWEEN PILE CAP AND PEDESTAL).
- FOUNDATION DESIGN CRITERIA SHALL CONFORM TO DRAWING NO. C21-001.



ELECTRICITY GENERATING AUTHORITY OF THAILAND

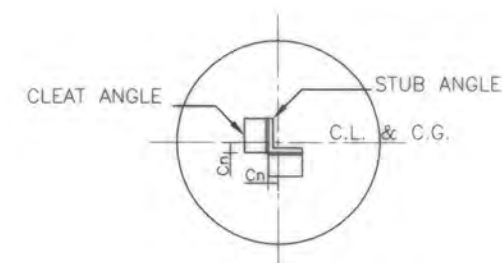
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|----------|--------|--|----------|--------------|---------------------------------|
| DRAWN | P.Sit | RECOMMENDED AND VALIDATED | Litipong | DRAWING NAME | 500 kV TRANSMISSION LINE |
| DESIGNED | P.Sit | CONCURRED | | DESCRIPTION | TYPICAL OUTLINE PILE FOUNDATION |
| VERIFIED | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | REPLACING DWG.NO. |
| APPROVED | Sorach | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | DWG.NO. | C21-026 |



| | |
|---------------------------|---|
| STUB ANGLE | HL 250X250X35 |
| CLEAT ANGLE | 16 - HL 175X175X15 LENGTH 250 mm. 5 - M20 / CLEAT |
| COMPRESSION LOAD (kg) | 491,577 |
| UPLIFT LOAD (kg) | 384,258 |
| SHEAR LOAD RESULTANT (kg) | 46,408 |
| OFFSET DIMENSION (Cn) | 74.5 |
| HORIZONTAL RATIO "S" | 0.125 |

NOTES

1. ALL MEMBER ARE IN MILLIMETERS EXCEPT AS NOTED.
LOADS ON FOUNDATION ARE INCLUDED TOWER LOAD FACTORS.
2. MEMBERS AND PLATES WITH PREFIX "H" SHALL CONFORM TO JIS G3101 SS540.
MEMBERS AND PLATES WITHOUT PREFIX "H" SHALL CONFORM TO JIS G3101 SS400.
3. STUB ANGLES SHALL BE SET IN ACCORDANCE WITH STUB ANGLE SETTING TEMPLATE.
4. THE AREA OF CONCRETE PIER SHALL BE AT LEAST FOUR TIMES AS LARGE AS THE BEARING AREA OF A SET OF SHEAR CONNECTOR ANGLES.
5. C.L. DENOTES THE CENTER LINE OF PEDESTAL.
C.G. DENOTES THE CENTER OF GRAVITY OF STUB ANGLE.
6. THE CONSTRUCTION AND OTHERWISE SHOWN SHALL BE AS SPECIFIED IN THE LATEST EDITION OF EGAT'S SPECIFICATION NO. L-500 kV.

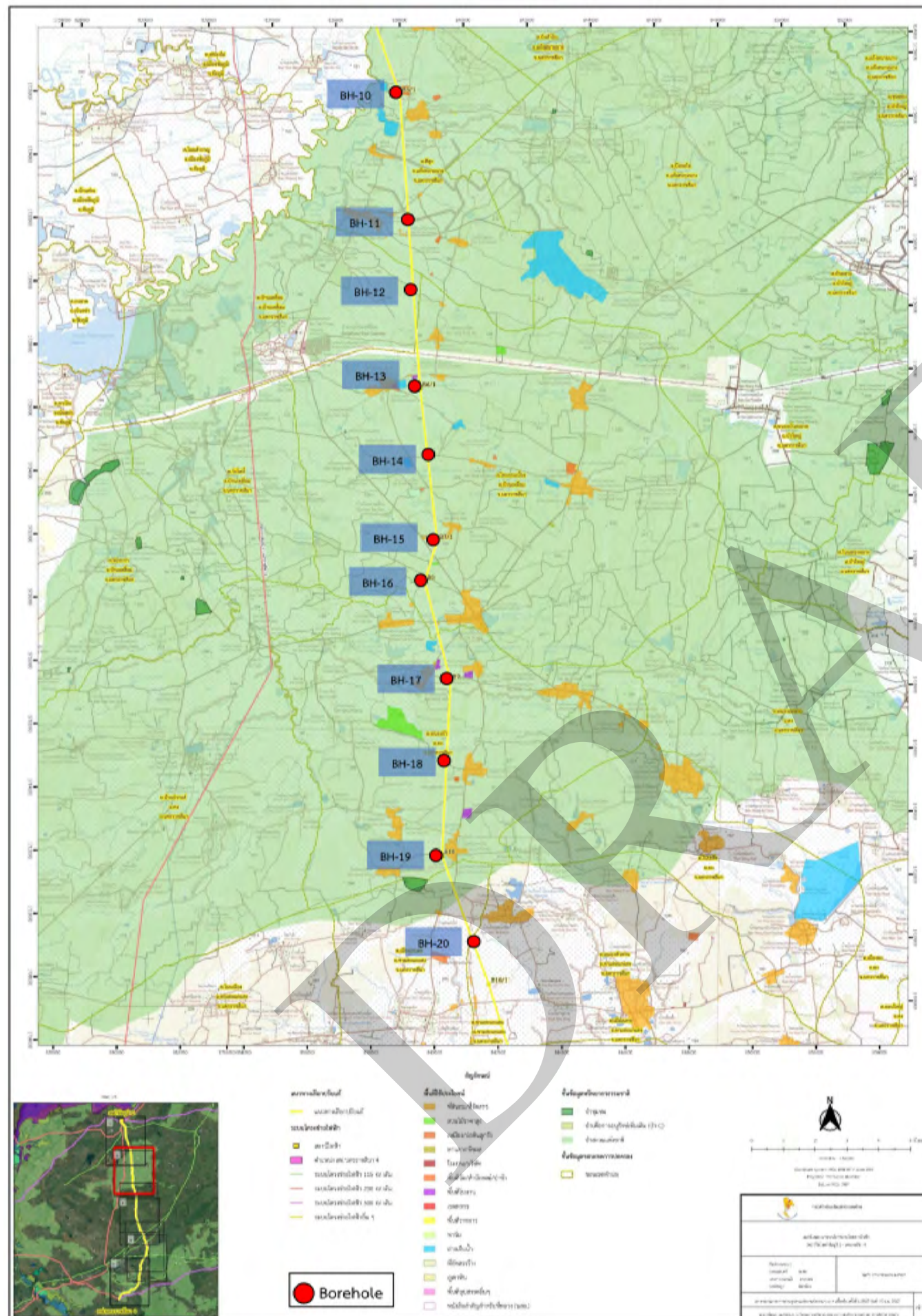


SECTION A-A

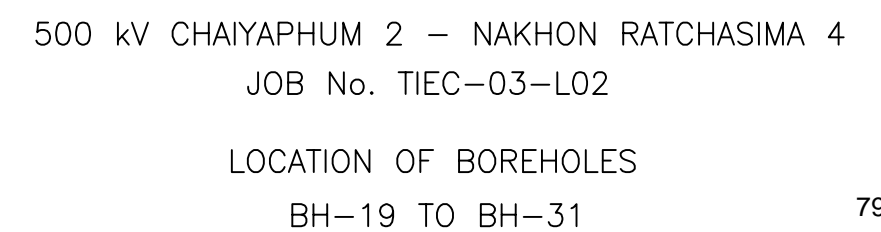


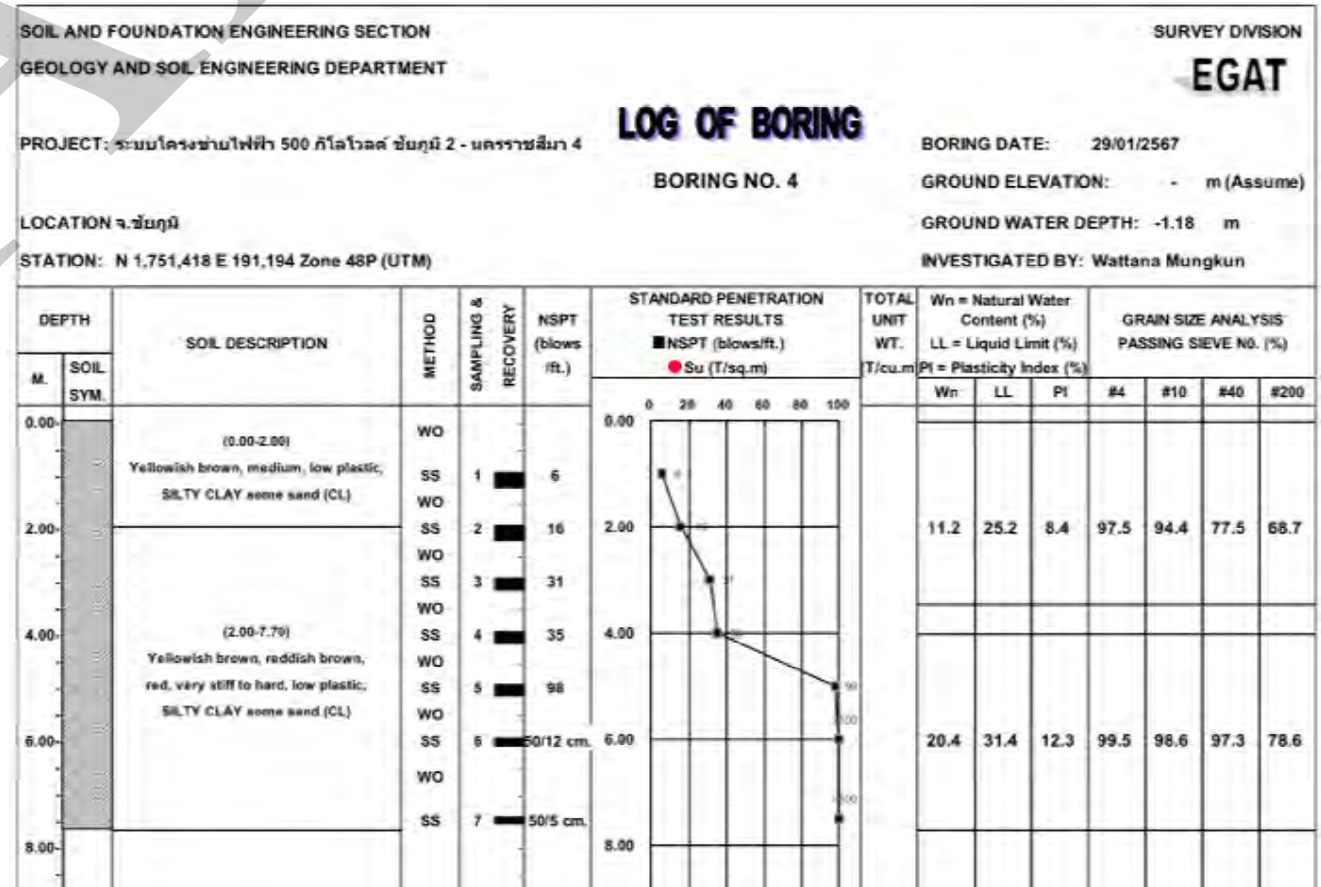
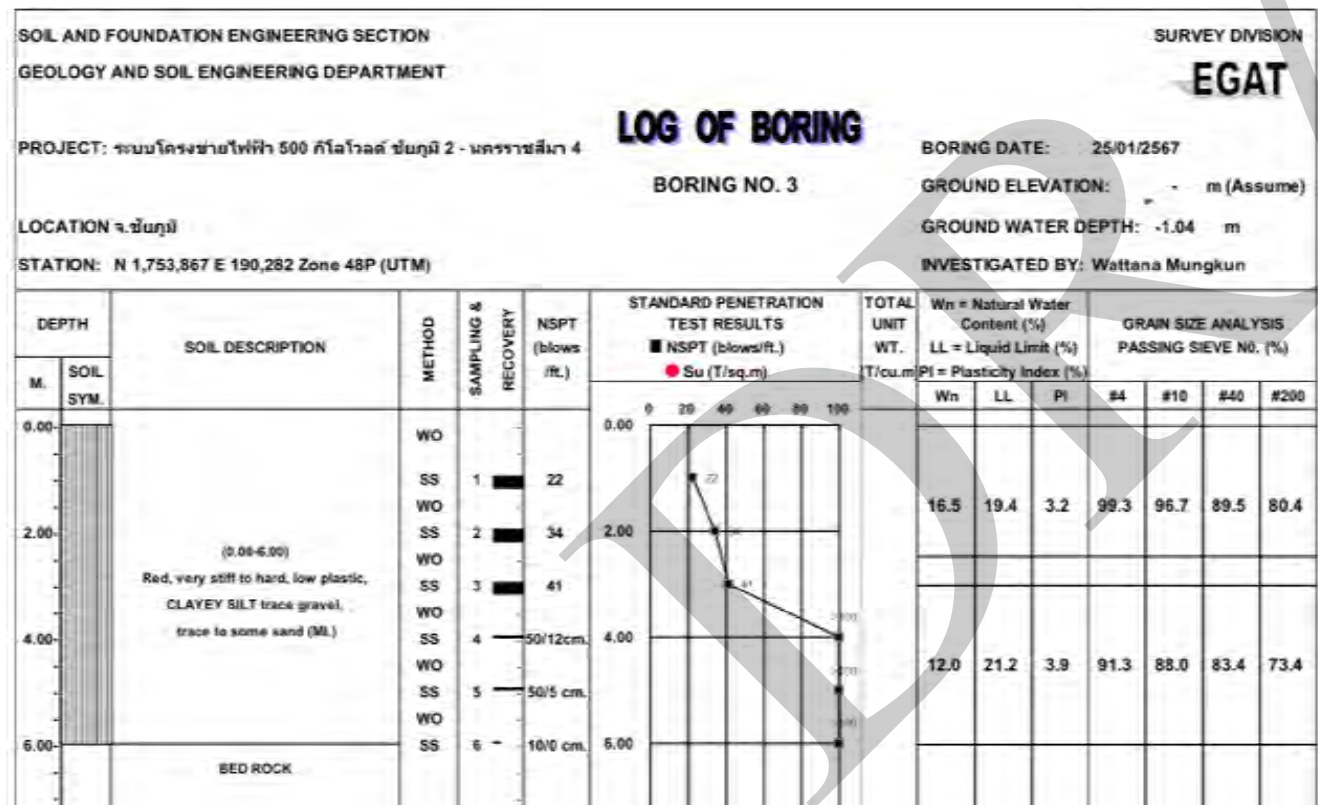
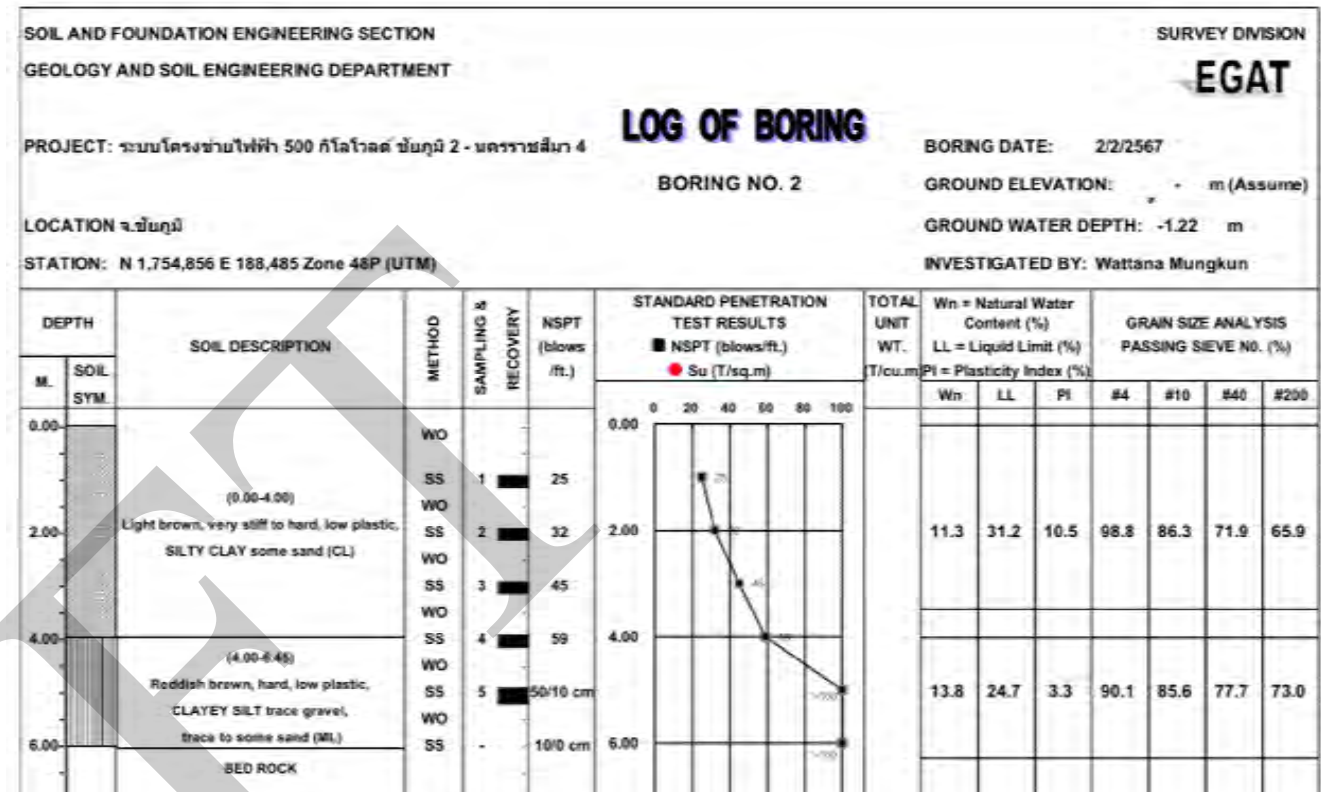
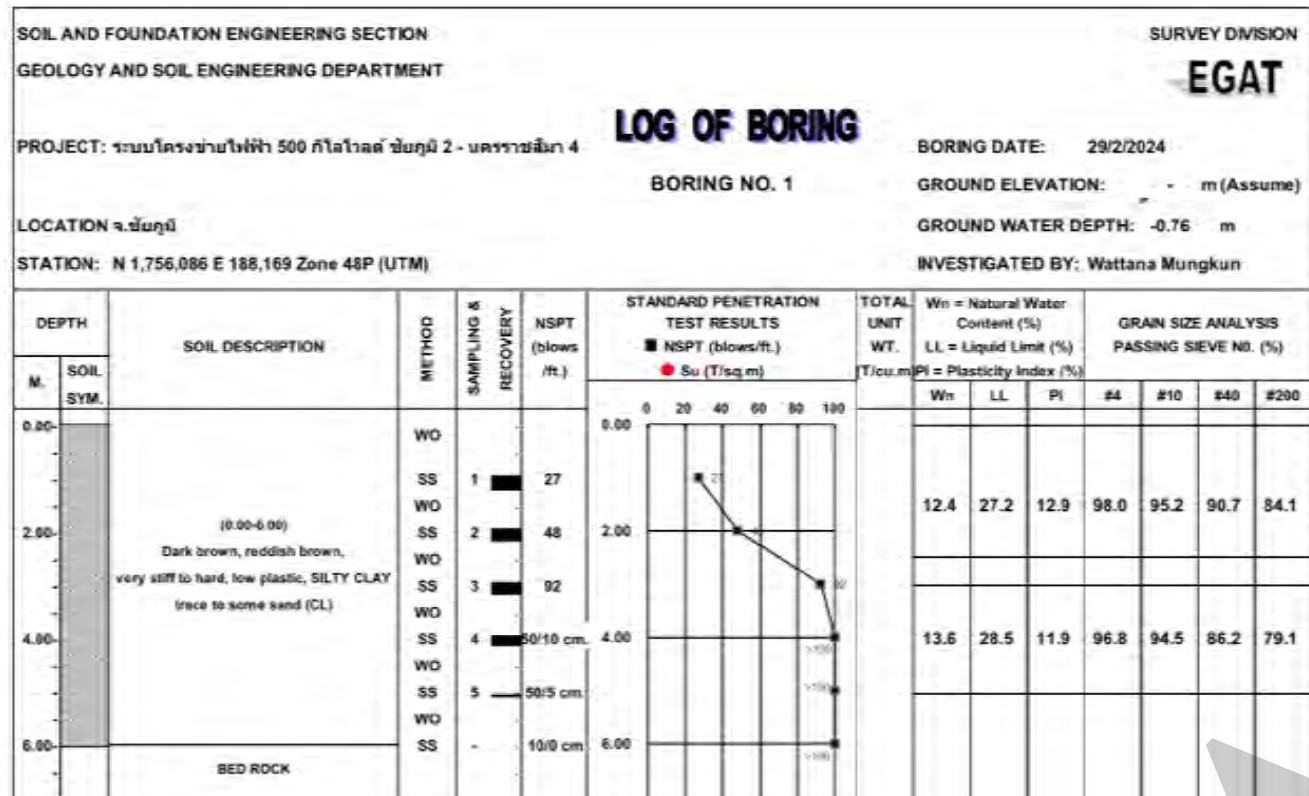
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| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | | 500 kV TRANSMISSION LINE | | | |
|--|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|---|---------|-------------------|---------|
| | | | | | | | | | | | STUB AND CLEAT ANGLES AND LOAD ON FOUNDATION FOR TOWER TYPE HDQV3 | | | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | APPROVED | DATE | REPLACING DWG.NO. | DWG.NO. |
| - | - | - | - | - | - | - | - | - | - | - | 24.26 | 12/6/19 | - | C25-037 |
| | | | | | | | | | | | - REV. - | | | |



500 kV CHAIYAPHUM 2 – NAKHON RATCHASIMA 4
 JOB No. TIEC-03-L02
 LOCATION OF BOREHOLES
 BH-10 TO BH-20





SOIL AND FOUNDATION ENGINEERING SECTION
GEOLOGY AND SOIL ENGINEERING DEPARTMENT

SURVEY DIVISION
EGAT

PROJECT: ระบบโครงข่ายไฟฟ้า 500 กิโลโวลต์ ชัยภูมิ 2 - นครราชสีมา 4

LOG OF BORING

BORING DATE: 1/2/2567

BORING NO. 5

GROUND ELEVATION: - m (Assume)

GROUND WATER DEPTH: -1.75 m

INVESTIGATED BY: Wattana Mungkun

LOCATION จ.ชัยภูมิ

STATION: N 1,748,417 E 191,306 Zone 48P (UTM)

| DEPTH | SOIL DESCRIPTION | METHOD | SAMPLING & RECOVERY | NSPT (blows /ft.) | STANDARD PENETRATION TEST RESULTS ■ NSPT (blows/ft.) ● Su (T/sq.m) | TOTAL UNIT WT. (T/cu.m) | Wn = Natural Water Content (%) LL = Liquid Limit (%) PI = Plasticity Index (%) | GRAIN SIZE ANALYSIS PASSING SIEVE NO. (%) |
|-------|--|--------|---------------------|-------------------|--|-------------------------|--|---|
| M. | SOIL SYM. | | | | | | Wn LL PI #4 #10 #40 #200 | |
| 0.00 | | WO | | | | | | |
| 0.00 | (0.00-3.00) | SS | 1 | 5 | | | | |
| | Brown, medium, low plastic, SILTY CLAY trace to some sand (CL) | WO | | | | | | |
| 2.00 | | SS | 2 | 8 | | | | |
| | | WO | | | | | | |
| | (3.00-4.00) | SS | 3 | 16 | | | | |
| | Light brown, very stiff, low plastic, SILTY CLAY trace to some sand (CL) | WO | | | | | | |
| 4.00 | | SS | 4 | 21 | | | | |
| | | WO | | | | | | |
| | (4.00-7.95) | SS | 5 | 32 | | | | |
| | Reddish brown, very stiff to hard, medium plastic, CLAYEY SILT trace gravel, trace to some sand (ML) | WO | | | | | | |
| 6.00 | | SS | 6 | 33 | | | | |
| | | WO | | | | | | |
| 8.00 | | SS | 7 | 37 | | | | |
| | | WO | | | | | | |

SOIL AND FOUNDATION ENGINEERING SECTION
GEOLOGY AND SOIL ENGINEERING DEPARTMENT

SURVEY DIVISION
EGAT

LOG OF BORING

PROJECT: ระบบโครงข่ายไฟฟ้า 500 กิโลโวลต์ ชัยภูมิ 2 - นครราชสีมา 4

BORING DATE: 8/2/2567

BORING NO. 6

GROUND ELEVATION: - m (Assume)

LOCATION จ.ชัยภูมิ

GROUND WATER DEPTH: -0.92 m

STATION: N 1,745,497 E 191,415 Zone 48P (UTM)

INVESTIGATED BY: Wattana Mungkun

| DEPTH | SOIL DESCRIPTION | METHOD | SAMPLING & RECOVERY | NSPT (blows /ft.) | STANDARD PENETRATION TEST RESULTS ■ SPT (blows/ft.) ● Su (T/sq.m) | TOTAL UNIT WT. (T/cu.m) | Wn = Natural Water Content (%) LL = Liquid Limit (%) PI = Plasticity Index (%) | GRAIN SIZE ANALYSIS PASSING SIEVE NO. (%) |
|-------|--|--------|---------------------|-------------------|---|-------------------------|--|---|
| M. | SOIL SYM. | | | | | | Wn LL PI #4 #10 #40 #200 | |
| 0.00 | | WO | | | | | | |
| 0.00 | (0.00-3.00) | SS | 1 | 25 | | | | |
| | Brown, very stiff, high plastic, SILTY CLAY trace sand (CH) | WO | | | | | | |
| 2.00 | | SS | 2 | 17 | | | | |
| | | WO | | | | | | |
| | | SS | 3 | 14 | | | | |
| | | WO | | | | | | |
| 4.00 | | SS | 4 | 15 | | | | |
| | (3.00-9.00) | WO | | | | | | |
| | Brown, yellowish brown, brownish grey, stiff, high plastic, SILTY CLAY trace sand (CH) | SS | 5 | 13 | | | | |
| 6.00 | | WO | | | | | | |
| | | SS | 6 | 13 | | | | |
| | | WO | | | | | | |
| 8.00 | | SS | 7 | 11 | | | | |
| | | WO | | | | | | |
| 10.00 | | SS | 8 | 7 | | | | |
| | (9.00-12.00) | WO | | | | | | |
| | Grey, medium, high plastic, SILTY CLAY (CH) | SS | 9 | 8 | | | | |
| 12.00 | | WO | | | | | | |
| | | SS | 10 | 35 | | | | |
| | (12.00-15.45) | WO | | | | | | |
| | Yellowish brown, brown, dense to very dense, SILTY SAND trace to some gravel (SM) | SS | 11 | 52 | | | | |
| 14.00 | | WO | | | | | | |
| | | SS | 12 | 56 | | | | |
| 16.00 | | | | | | | | |

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | |
|----------|-------|--|---|
| DRAWN | Parne | RECOMMENDED AND VALIDATED | 500 kV CHAIYAPHUM 2 - NAKHON RATCHASIMA 4 |
| DESIGNED | | CONCURRED | CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT |
| VERIFIED | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | SOIL BORING LOGS BORING NO. BH-5 TO BH-6 |
| APPROVED | | DATE | JOB NO. TIEC-03-L02 REPLACING DWG.NO. DWG.NO. C32-964 |

SOIL AND FOUNDATION ENGINEERING SECTION
GEOLOGY AND SOIL ENGINEERING DEPARTMENT

PROJECT: ระบบโครงข่ายไฟฟ้า 500 กิโลโวลต์ ชัยภูมิ 2 - นครราชสีมา 4

LOCATION จ.ชัยภูมิ

STATION: N 1,743,045 E 192,282 Zone 48P (UTM)

SURVEY DIVISION
EGAT

LOG OF BORING

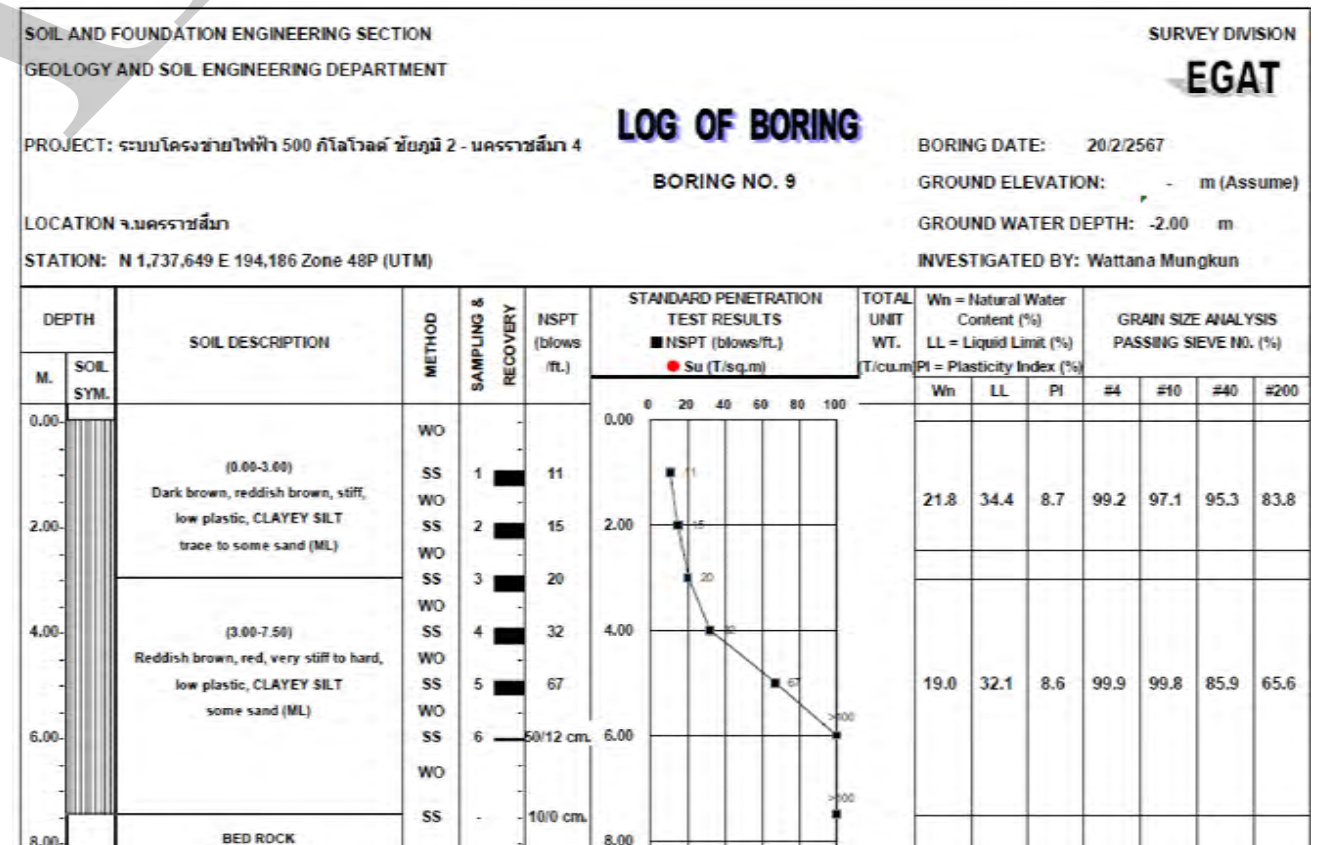
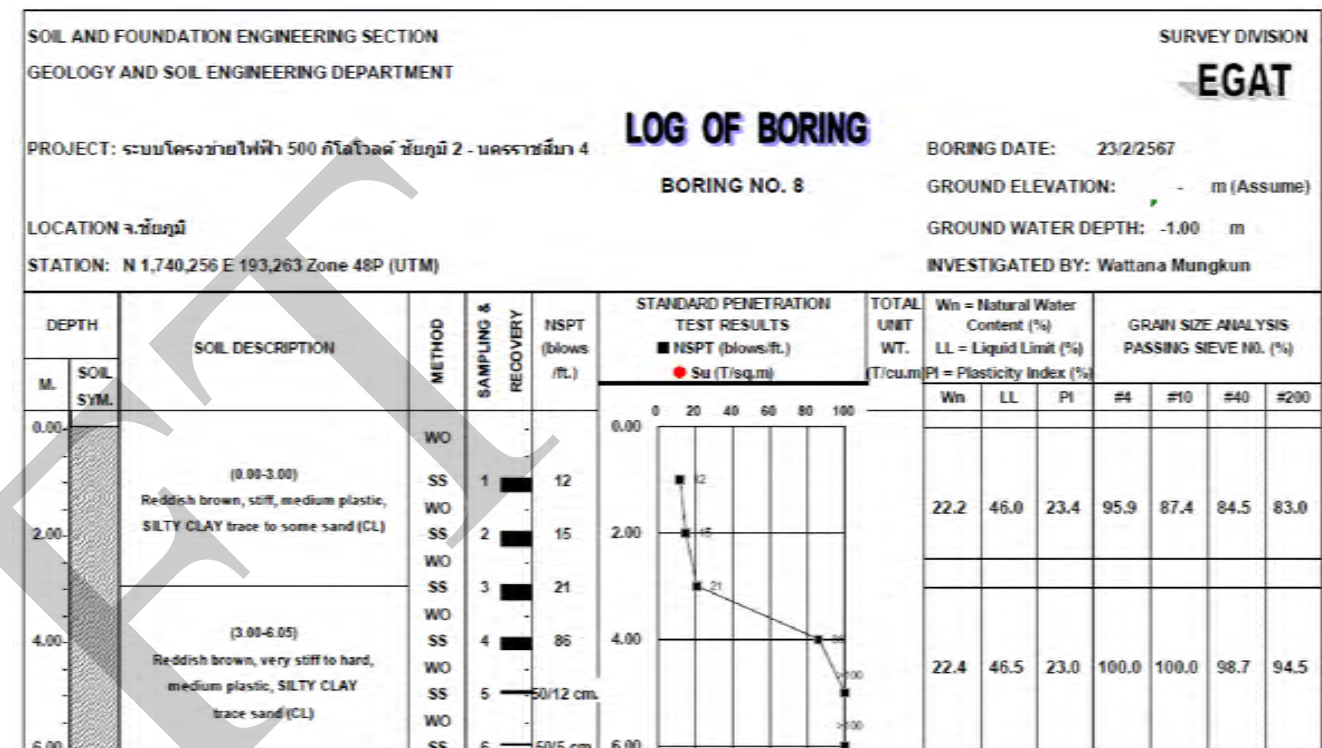
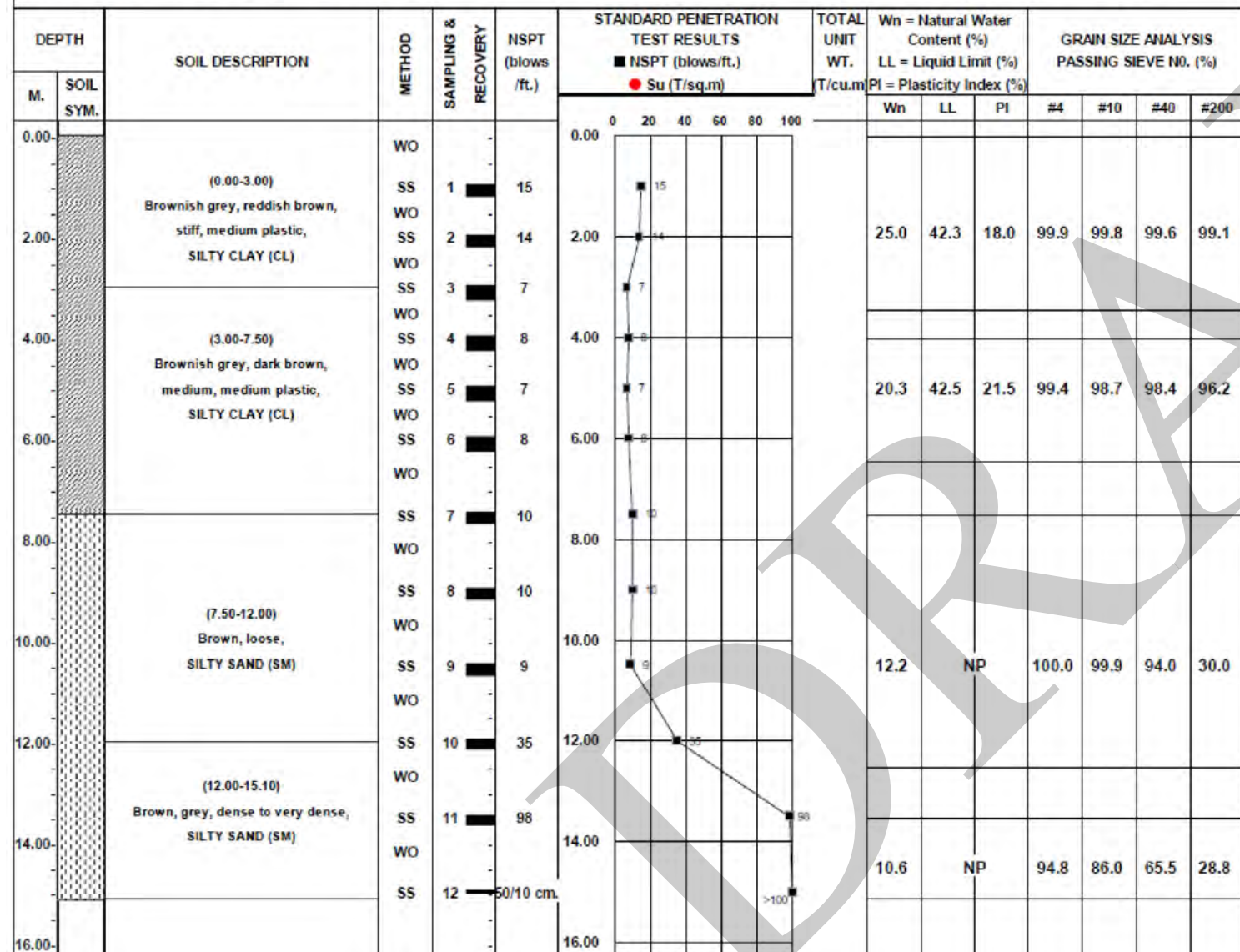
BORING NO. 7

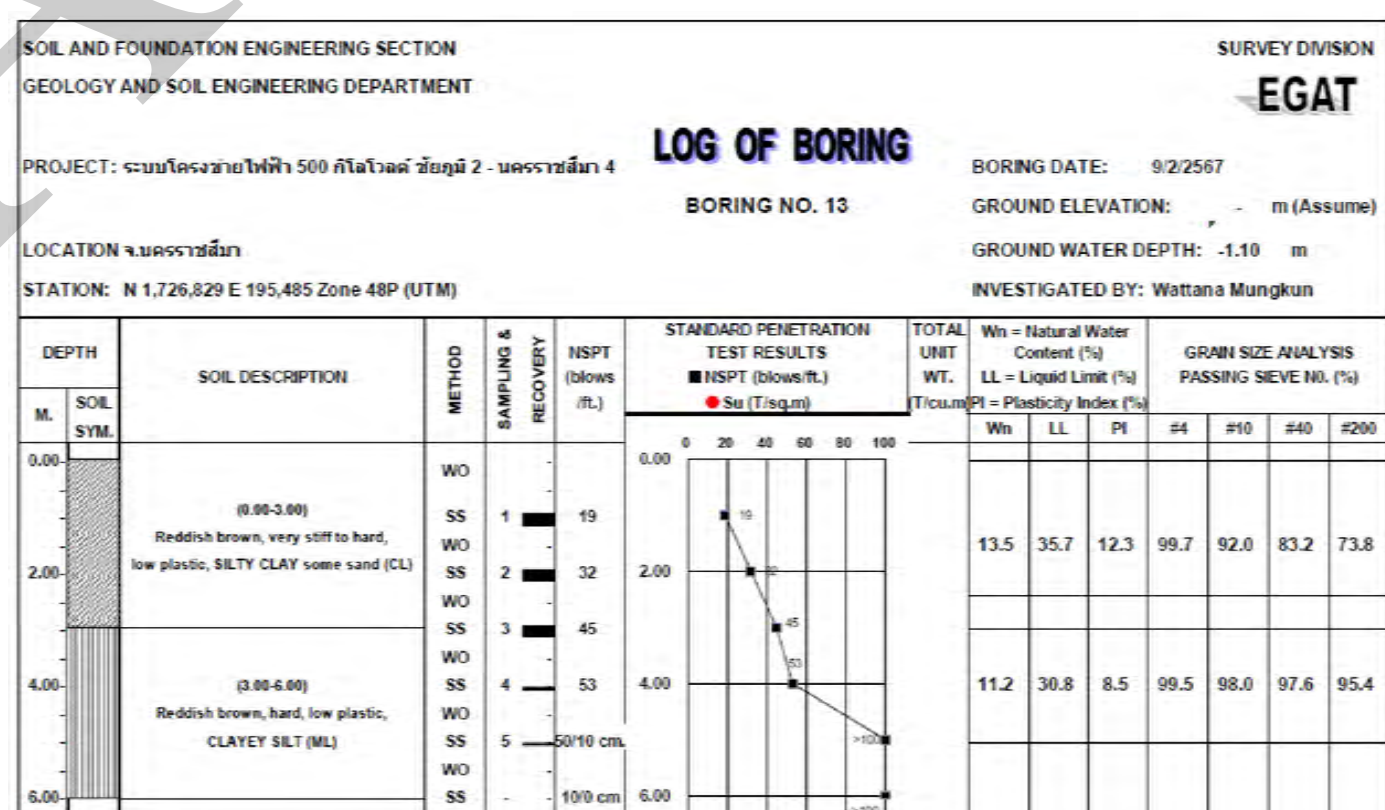
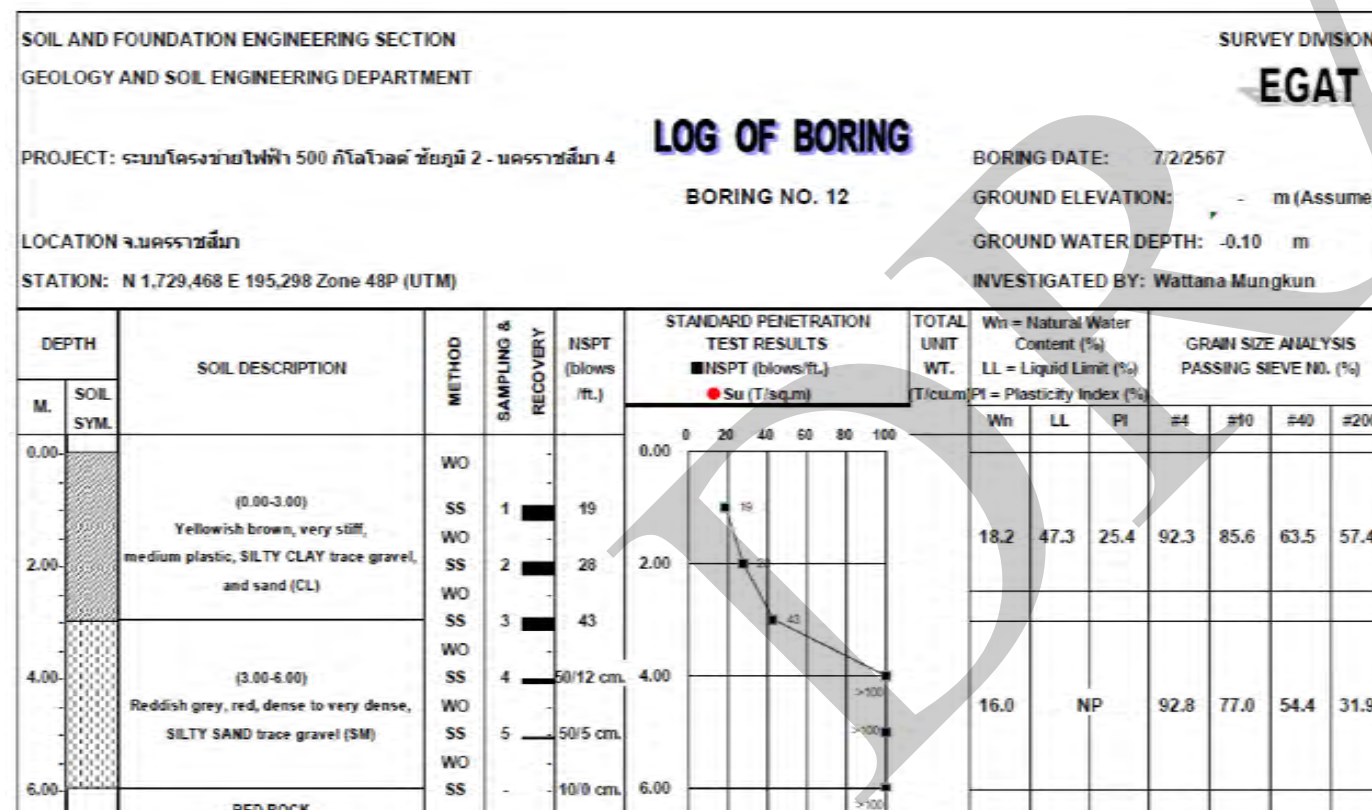
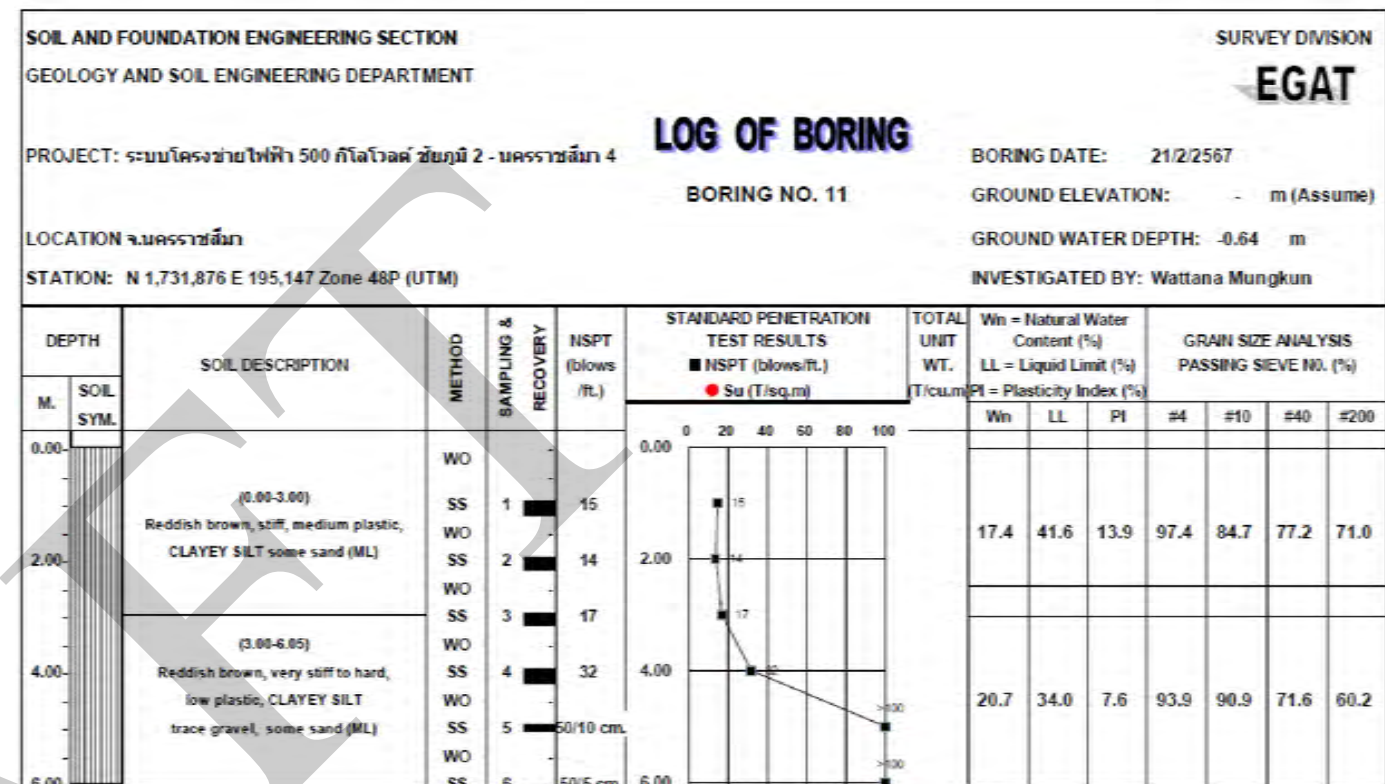
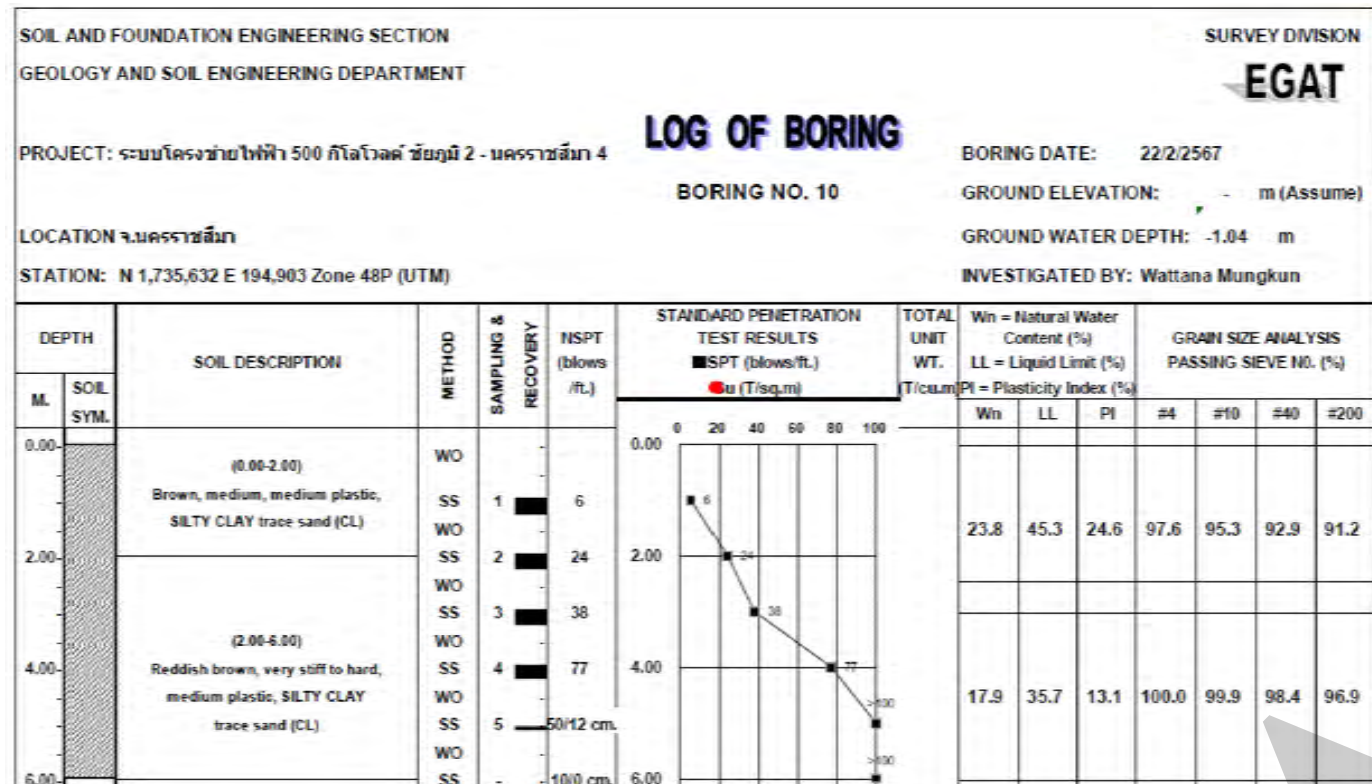
BORING DATE: 28/2/2567

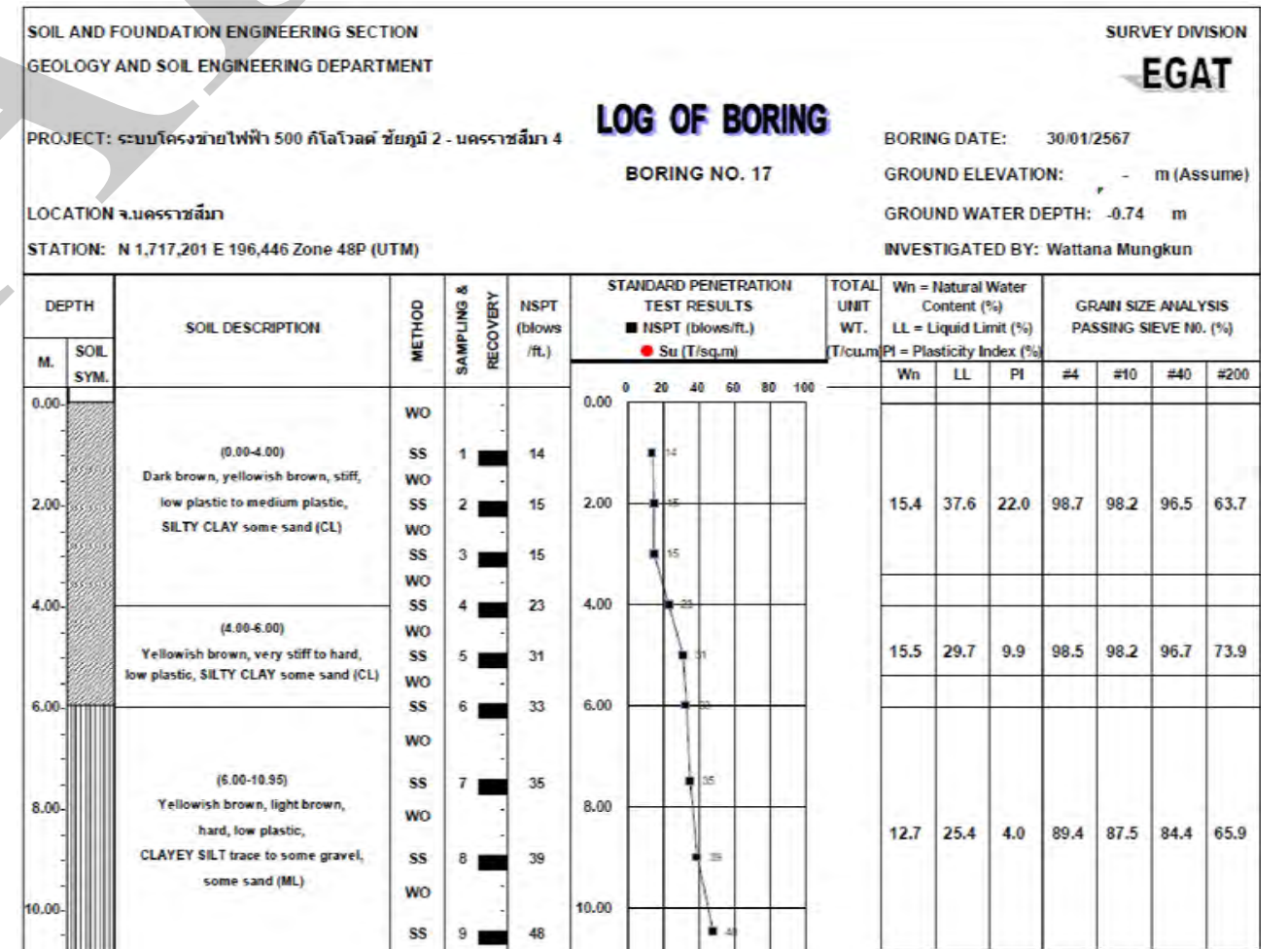
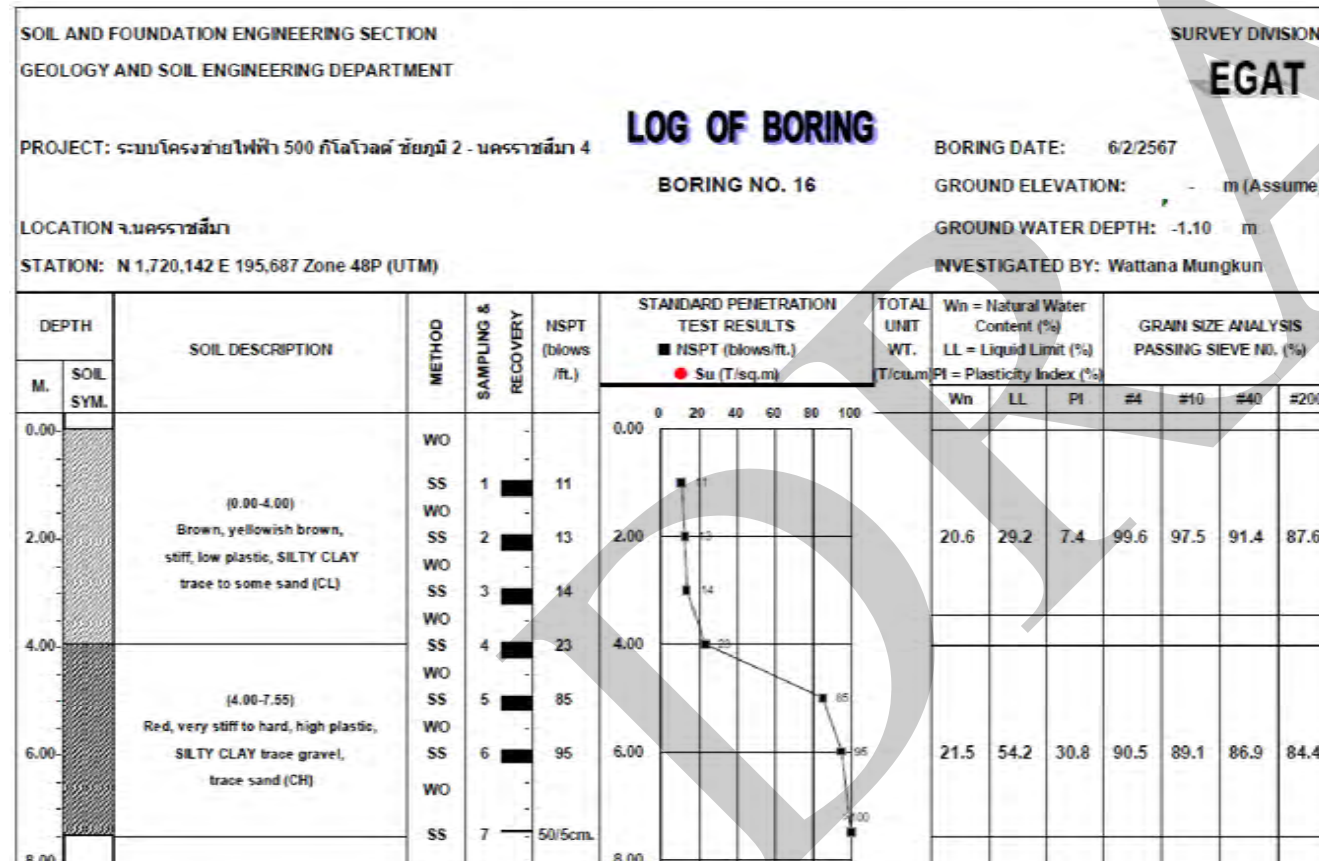
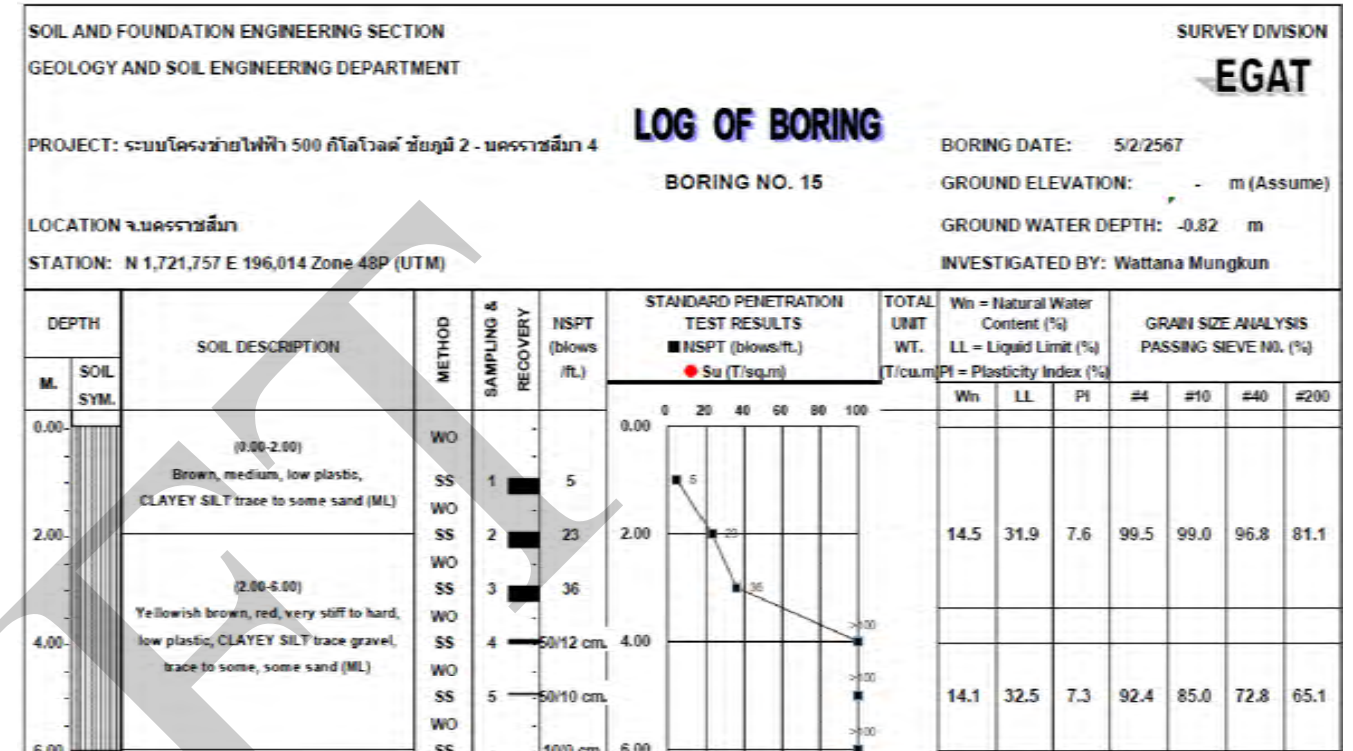
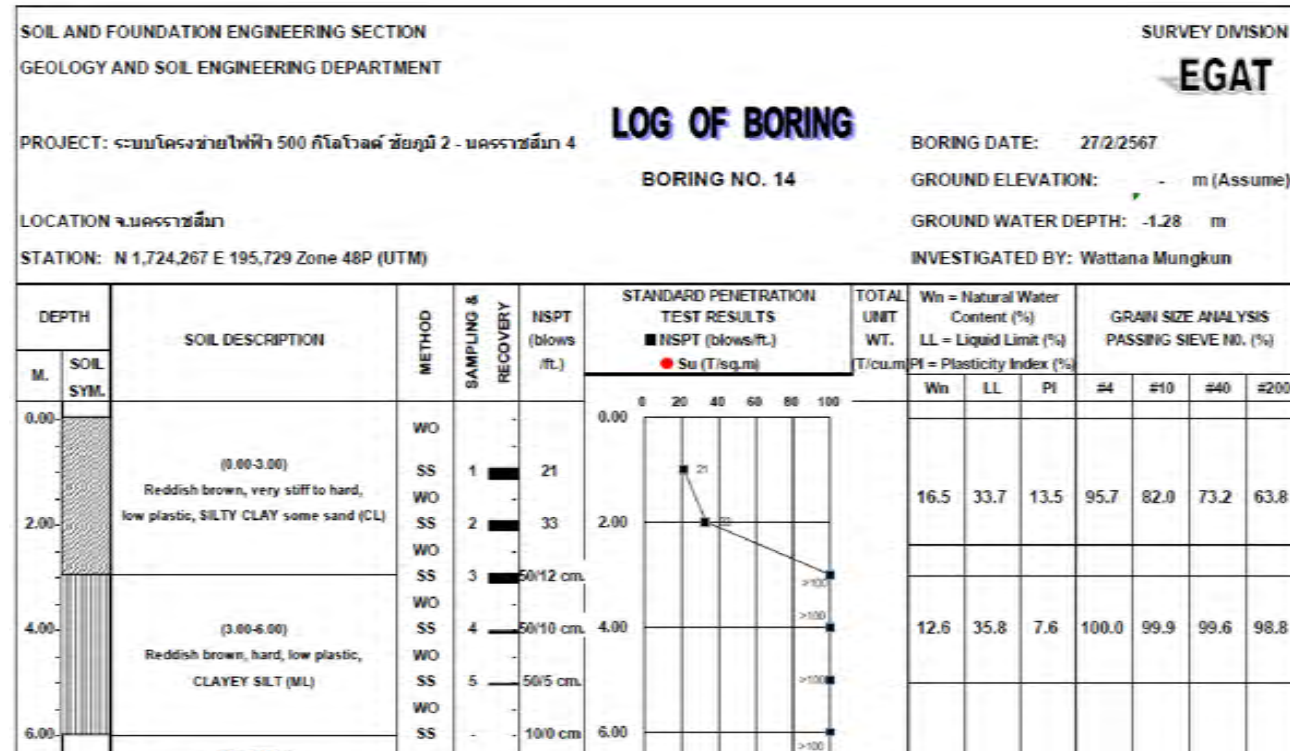
GROUND ELEVATION: - m (Assume)

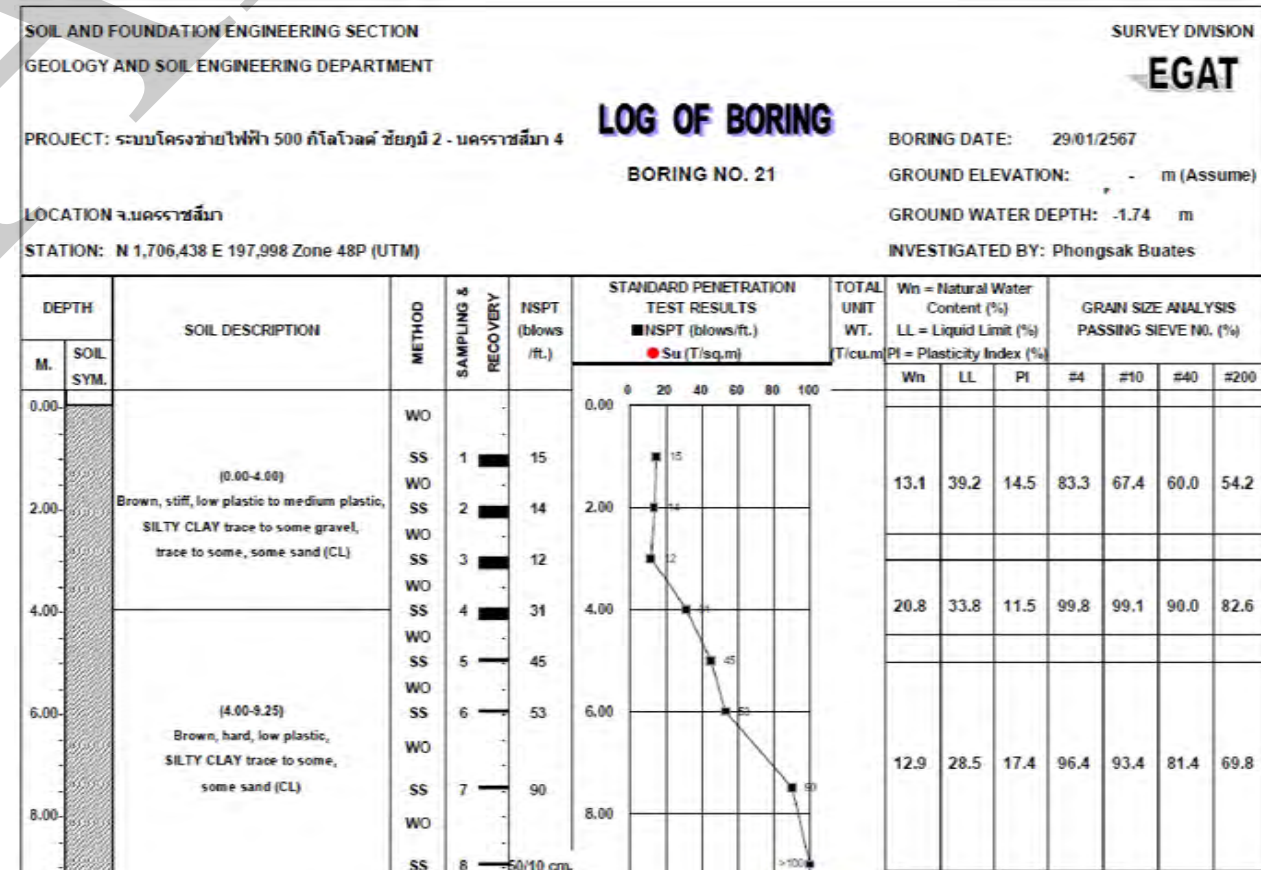
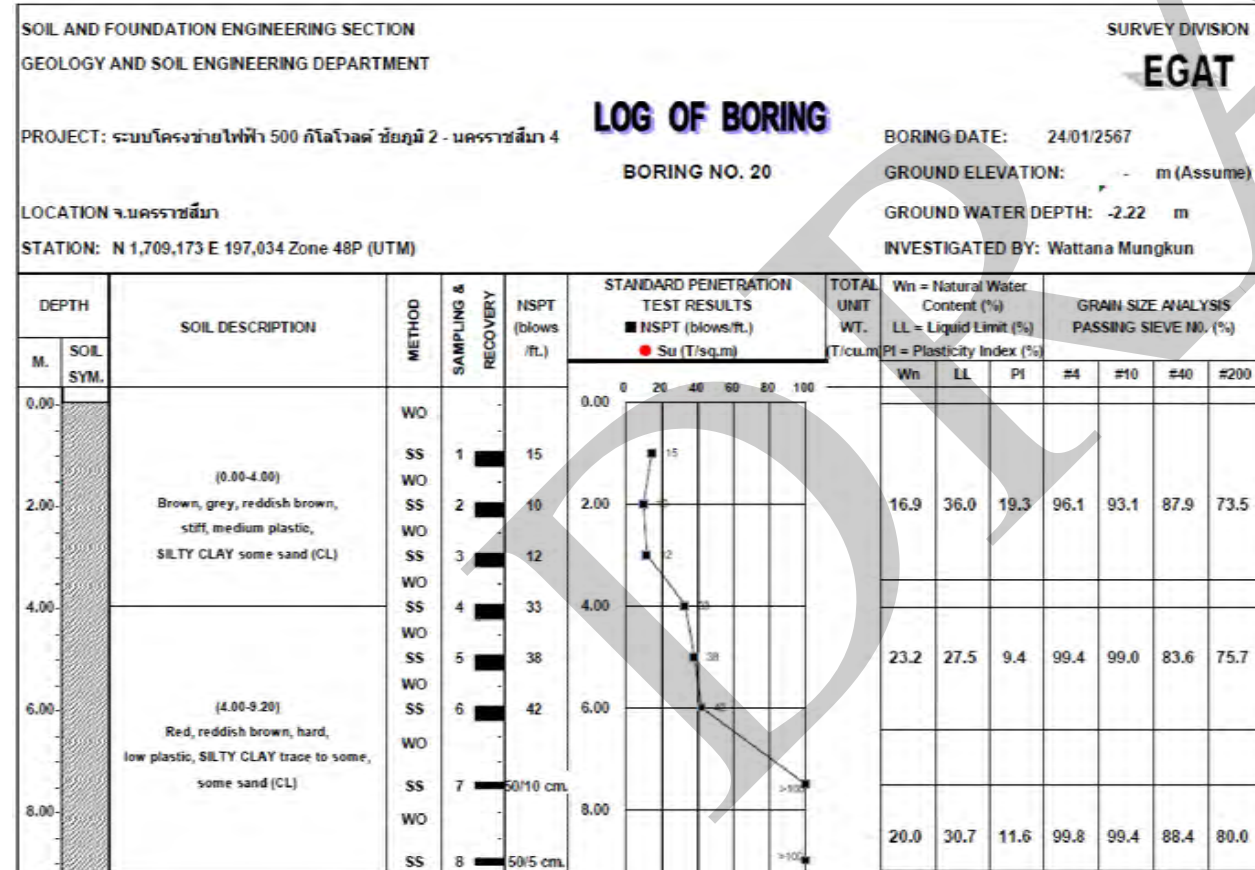
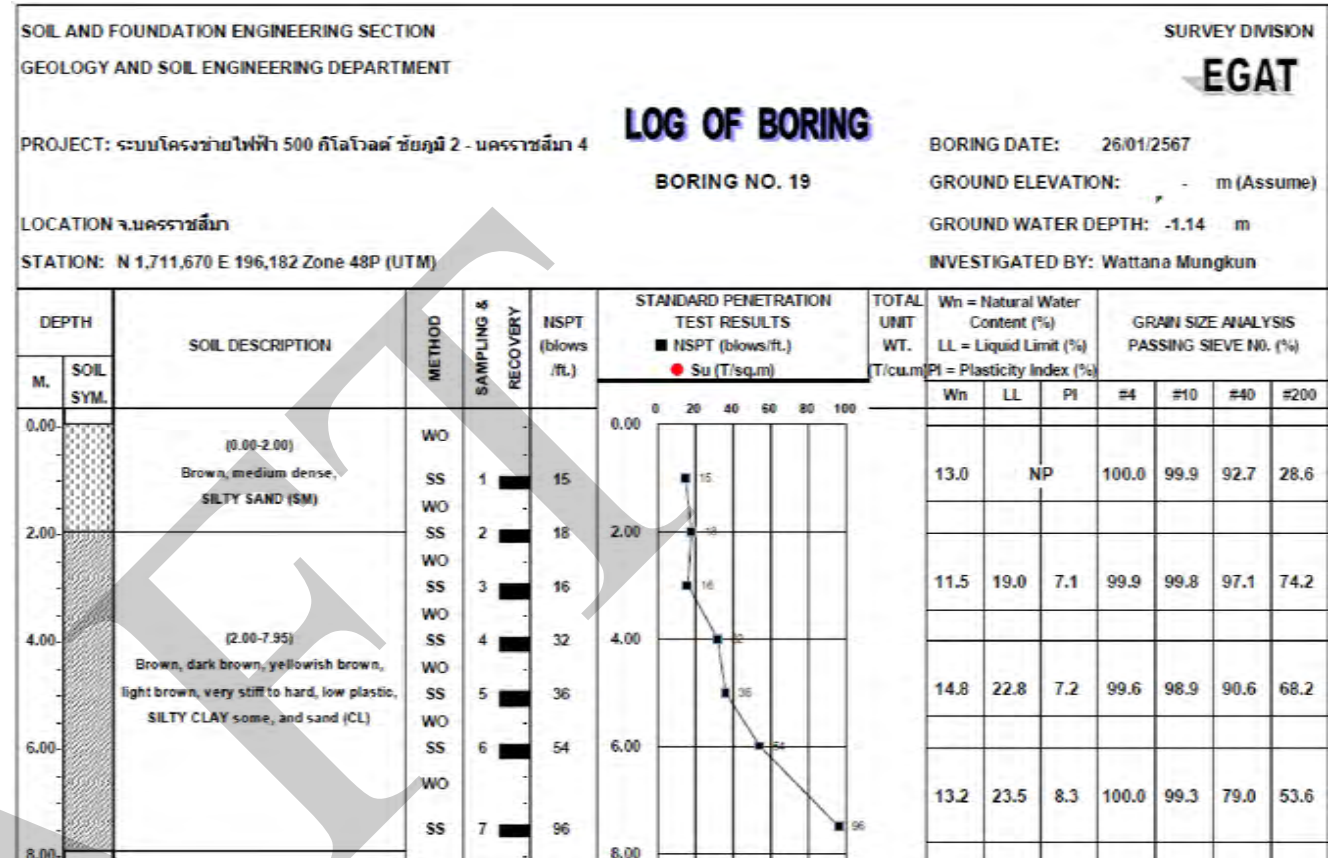
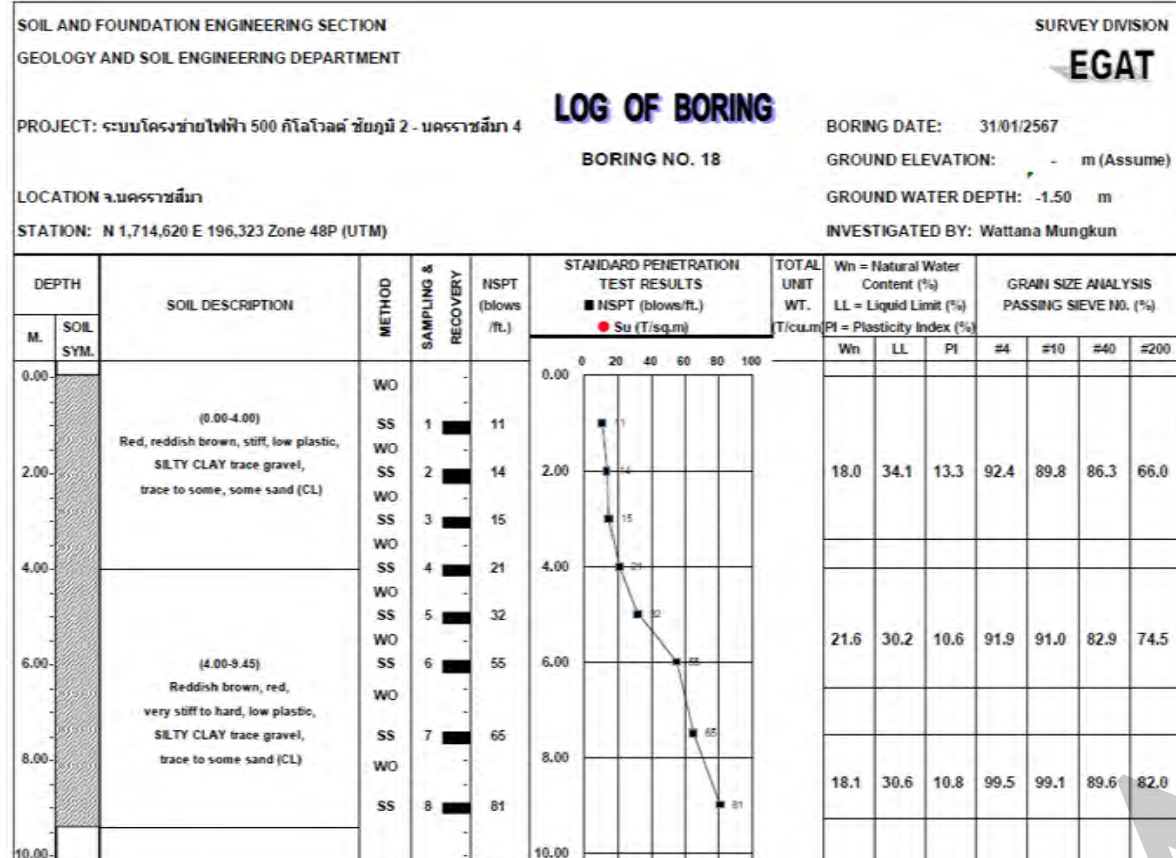
GROUND WATER DEPTH: -4.27 m

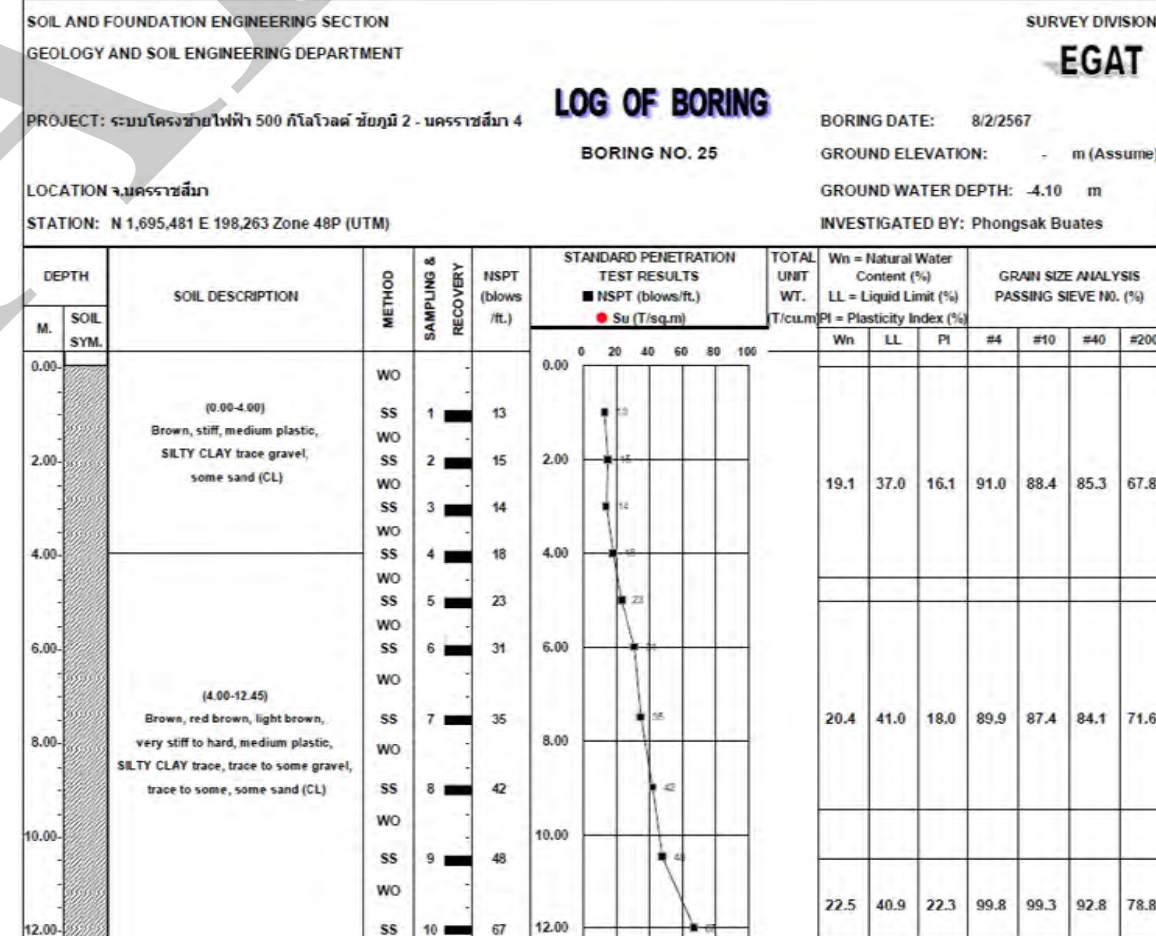
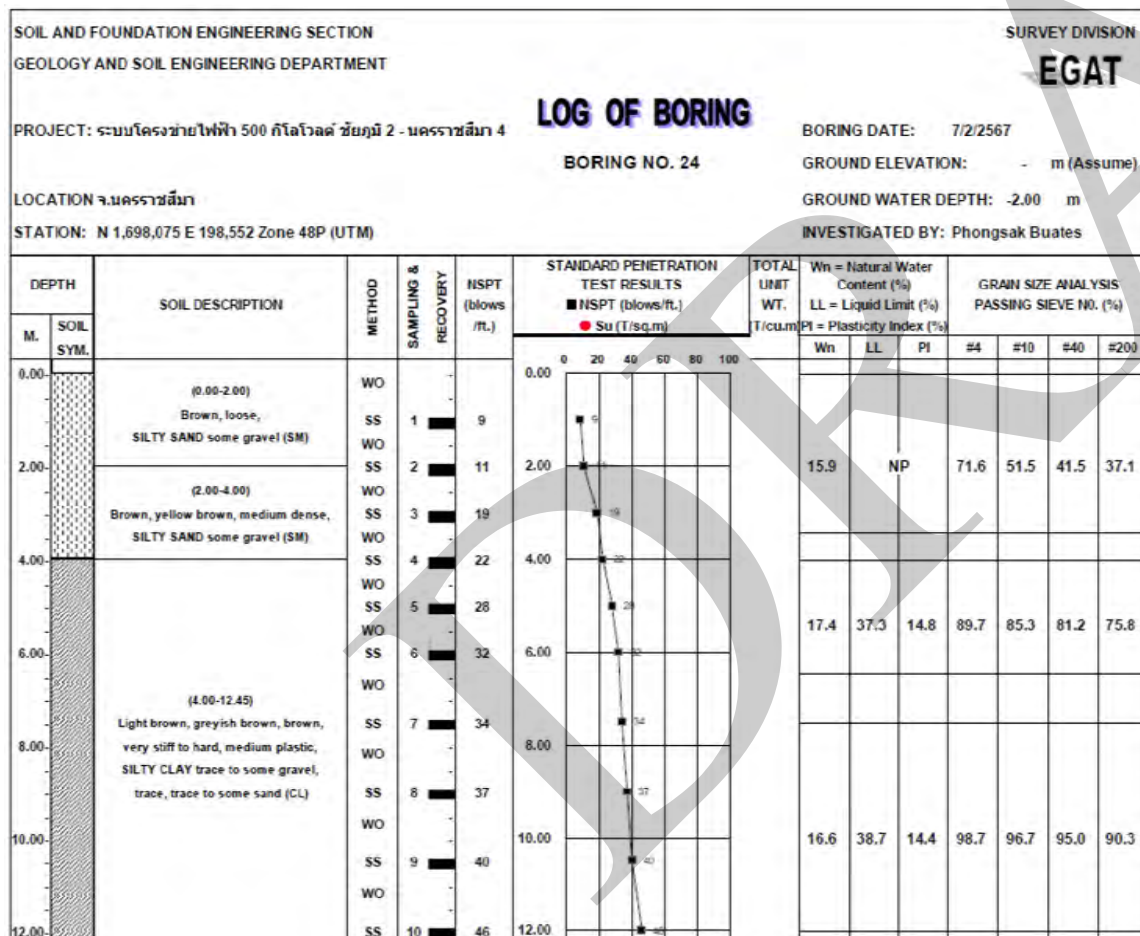
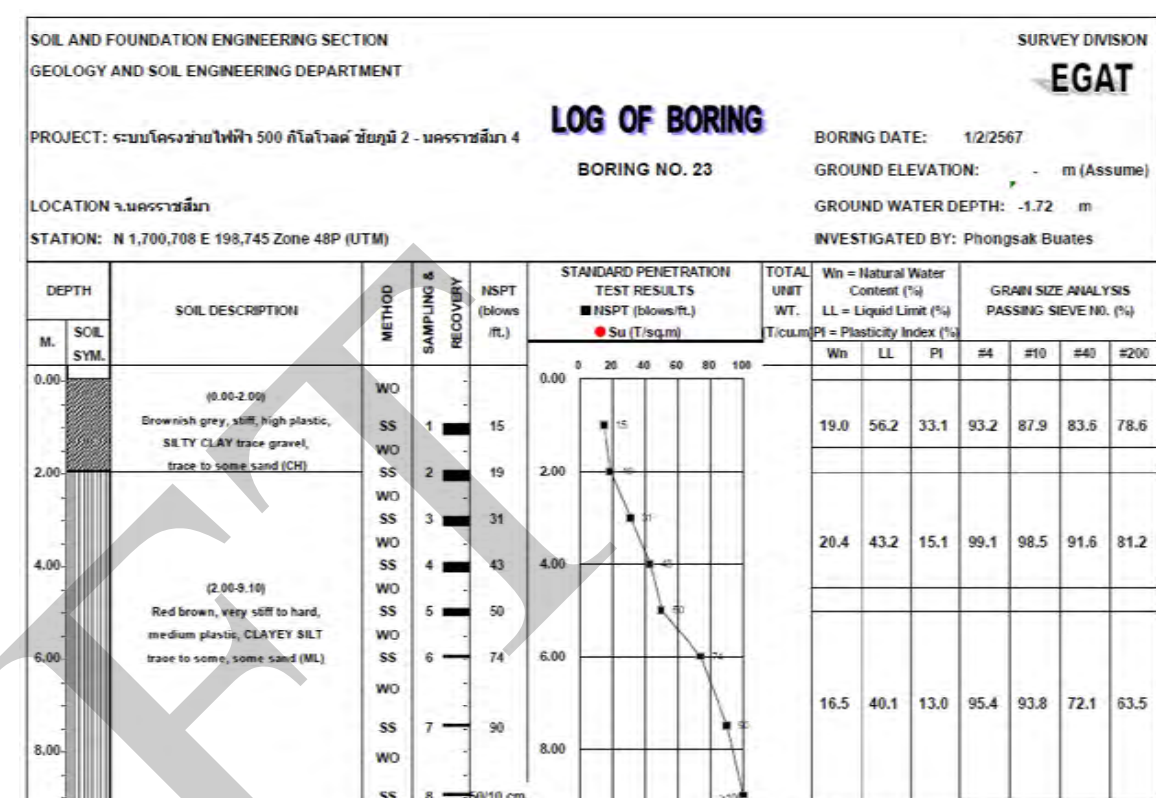
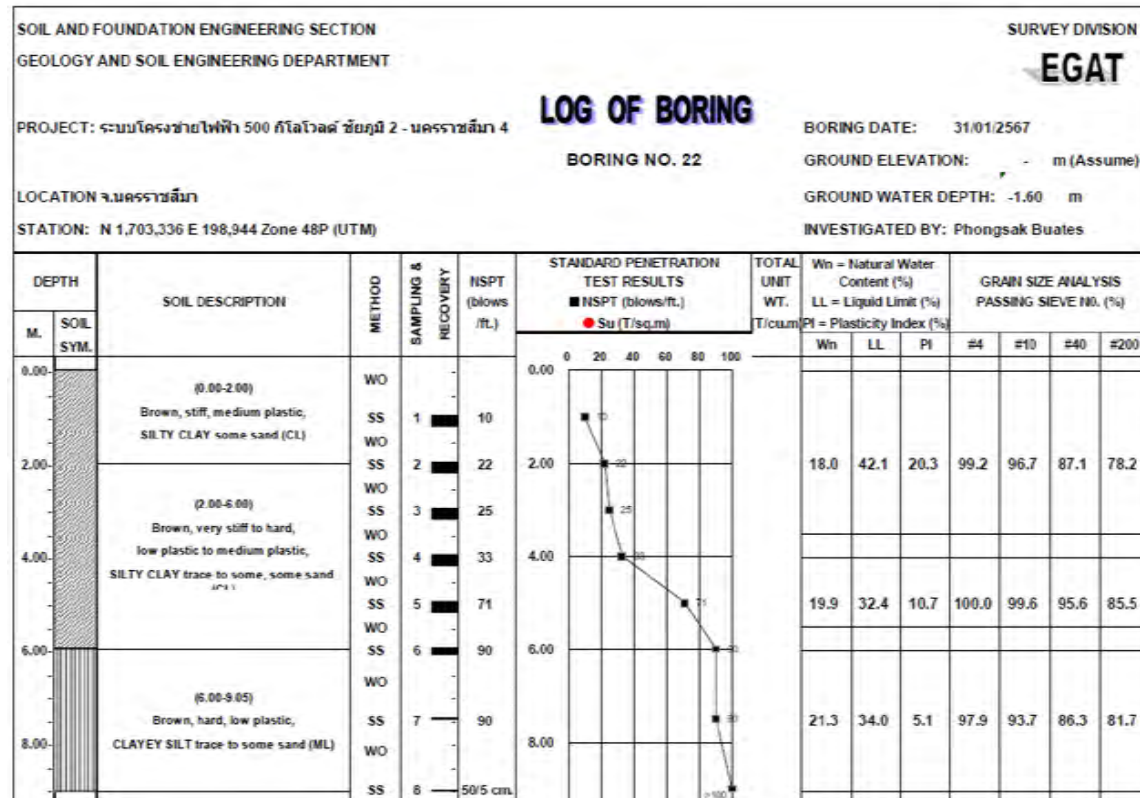
INVESTIGATED BY: Wattana Mungkun

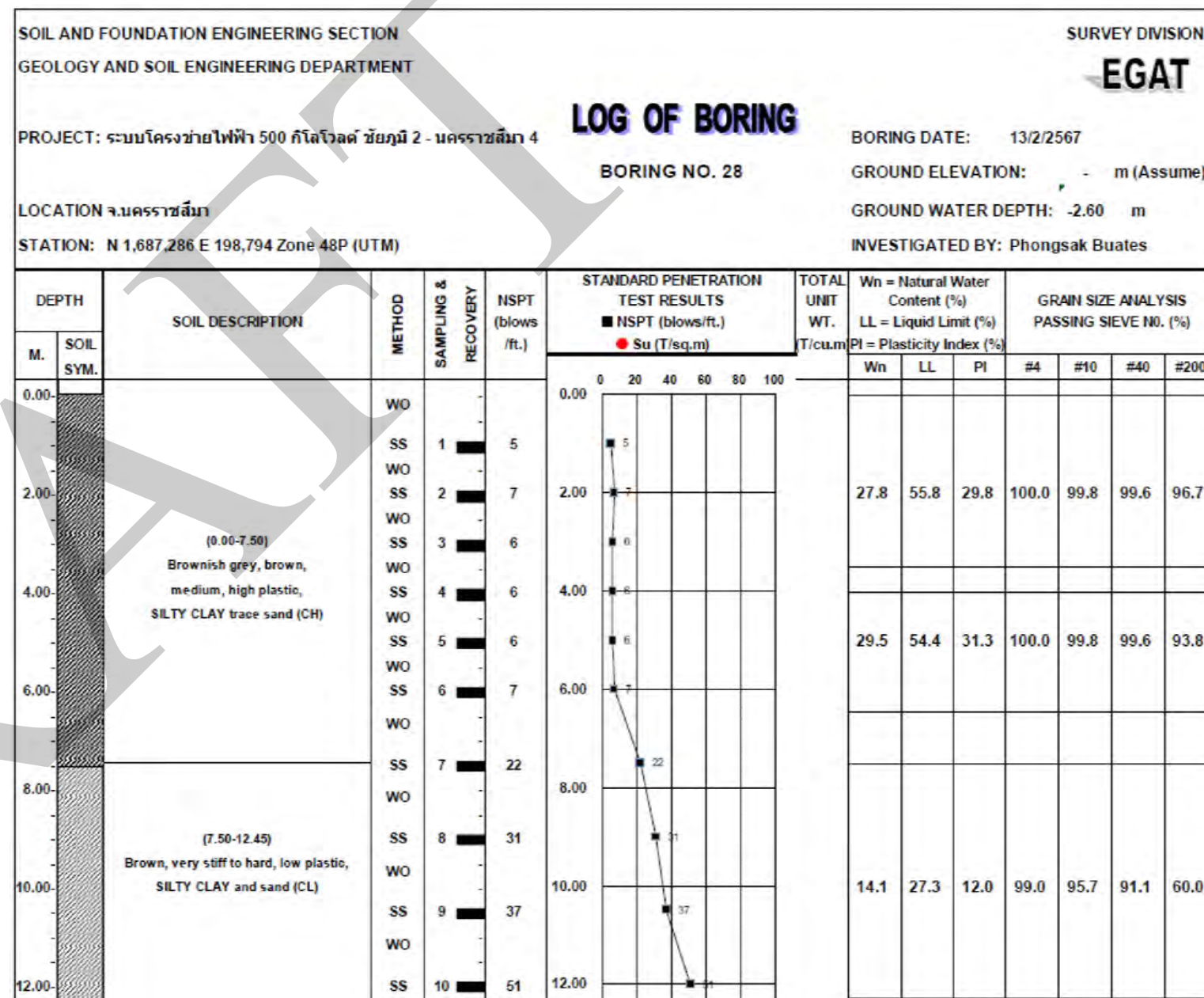
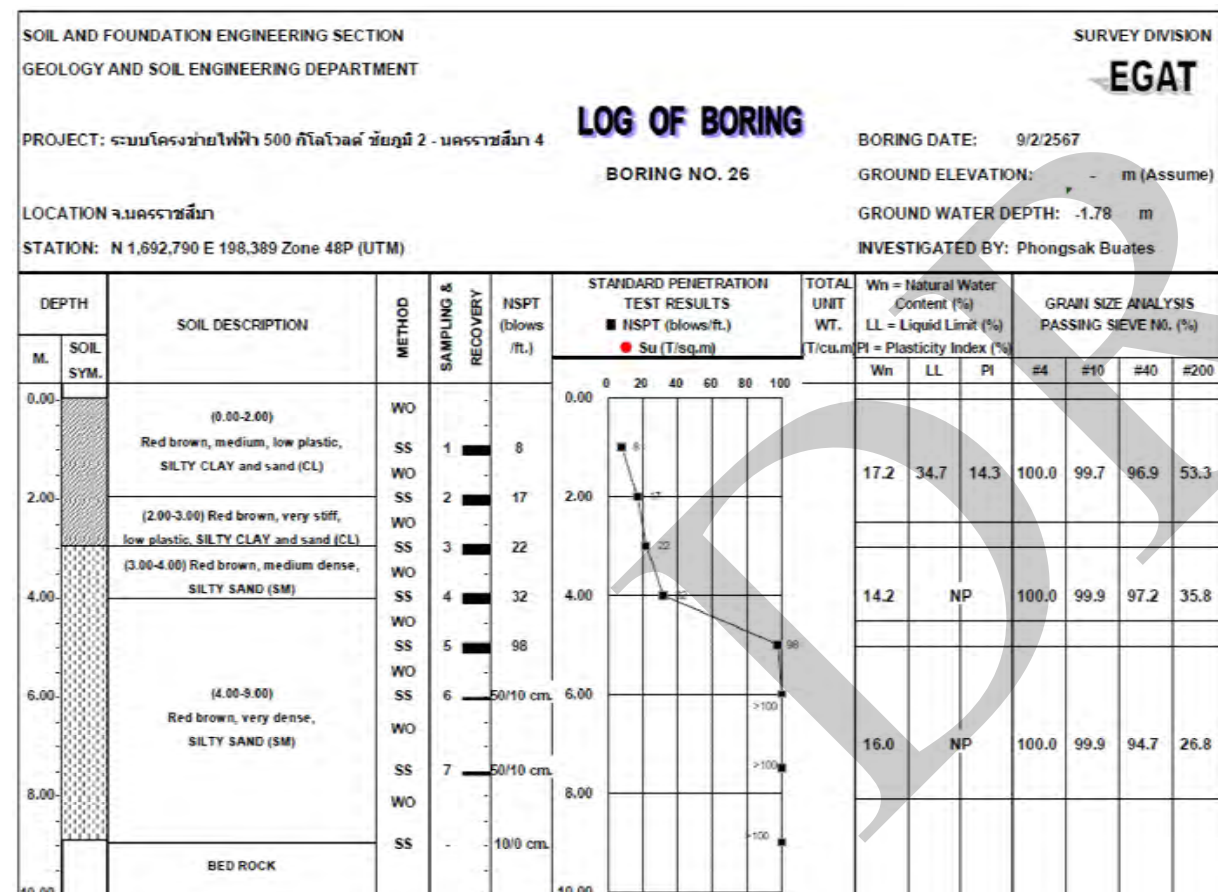
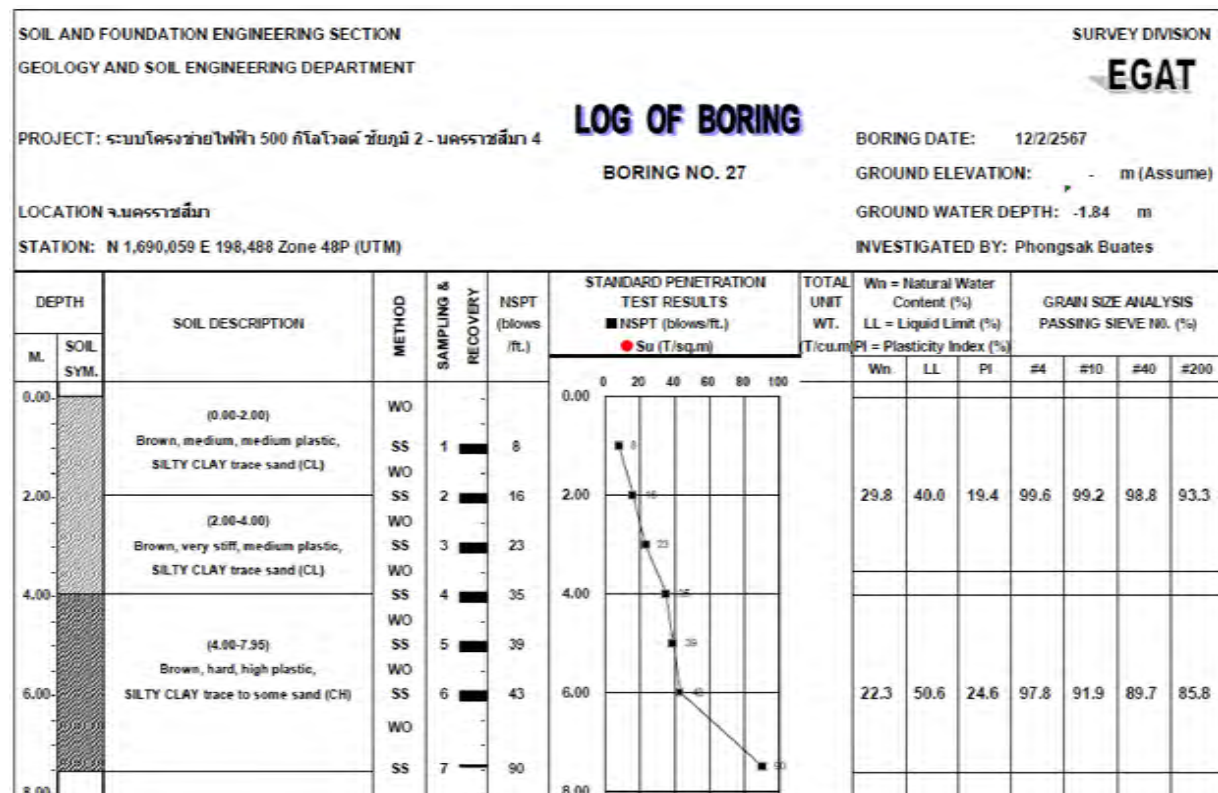


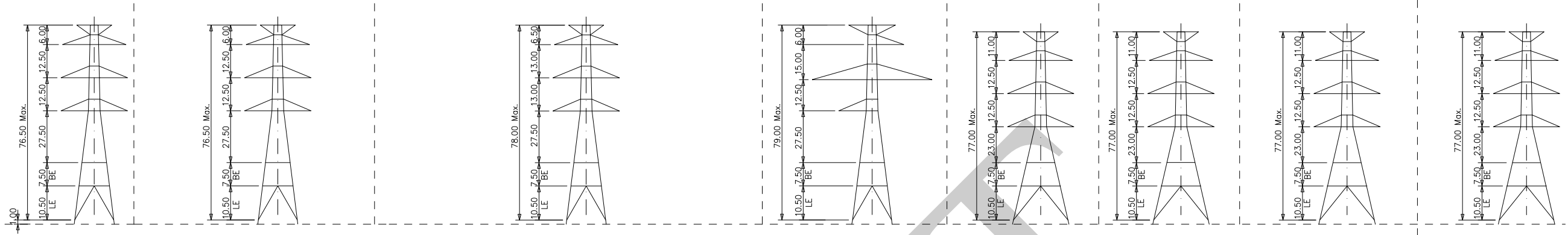






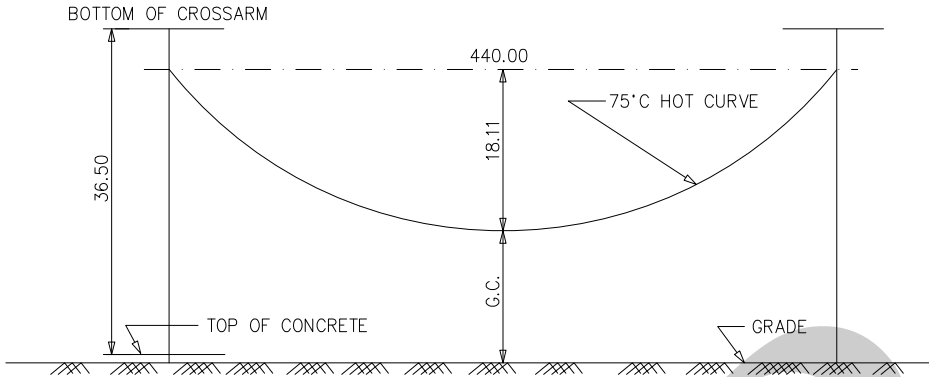






| TOWER TYPE | DQV3 SUSPENSION | DQV9(3) SUSPENSION | DQV9(9) SUSPENSION | DQV15(3) SUSPENSION | DQV15(9) SUSPENSION | DQV15(15) SUSPENSION | DQTR SUSPENSION | DQT20 TENSION | DQT40 TENSION | DQT60 TENSION | DQT90 TENSION |
|----------------|-------------------|--------------------|--------------------|--------------------------------------|--------------------------------------|----------------------|-------------------|-------------------|-------------------|-------------------------------|-------------------------------|
| LINE ANGLE | 0°-3° | 0°-3° | 3°-9° | 0°-3° | 3°-9° | 9°-15° | 0°-3° | 0°-20° | 0°-40° | 0°-60° ,0°+COMPLETE,45°+SLACK | 0°-90° ,0°+COMPLETE,90°+SLACK |
| BRACKETS | - | 3°-9° | NONE AND 9° | 3°-3° | NONE AND 9° | NONE AND 15° | - | - | - | - | - |
| ARMS | SYMMETRICAL | 3° | 9° | 3° | 9° | 15° | SYMMETRICAL | SYMMETRICAL | SYMMETRICAL | SYMMETRICAL | SYMMETRICAL |
| LEG EXTENSION | 1.50 m TO 10.50 m | 1.50 m TO 10.50 m | | 1.50 m TO 10.50 m | 1.50 m TO 10.50 m | | 1.50 m TO 10.50 m | 1.50 m TO 10.50 m | 1.50 m TO 10.50 m | 1.50 m TO 10.50 m | 1.50 m TO 10.50 m |
| BODY EXTENSION | 7.50 m | 7.50 m | | 7.50 m, 15.0 m | 7.50 m, 15.0 m | | 7.50 m | 7.50 m | 7.50 m | 7.50 m | 7.50 m |
| WIND SPAN | 460 m AT 0° | 650 m AT 0° | | 850 m AT 0°,610 m AT 9°,460 m AT 15° | 850 m AT 0°,610 m AT 9°,460 m AT 15° | | 460 m AT 0° | 460 m AT 20° | 460 m AT 40° | 460 m AT 60° | 460 m AT 90° |
| WEIGHT SPAN | 690 m | 1300 m | | 1700 m | 1700 m | | 690 m | 690 m | 690 m | 690 m | 690 m |

TOWER SPOTTING TEMPLATE DATA



1. VERTICAL CONDUCTOR CLEARANCES
(BASED ON FINAL CONDUCTOR SAG AT 75°C)
- GROUND CLEARANCES
- RAIL ROADS, NEAR SUBSTATION ENTRANCES

STATE/MAJOR HIGHWAYS

CULTIVATED AREAS, GROUND ACCESSIBLE BY VEHICLES

GROUND ACCESSIBLE TO PEDESTRIANS, UNCULTIVATED LAND

WATER FOR SAIL BOATS LESS THAN 0.8 SQUARE KM
- CROSSING CLEARANCES
- 500 kV LINES

230 kV LINES

115 kV AND COMMUNICATION LINES

DISTRIBUTION LINES 69 kV AND LESS

SHIELD WIRES OF OTHER LINES

GAS PIPE LINES

BUILDINGS
2. HORIZONTAL CLEARANCES TO OTHER FEATURES
(BASED ON MIN.DISTANCE TO TOWER CENTER LINE)
- STATE/MAJOR HIGHWAYS

RAIL ROADS

COUNTRY ROADS

FARM LANES, DIRT ROADS, CART TRACKS

CANALS

BUILDINGS

TRANSMISSION LINES 230 kV

TRANSMISSION & DISTRIBUTION LINES 115 kV AND LESS

GAS PIPE LINES

METER

NOT PERMITTED

75.00
65.00
55.00
25.00
20.00
35.00
50.00
40.00
43.00

CONDUCTOR AND SHIELD WIRE SAG-TENSION DATA

CONDUCTOR : 1272 MCM ACSR/GA, 42/7 STRAND AND 1272 MCM ACSR/AW, 42/7 STRAND
SHIELD WIRE : 3/8 INCH, 7 STRAND, EHS GALV. ,7 NO.8 ALUMINUM CLAD STEEL AND OPGW
75°C HOT CURVE TEMPLATE : 18.11 M FINAL SAG AT 440 M RULING SPAN
5°C COLD CURVE TEMPLATE : 12.81 M INITIAL SAG AT 440 M RULING SPAN

TOWER HEIGHT

| SUSPENSION TOWERS | | | | | |
|--|------------------|--|------------------|-----------------------|-------|
| TOWER BODY HEIGHT TOP OF CONCRETE TO BOTTOM CROSSARM | | SPOTTING HEIGHT (GROUND TO SUSPENSION CLAMP) | | | |
| | | DQV(3) | DQV(9) | DQV(15) | DQTR |
| HEIGHT | LEG EXT. | 0°-3° | 0°-3° & 3°-9° | 0°-3° 3°-9°&9°-15° | 0°-3° |
| 29.0 | 1.5 | 24.5 | 24.5 | 24.5 | 24.5 |
| 30.5 | 3.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 32.0 | 4.5 | 27.5 | 27.5 | 27.5 | 27.5 |
| 33.5 | 6.0 | 29.0 | 29.0 | 29.0 | 29.0 |
| 35.0 | 7.5 | 30.5 | 30.5 | 30.5 | 30.5 |
| 36.5 | 9.0 | 32.0 | 32.0 | 32.0 | 32.0 |
| 38.0 | 10.5or 3.0+BE | 33.5 | 33.5 (41.0)* | 33.5 | 33.5 |
| 39.5 | 4.5+BE | 35.0 | 35.0 (42.5)* | 35.0 | 35.0 |
| 41.0 | 6.0+BE | 36.5 | 36.5 (44.0)* | 36.5 | 36.5 |
| 42.5 | 7.5+BE | 38.0 | 38.0 (45.5)* | 38.0 | 38.0 |
| 44.0 | 9.0+BE | 39.5 | 39.5 (47.0)* | 39.5 | 39.5 |
| 45.5 | 10.5+BE | 41.0 | 41.0 (48.5)* | 41.0 | 41.0 |

* IF THE BODY EXTENSION OF 15.0 M IS USED

| TENSION TOWERS | | | | | |
|--|------------------|---|--------|------------------------------|------------------------------|
| TOWER BODY HEIGHT TOP OF CONCRETE TO BOTTOM CROSSARM | | SPOTTING HEIGHT (GROUND TO CROSSARM) | | | |
| | | DQT-20 | DQT-40 | DQT-60 | DQT-90 |
| HEIGHT | LEG EXT. | 0°-20° | 0°-40° | 0°-60° 0°-45° TERMINAL | 0°-90° 0°-90° TERMINAL |
| 24.5 | 1.5 | 25.5 | - | - | - |
| 26.0 | 3.0 | 27.0 | 27.0 | 27.0 | 27.0 |
| 27.5 | 4.5 | 28.5 | 28.5 | 28.5 | 28.5 |
| 29.0 | 6.0 | 30.0 | 30.0 | 30.0 | 30.0 |
| 30.5 | 7.5 | 31.5 | 31.5 | 31.5 | 31.5 |
| 32.0 | 9.0 | 33.0 | 33.0 | 33.0 | 33.0 |
| 33.5 | 10.5or 3.0+BE | 34.5 | 34.5 | 34.5 | 34.5 |
| 35.0 | 4.5+BE | 36.0 | 36.0 | 36.0 | 36.0 |
| 36.5 | 6.0+BE | 37.5 | 37.5 | 37.5 | 37.5 |
| 38.0 | 7.5+BE | 39.0 | 39.0 | 39.0 | 39.0 |
| 39.5 | 9.0+BE | 40.5 | 40.5 | 40.5 | 40.5 |
| 41.0 | 10.5+BE | 42.0 | 42.0 | 42.0 | 42.0 |

NOTE

ALL DIMENSIONS ARE IN METERS.

| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| - | - | - | - | - | - | - | - | - | - | - |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|--|--|--|---|--|------------------------|--|----------------------|--|
| DRAWN KITIPAT P. | | RECOMMENDED AND VALIDATED TITIPONG | | DRAWING NAME 500 kV TRANSMISSION LINE | | | | | |
| DESIGNED PISAGORN T. | | CONCURRED PISAGORN T. | | DESCRIPTION OF DETAIL DRAWING RULING SPAN SUMMARY AND TOWER HEIGHT DESCRIPTION | | | | | |
| VERIFIED Akanay D. | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. - | | REPLACING DWG.NO. - | | DWG.NO. E03-049.1 | |
| APPROVED Sutheerat Thairat | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | DATE 24 Apr 2025 | | REV. - | | REV. - | |

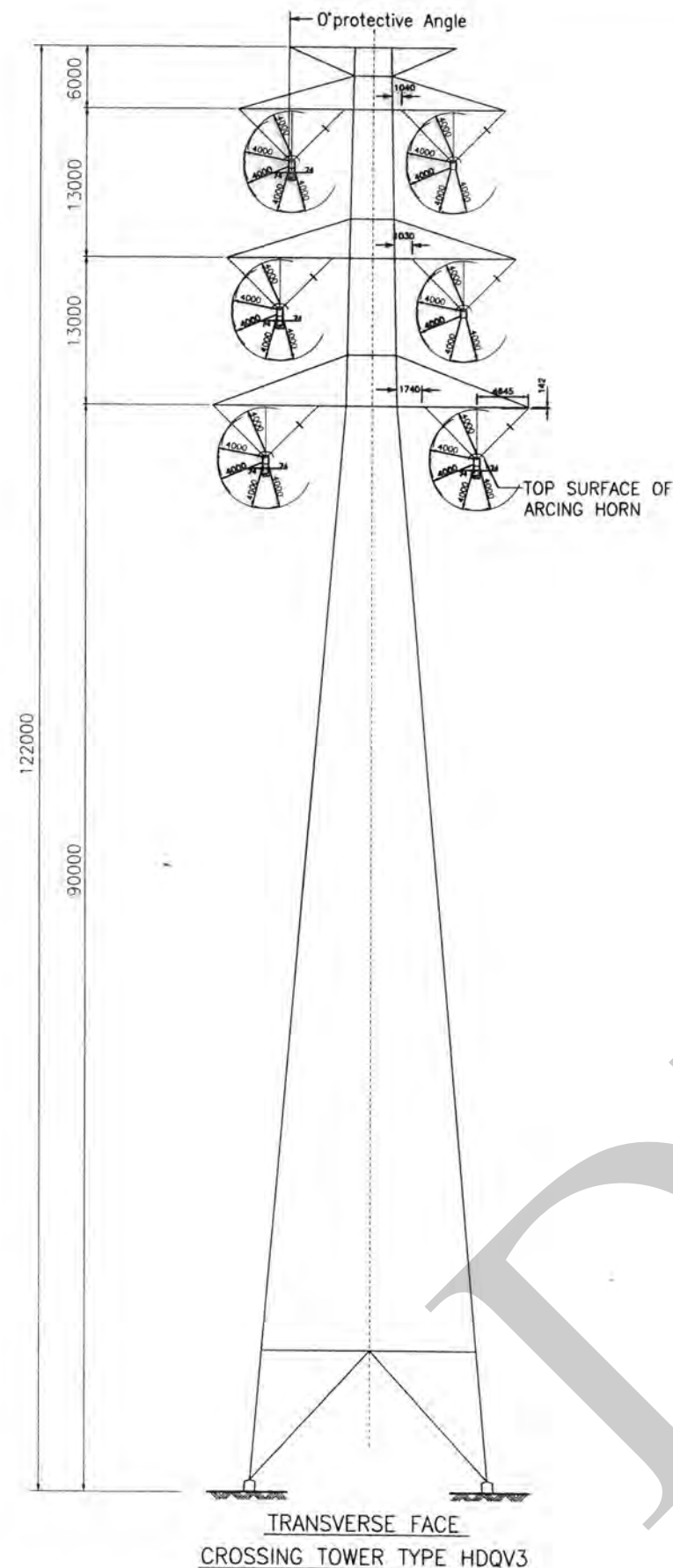
| DESCRIPTION | | CONDUCTOR | | OVERHEAD GROUND WIRE | | OPGW |
|----------------------------------|--------------------|----------------------|--|----------------------|--|----------|
| CODE NAME | | - | | - | | OPGW |
| MATERIAL | | ACSR/GA | | GSW(EHS) | | - |
| NOMINAL SIZE | | 1272 MCM | | 3/8" | | - |
| TOTAL AREA | mm ² | 677.8 | | 51.07 | | 99 |
| STRANDING | | 42X4.42 AL/7X2.46 ST | | 7X3.048 ST | | - |
| DIAMETER | mm | 33.91 | | 9.144 | | 13.5 |
| WEIGHT | kg/m | 2.04 | | 0.406 | | 0.55 |
| ULTIMATE STRENGTH | kg | 14050 | | 6985 | | 6000 |
| FINAL MODULUS OF ELASTICITY | kg/mm ² | 6200 | | 19300 | | 11000 |
| CCOEFFICIENT OF LINEAR EXPANSION | /° c | 0.0000213 | | 0.000115 | | 0.000015 |

SAG AND TENSION
RULING SPAN 440 m
FULL TENSION

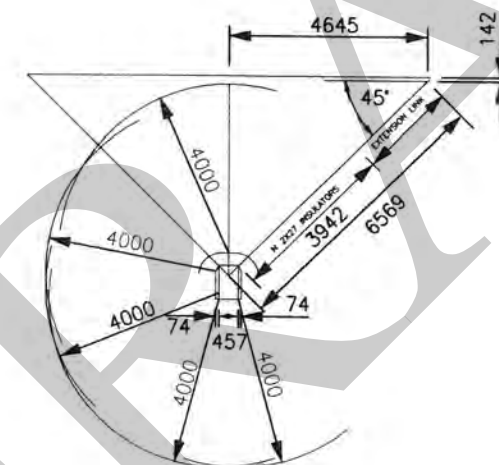
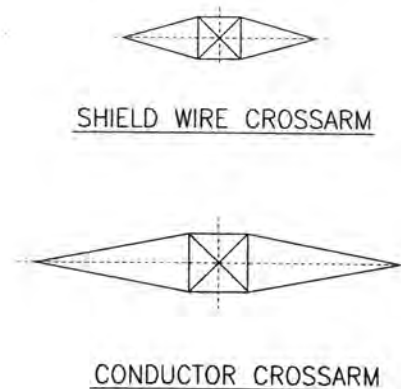
| Temperature (°C) | Wind Load (kg/m²) | CONDUCTOR | | | | | | Temperature (°C) | Wind Load (kg/m²) | OVERHEAD GROUND WIRE | | | | | | OPGW | | | | | |
|-------------------------|--------------------------|------------|-----------------|-------|------------|-----------------|------|-------------------------|--------------------------|----------------------|-----------------|------|------------|-----------------|------|------------|-----------------|------|------------|-----------------|------|
| | | Final | | | Initial | | | | | Final | | | Initial | | | Final | | | Initial | | |
| | | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS | | | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS |
| 27 | 120.0 | 17.60 | 6299 | 44.8 | 16.52 | 6705 | 47.7 | 27 | 140 | 15.73 | 2077 | 29.7 | 15.73 | 2077 | 29.7 | 15.94 | 3004 | 50.1 | 15.94 | 3004 | 50.1 |
| 27 | 115.0 | 17.52 | 6119 | 43.6 | 16.37 | 6541 | 46.6 | 27 | 138 | 15.68 | 2057 | 29.4 | 15.67 | 2057 | 29.5 | 15.88 | 2975 | 49.6 | 15.87 | 2977 | 49.6 |
| 27 | 110.0 | 17.43 | 5939 | 42.3 | 16.22 | 6376 | 45.4 | 27 | 130 | 15.46 | 1975 | 28.3 | 15.45 | 1977 | 28.3 | 15.67 | 2855 | 47.6 | 15.61 | 2865 | 47.7 |
| 27 | 85.5 | 17.02 | 5070 | 36.1 | 15.50 | 5561 | 39.6 | 27 | 103 | 14.71 | 1695 | 24.3 | 14.65 | 1702 | 24.4 | 14.89 | 2442 | 40.7 | 14.69 | 2474 | 41.2 |
| 27 | 80.0 | 16.93 | 4880 | 34.7 | 15.35 | 5378 | 38.3 | 27 | 95 | 14.47 | 1610 | 23.1 | 14.40 | 1618 | 23.2 | 14.65 | 2316 | 38.6 | 14.40 | 2355 | 39.2 |
| 27 | 75.0 | 16.85 | 4709 | 33.5 | 15.21 | 5214 | 37.1 | 27 | 90 | 14.32 | 1557 | 22.3 | 14.24 | 1566 | 22.4 | 14.49 | 2237 | 37.3 | 14.22 | 2279 | 38.0 |
| 27 | 70.0 | 16.77 | 4542 | 32.3 | 15.07 | 5051 | 36.0 | 27 | 85 | 14.17 | 1504 | 21.5 | 14.08 | 1513 | 21.7 | 14.33 | 2158 | 36.0 | 14.03 | 2204 | 36.7 |
| 27 | 57.2 | 16.57 | 4134 | 29.4 | 14.72 | 4648 | 33.1 | 27 | 68.9 | 13.67 | 1332 | 19.1 | 13.55 | 1344 | 19.2 | 13.81 | 1901 | 31.7 | 13.41 | 1958 | 32.6 |
| 27 | 25.0 | 16.17 | 3323 | 23.7 | 14.03 | 3825 | 27.2 | 27 | 30 | 12.49 | 952 | 13.6 | 12.28 | 969 | 13.9 | 12.55 | 1322 | 22.0 | 11.88 | 1396 | 23.3 |
| 27 | 20.0 | 16.13 | 3242 | 23.1 | 13.96 | 3741 | 26.6 | 27 | 25 | 12.37 | 914 | 13.1 | 12.15 | 931 | 13.3 | 12.41 | 1262 | 21.0 | 11.71 | 1338 | 22.3 |
| 27 | 15.0 | 16.10 | 3177 | 22.6 | 13.91 | 3674 | 26.1 | 27 | 20 | 12.26 | 882 | 12.6 | 12.03 | 899 | 12.9 | 12.29 | 1210 | 20.2 | 11.56 | 1287 | 21.4 |
| 0 | 0 | 14.81 | 3348 | 23.8 | 12.57 | 3939 | 28.0 | 0 | 0 | 11.27 | 874 | 12.5 | 11.02 | 894 | 12.8 | 11.06 | 1207 | 20.1 | 10.28 | 1298 | 21.6 |
| 5 | 0 | 15.05 | 3296 | 23.5 | 12.81 | 3867 | 27.5 | 5 | 0 | 11.42 | 863 | 12.4 | 11.17 | 882 | 12.6 | 11.24 | 1187 | 19.8 | 10.46 | 1275 | 21.3 |
| 10 | 0 | 15.28 | 3246 | 23.1 | 13.04 | 3798 | 27.0 | 10 | 0 | 11.56 | 852 | 12.2 | 11.31 | 871 | 12.5 | 11.43 | 1168 | 19.5 | 10.64 | 1254 | 20.9 |
| 15 | 0 | 15.51 | 3198 | 22.8 | 13.28 | 3732 | 26.6 | 15 | 0 | 11.71 | 842 | 12.0 | 11.45 | 860 | 12.3 | 11.61 | 1149 | 19.2 | 10.82 | 1233 | 20.5 |
| 20 | 0 | 15.74 | 3152 | 22.4 | 13.51 | 3668 | 26.1 | 20 | 0 | 11.85 | 831 | 11.9 | 11.59 | 850 | 12.2 | 11.8 | 1132 | 18.9 | 11.00 | 1213 | 20.2 |
| 25 | 0 | 15.97 | 3108 | 22.1 | 13.74 | 3607 | 25.7 | 25 | 0 | 11.99 | 822 | 11.8 | 11.73 | 840 | 12.0 | 11.98 | 1115 | 18.6 | 11.18 | 1194 | 19.9 |
| 27 | 0 | 16.06 | 3091 | 22.0* | 13.83 | 3584 | 25.5 | 27 | 0 | 12.05* | 818 | 11.7 | 11.79 | 836 | 12.0 | 12.05* | 1108 | 18.5 | 11.25 | 1186 | 19.8 |
| 30 | 0 | 16.19 | 3066 | 21.8 | 13.97 | 3549 | 25.3 | 30 | 0 | 12.13 | 812 | 11.6 | 11.87 | 830 | 11.9 | 12.16 | 1098 | 18.3 | 11.36 | 1175 | 19.6 |
| 35 | 0 | 16.41 | 3025 | 21.5 | 14.20 | 3492 | 24.9 | 35 | 0 | 12.28 | 803 | 11.5 | 12.01 | 820 | 11.7 | 12.34 | 1082 | 18.0 | 11.53 | 1157 | 19.3 |
| 40 | 0 | 16.63 | 2985 | 21.2 | 14.42 | 3438 | 24.5 | 40 | 0 | 12.42 | 794 | 11.4 | 12.15 | 811 | 11.6 | 12.52 | 1067 | 17.8 | 11.71 | 1140 | 19.0 |
| 50 | 0 | 17.06 | 2911 | 20.7 | 14.87 | 3335 | 23.7 | 50 | 0 | 12.69 | 777 | 11.1 | 12.43 | 793 | 11.4 | 12.87 | 1038 | 17.3 | 12.06 | 1107 | 18.4 |
| 75 | 0 | 18.11 | 2745 | 19.5 | 15.96 | 3109 | 22.1 | 75 | 0 | 13.38 | 737 | 10.6 | 13.11 | 752 | 10.8 | 13.73 | 973 | 16.2 | 12.92 | 1034 | 17.2 |
| 100 | 0 | 19.11 | 2603 | 18.5 | 17.01 | 2919 | 20.8 | 100 | 0 | 14.04 | 703 | 10.1 | 13.76 | 717 | 10.3 | 14.56 | 918 | 15.3 | 13.75 | 972 | 16.2 |

SAG AND TENSION
RULING SPAN 220 m
SLACK TENSION

| | | CONDUCTOR | | | | | | | | OVERHEAD GROUND WIRE | | | | | | OPGW | | | | | |
|-------------------------|---------------------------------------|------------|-----------------|------|------------|-----------------|------|-------------------------|---------------------------------------|----------------------|-----------------|------|------------|-----------------|------|------------|-----------------|------|------------|-----------------|------|
| Temperature (°C) | Wind Load (kg/m ²) | Final | | | Initial | | | Temperature (°C) | Wind Load (kg/m ²) | Final | | | Initial | | | Final | | | Initial | | |
| | | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS | | | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS | Sag (m) | Tension (kg) | %RTS |
| 4 | 23 | 9.39 | 1418 | 10.1 | 8.98 | 1482 | 10.5 | 4 | 23 | 7.11 | 390 | 5.6 | 7.02 | 396 | 5.7 | 7.04 | 545 | 9.1 | 6.86 | 559 | 9.3 |
| 27 | 130 | 10.16 | 2916 | 20.8 | 9.88 | 2999 | 21.3 | 27 | 130 | 8.16 | 937 | 13.4 | 8.16 | 937 | 13.4 | 8.21 | 1363 | 22.7 | 8.21 | 1363 | 22.7 |
| 27 | 120 | 10.13 | 2742 | 19.5 | 9.83 | 2824 | 20.1 | 27 | 120 | 8.09 | 880 | 12.6 | 8.08 | 881 | 12.6 | 8.13 | 1279 | 21.3 | 8.12 | 1281 | 21.4 |
| 27 | 115 | 10.11 | 2656 | 18.9 | 9.81 | 2737 | 19.5 | 27 | 115 | 8.05 | 852 | 12.2 | 8.04 | 853 | 12.2 | 8.10 | 1237 | 20.6 | 8.08 | 1240 | 20.7 |
| 27 | 100 | 10.06 | 2400* | 17.1 | 9.73 | 2479 | 17.6 | 27 | 100 | 7.94 | 766 | 11.0 | 7.92 | 768 | 11.0 | 7.98 | 1110 | 18.5 | 7.94 | 1116 | 18.6 |
| 27 | 85.8 | 10.01 | 2165 | 15.4 | 9.67 | 2241 | 15.9 | 27 | 85.8 | 7.84 | 685 | 9.8 | 7.81 | 688 | 9.9 | 7.88 | 990 | 16.5 | 7.81 | 998 | 16.6 |
| 27 | 80 | 9.99 | 2072 | 14.7 | 9.64 | 2146 | 15.3 | 27 | 80 | 7.80 | 653 | 9.3 | 7.76 | 656 | 9.4 | 7.83 | 941 | 15.7 | 7.76 | 950 | 15.8 |
| 27 | 75 | 9.98 | 1993 | 14.2 | 9.62 | 2066 | 14.7 | 27 | 75 | 7.76 | 625 | 8.9 | 7.72 | 628 | 9.0 | 7.79 | 899 | 15.0 | 7.71 | 908 | 15.1 |
| 27 | 70 | 9.96 | 1917 | 13.6 | 9.6 | 1987 | 14.1 | 27 | 70 | 7.72 | 597 | 8.5 | 7.68 | 600 | 8.6 | 7.75 | 857 | 14.3 | 7.66 | 867 | 14.5 |
| 27 | 57.2 | 9.92 | 1730 | 12.3 | 9.55 | 1797 | 12.8 | 27 | 57.2 | 7.63 | 527 | 7.6 | 7.57 | 532 | 7.6 | 7.66 | 753 | 12.5 | 7.54 | 764 | 12.7 |
| 27 | 25 | 9.85 | 1368 | 9.7 | 9.45 | 1425 | 10.1 | 27 | 25 | 7.43 | 381 | 5.5 | 7.34 | 386 | 5.5 | 7.44 | 527 | 8.8 | 7.27 | 539 | 9.0 |
| 27 | 20 | 9.84 | 1332 | 9.5 | 9.44 | 1388 | 9.9 | 27 | 20 | 7.41 | 365 | 5.2 | 7.31 | 370 | 5.3 | 7.42 | 502 | 8.4 | 7.24 | 514 | 8.6 |
| 27 | 15 | 9.84 | 1304 | 9.3 | 9.43 | 1359 | 9.7 | 27 | 15 | 7.39 | 352 | 5.0 | 7.29 | 357 | 5.1 | 7.40 | 482 | 8.0 | 7.21 | 494 | 8.2 |
| 0 | 0 | 9.29 | 1339 | 9.5 | 8.87 | 1401 | 10.0 | 0 | 0 | 7.00 | 352 | 5.0 | 6.89 | 358 | 5.1 | 6.90 | 484 | 8.1 | 6.71 | 498 | 8.3 |
| 5 | 0 | 9.39 | 1324 | 9.4 | 8.97 | 1385 | 9.9 | 5 | 0 | 7.07 | 349 | 5.0 | 6.96 | 354 | 5.1 | 6.99 | 478 | 8.0 | 6.79 | 492 | 8.2 |
| 10 | 0 | 9.49 | 1310 | 9.3 | 9.08 | 1369 | 9.7 | 10 | 0 | 7.14 | 346 | 4.9 | 7.03 | 351 | 5.0 | 7.08 | 472 | 7.9 | 6.88 | 485 | 8.1 |
| 15 | 0 | 9.59 | 1297 | 9.2 | 9.18 | 1354 | 9.6 | 15 | 0 | 7.21 | 342 | 4.9 | 7.10 | 348 | 5.0 | 7.16 | 466 | 7.8 | 6.97 | 479 | 8.0 |
| 20 | 0 | 9.69 | 1284 | 9.1 | 9.28 | 1339 | 9.5 | 20 | 0 | 7.28 | 339 | 4.9 | 7.16 | 344 | 4.9 | 7.25 | 461 | 7.7 | 7.06 | 473 | 7.9 |
| 25 | 0 | 9.79 | 1271 | 9.0 | 9.38 | 1325 | 9.4 | 25 | 0 | 7.34 | 336 | 4.8 | 7.23 | 341 | 4.9 | 7.34 | 456 | 7.6 | 7.14 | 468 | 7.8 |
| 27 | 0 | 9.83 | 1266 | 9.0 | 9.42 | 1320 | 9.4 | 27 | 0 | 7.37* | 335 | 4.8 | 7.26 | 340 | 4.9 | 7.37* | 454 | 7.6 | 7.18 | 465 | 7.8 |
| 30 | 0 | 9.89 | 1258 | 9.0 | 9.48 | 1311 | 9.3 | 30 | 0 | 7.41 | 333 | 4.8 | 7.3 | 338 | 4.8 | 7.42 | 450 | 7.5 | 7.23 | 462 | 7.7 |
| 35 | 0 | 9.98 | 1246 | 8.9 | 9.58 | 1298 | 9.2 | 35 | 0 | 7.48 | 330 | 4.7 | 7.37 | 335 | 4.8 | 7.51 | 445 | 7.4 | 7.32 | 457 | 7.6 |
| 40 | 0 | 10.08 | 1235 | 8.8 | 9.68 | 1285 | 9.1 | 40 | 0 | 7.54 | 327 | 4.7 | 7.43 | 332 | 4.8 | 7.59 | 441 | 7.3 | 7.40 | 452 | 7.5 |
| 50 | 0 | 10.27 | 1212 | 8.6 | 9.87 | 1260 | 9.0 | 50 | 0 | 7.67 | 322 | 4.6 | 7.56 | 326 | 4.7 | 7.75 | 431 | 7.2 | 7.56 | 442 | 7.4 |
| 75 | 0 | 10.73 | 1161 | 8.3 | 10.34 | 1204 | 8.6 | 75 | 0 | 7.99 | 309 | 4.4 | 7.88 | 313 | 4.5 | 8.15 | 410 | 6.8 | 7.97 | 420 | 7.0 |
| 100 | 0 | 11.17 | 1116 | 7.9 | 10.8 | 1154 | 8.2 | 100 | 0 | 8.30 | 298 | 4.3 | 8.19 | 302 | 4.3 | 8.54 | 392 | 6.5 | 8.35 | 401 | 6.7 |



TRANSVERSE FACE
CROSSING TOWER TYPE HDQV3



ELECTRICAL CLEARANCE DIAGRAM

ELECTRICAL CLEARANCE DATA

1. NORMAL SPAN 440 m
WIND SPAN 500 m AT 0°, 460 m AT 3°
WEIGHT SPAN 1200 m
2. TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCE.
MINIMUM CLEARANCE 4000 mm
3. CROSSING CLEARANCE CONDITIONS
- 500 kV LINES 7.00 m
- COMMUNICATION LINES 5.25 m
4. SHIELD WIRE SHALL PROVIDE 0° PROTECTION ZONE ON OUTER AND TOP CONDUCTOR OF BUNDLE PHASE CONDUCTOR AT TOP ARM.

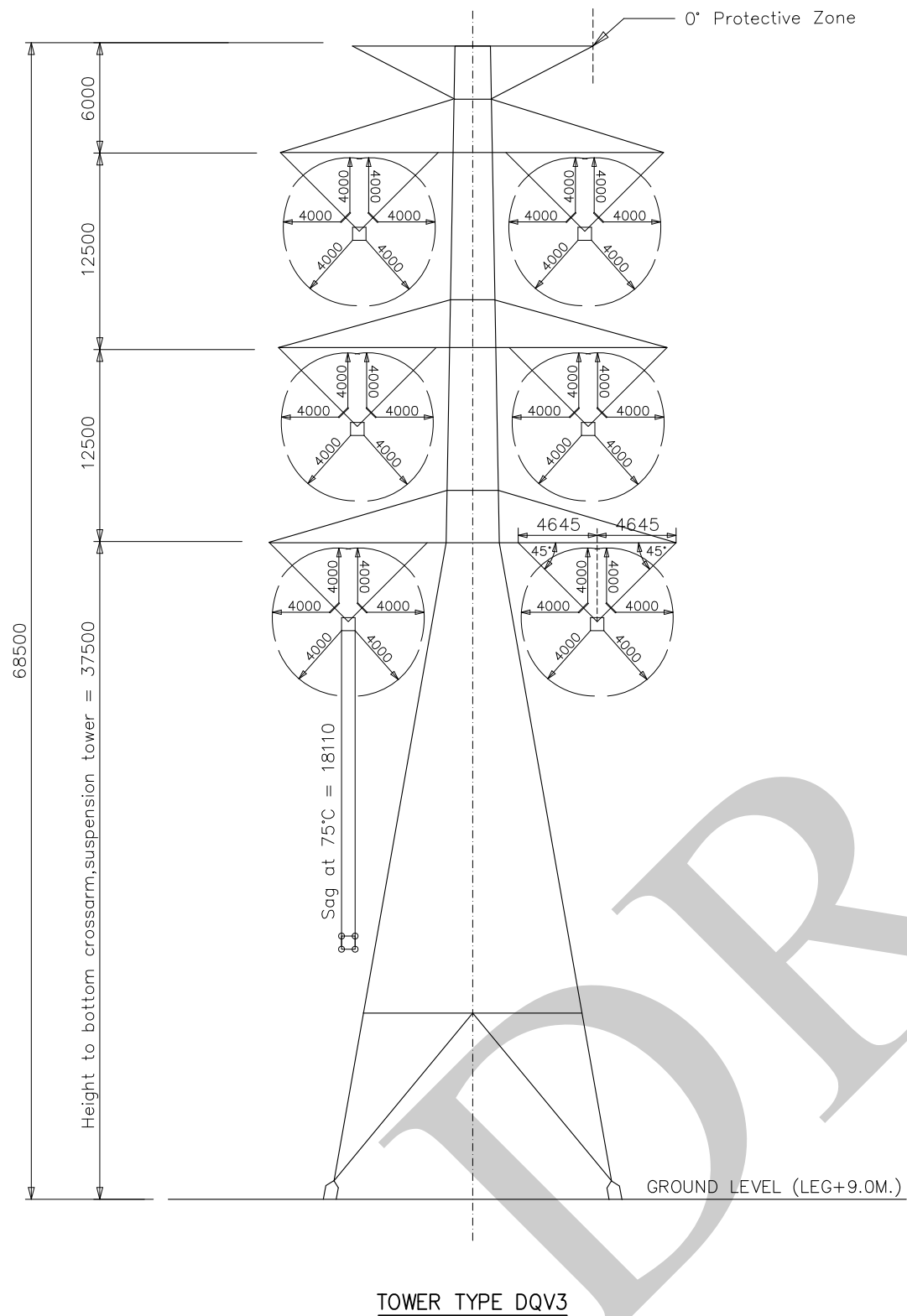
GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
2. CLEARANCE DIMENSION FROM CONDUCTOR TO TOWER ARE MINIMUM FROM SURFACE OF TOWER STEEL MEMBER (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
3. ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARE.
4. SEE DRAWING NO. E11-166, E11-024 FOR DETAIL OF INSULATOR AND HARDWARE ASSEMBLIES.
5. SEE DRAWING NO. E03-041.2, E03-041.3 FOR PARTICULAR OF CONDUCTOR AND SHIELD WIRE
6. MINIMUM DISTANCE BETWEEN 500 kV CROSSING TOWER TYPE HDQV3 AND CENTER LINE OF 500 kV EXISTING LINES SHALL BE 60 m.
7. SEE DRAWING NO. E31-018 FOR DETAILS OF TOWER GROUNDING.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------|---------|-----------------|--|--|--|--|--|--|--|--|--|----------|------------|-----------|-------------|-----------|-----------|------|--|--------------------|--|--|--|----------|---------|------|--|--|
| | | | | | | | | | | | DRAWN | | W. ARNON | | VALIDATED | | P. PATTAK | | 500 kV TRANSMISSION LINE | | | | | | | | | |
| | | | | | | | | | | | DESIGNED | | J. AMORNAT | | RECOMMENDED | | S. KANON | | 500 kV TOWER CROSSING 500 kV LINE | | | | | | | | | |
| | | | | | | | | | | | VERIFIED | | C. K. KONG | | CONCURRED | | S. KANON | | CONFIGURATION, ELECTRICAL AND GROUND CLEARANCE | | | | | | | | | |
| | | | | | | | | | | | APPROVED | | 2656 | | DATE | | 12/6/19 | | FOR TOWER TYPE HDQV3 | | | | | | | | | |
| | | | | | | | | | | | ASSISTANT GOVERNOR - TRANSMISSION SYSTEM DEVELOPMENT | | | | | | | | | | | | | | | | | |
| REV. NO. | JOB NO. | JOB DESCRIPTION | | | | | | | | | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | JOB NO. | REPLACING DWG. NO. | | | | DWG. NO. | E05-123 | REV. | | |

| | | | |
|------|---|---------|---------|
| REV. | - | DWG.NO. | E05-135 |
| - | - | - | - |



TOP PLANE

SHIELD WIRE CROSSARM

CONDUCTOR CROSSARM

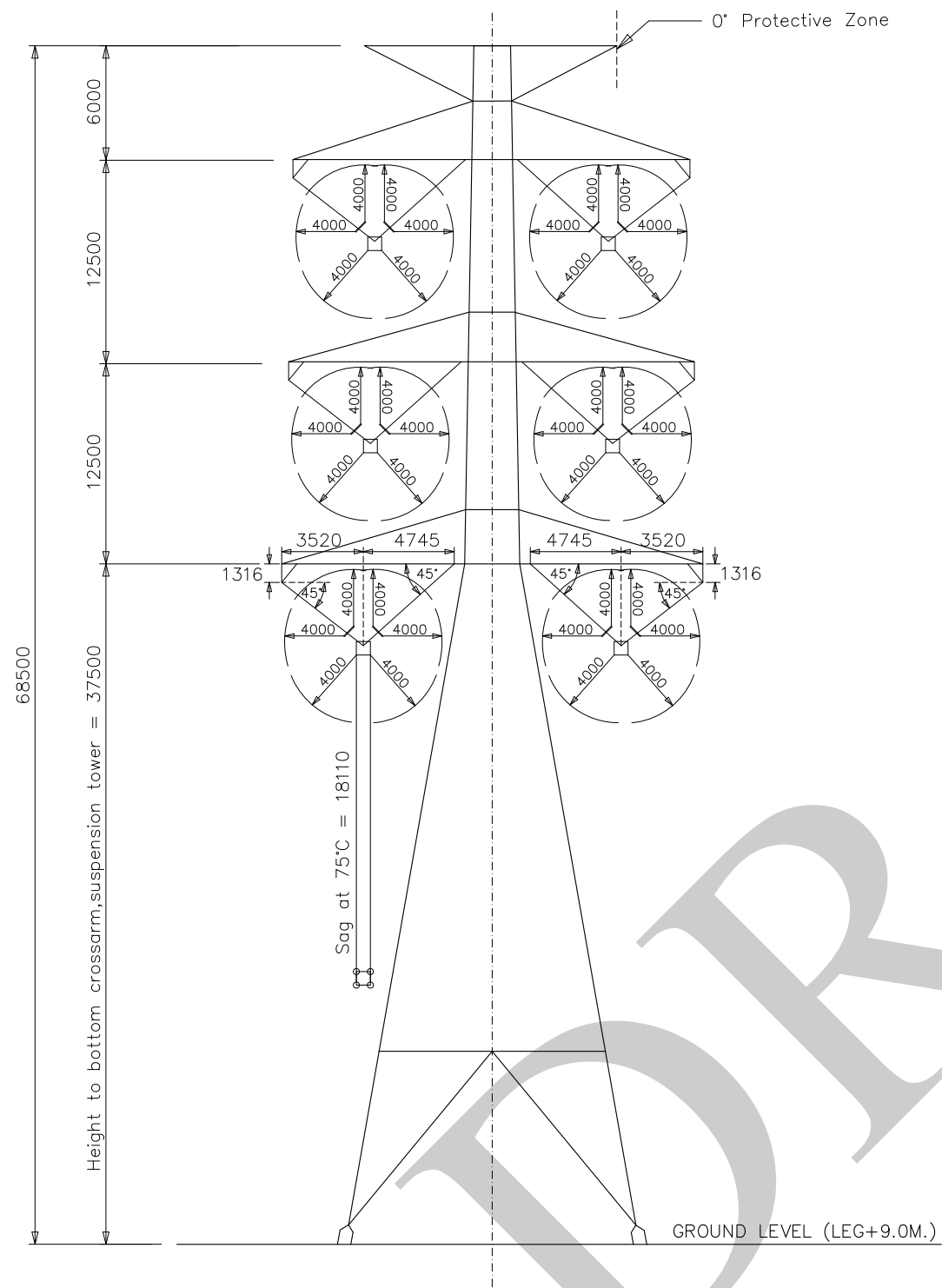
ELECTRICAL CLEARANCE DATA

- NORMAL SPAN 440 m
WIND SPAN 460 m at 0°
WEIGHT SPAN 690 m
- TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCES:
MINIMUM CLEARANCE 4000 mm
- OVERHEAD GROUND WIRE SHALL PROVIDE 0° PROTECTIVE ZONE (ON TOP CONDUCTOR OF V-SUSPENSION INSULATOR ASSEMBLY).

NOTES

- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
- ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARES.
- SEE DRAWING NO. E11-197 (ASSEMBLY 3D) AND E11-024 (SHIELD WIRE) FOR DETAILS OF INSULATOR AND HARDWARE ASSEMBLIES.

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | | |
|--|---------|-----------------|--|----------|----------|---|-------------|-----------|---------------------|------|------|
| DRAWN SARUTA S. | | | RECOMMENDED AND VALIDATED E. PONG | | | DRAWING NAME 500 kV TRANSMISSION LINE | | | | | |
| DESIGNED PISAGORN T. | | | CONCURRED CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | | | DESCRIPTION OF DETAIL DRAWING ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQV3 | | | | | |
| VERIFIED AKNEDY D. | | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | JOB NO. - | | | REPLACING DWG.NO. - | | |
| APPROVED | | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | DATE 24 Apr 2025 | | | DWG.NO. E05-135 | | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | REV. |
| - | - | - | - | - | - | - | - | - | - | - | - |



TOP PLANE

SHIELD WIRE CROSSARM

CONDUCTOR CROSSARM

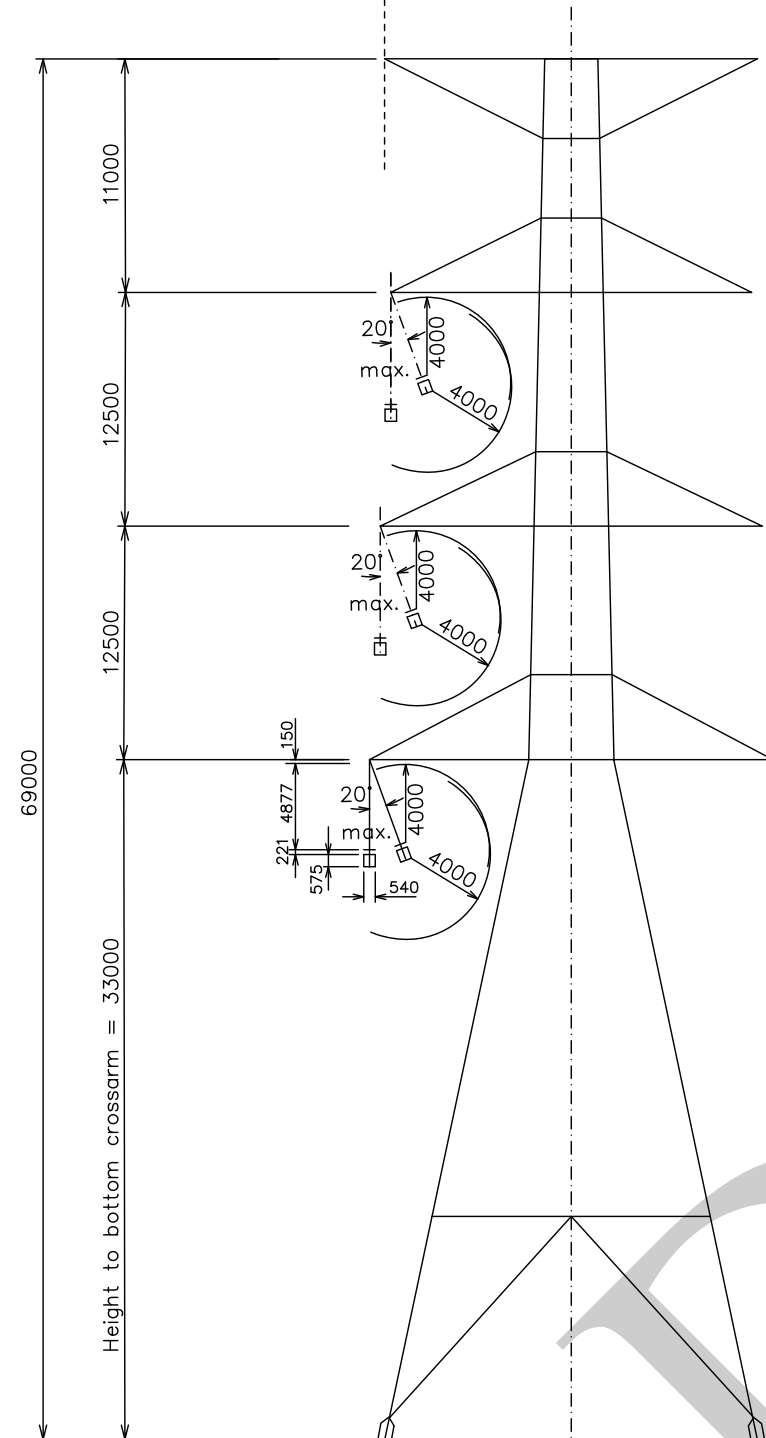
ELECTRICAL CLEARANCE DATA

- NORMAL SPAN 440 m
WIND SPAN 650 m at 0°
WEIGHT SPAN 1300 m
- TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCES:
MINIMUM CLEARANCE 4000 mm
- OVERHEAD GROUND WIRE SHALL PROVIDE 0° PROTECTIVE ZONE (ON TOP CONDUCTOR OF V-SUSPENSION INSULATOR ASSEMBLY).

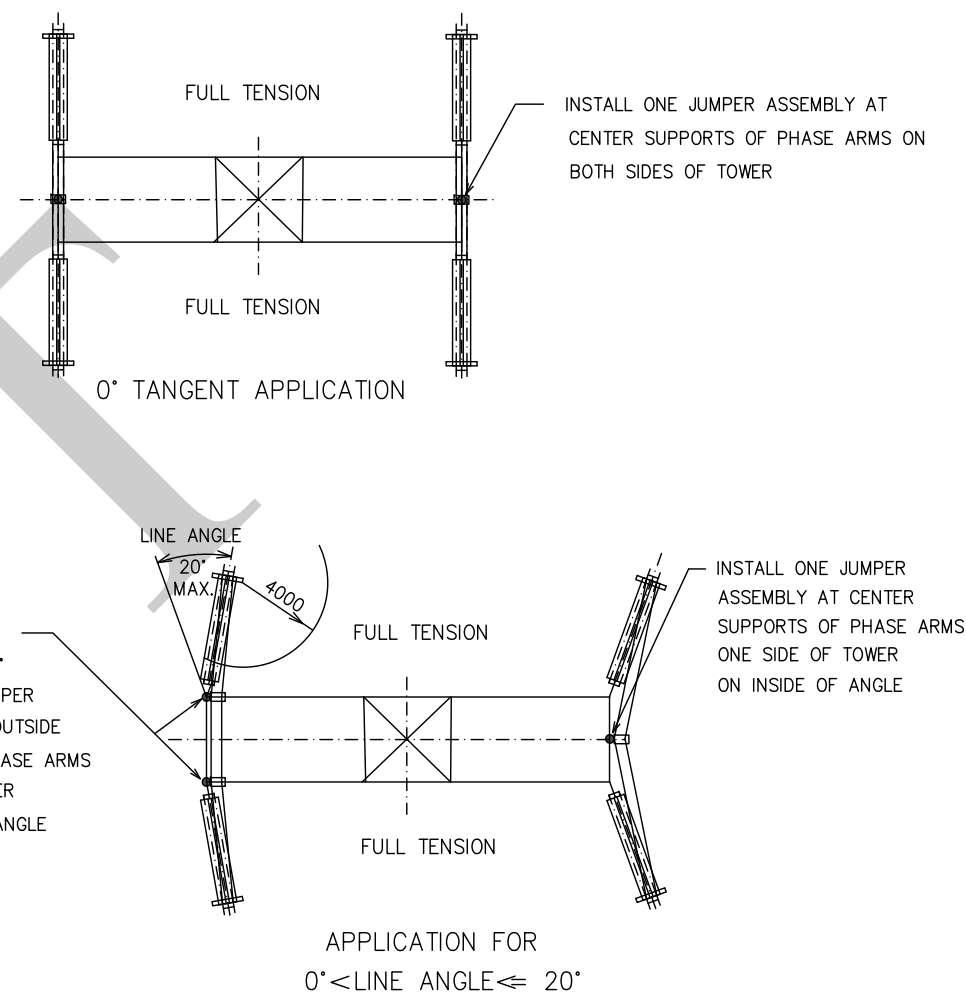
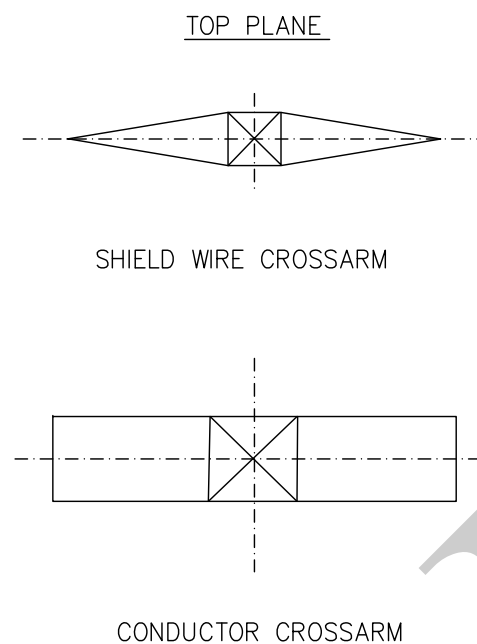
NOTES

- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
- ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARES.
- SEE DRAWING NO. E11-198 (ASSEMBLY 8D) AND E11-024 (SHIELD WIRE) FOR DETAILS OF INSULATOR AND HARDWARE ASSEMBLIES.

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | | |
|--|---------|-----------------|--|----------|----------|---|-------------|-----------|-------------------|------|---|
| DRAWN SARUTA S. | | | RECOMMENDED AND VALIDATED E. TIPONG | | | DRAWING NAME 500 kV TRANSMISSION LINE | | | | | |
| DESIGNED PISAGORN T. | | | CONCURRED CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | | | DESCRIPTION OF DETAIL DRAWING ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQV9 (3) | | | | | |
| VERIFIED Aknady D. | | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | JOB NO. | | | REPLACING DWG.NO. | | |
| APPROVED Saruta S. | | | DATE 24 Apr 2025 | | | DWG.NO. E05-136 | | | | | |
| DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | | | | | | | | | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | |
| - | - | - | - | - | - | - | - | - | - | - | - |



TOWER TYPE DQT20
0° < LINE ANGLE <= 20°



ELECTRICAL CLEARANCE DATA

- | | | |
|----|-------------|--------------|
| 1. | NORMAL SPAN | 440 m |
| | WIND SPAN | 460 m AT 20° |
| | WEIGHT SPAN | 690 m |
2. TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCES.

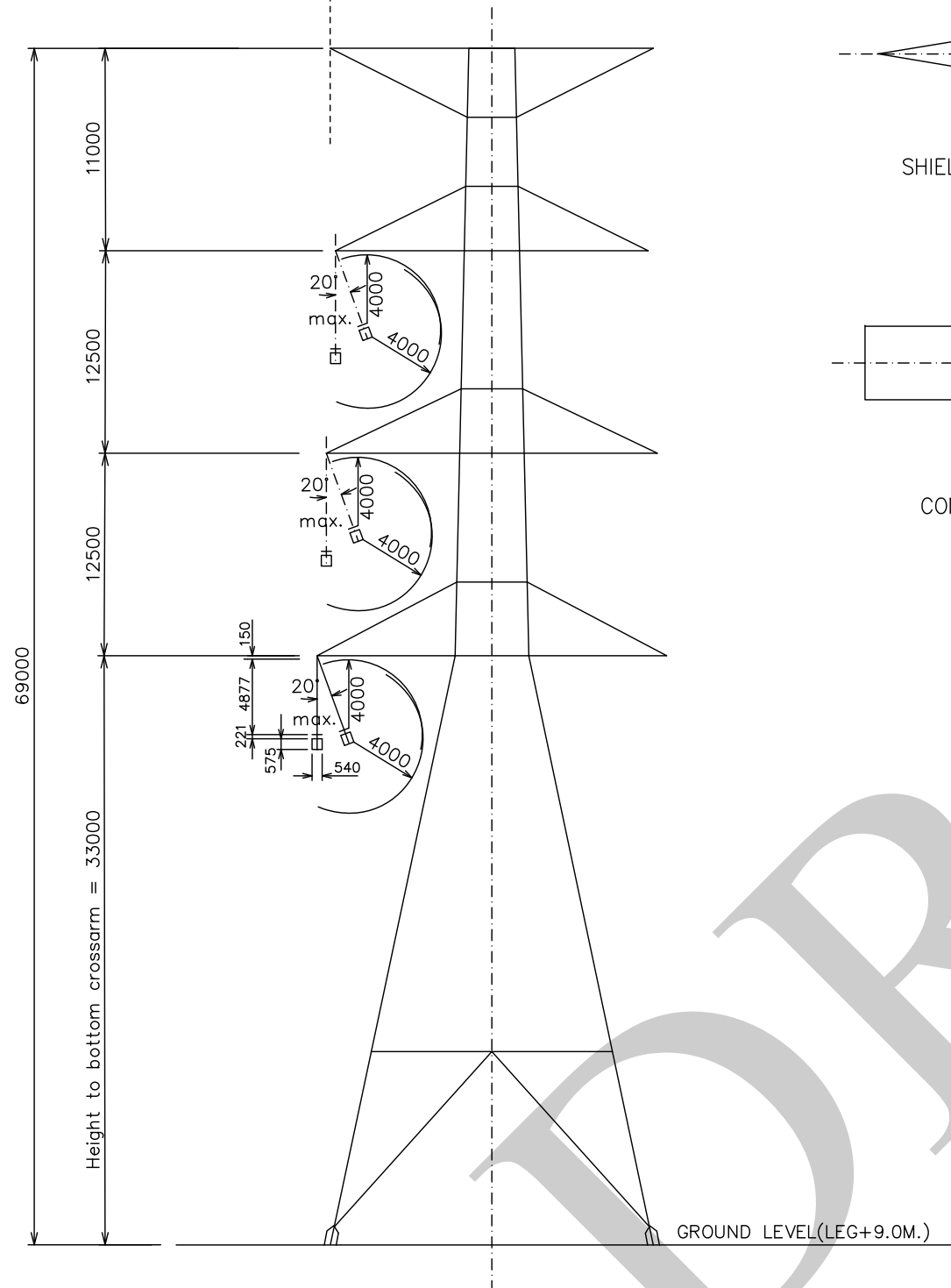
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|-------------------|---------|
| MINIMUM CLEARANCE | 4000 mm |
|-------------------|---------|
3. OVERHEAD GROUND WIRE SHALL PROVIDE 0° PROTECTIVE ZONE.

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
2. CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
3. ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARES.
4. SEE DRAWING NO. E11-203, E11-205, E11-024 FOR DETAIL OF INSULATOR AND HARDWARE ASSEMBLIES.

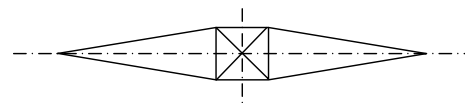
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| REV. | - | DWG.NO. | E05-142 |
| - | - | - | - |

0° Max. protective Zone

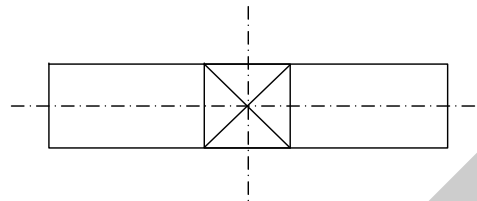


TOWER TYPE DQT40
0° < LINE ANGLE <= 40°

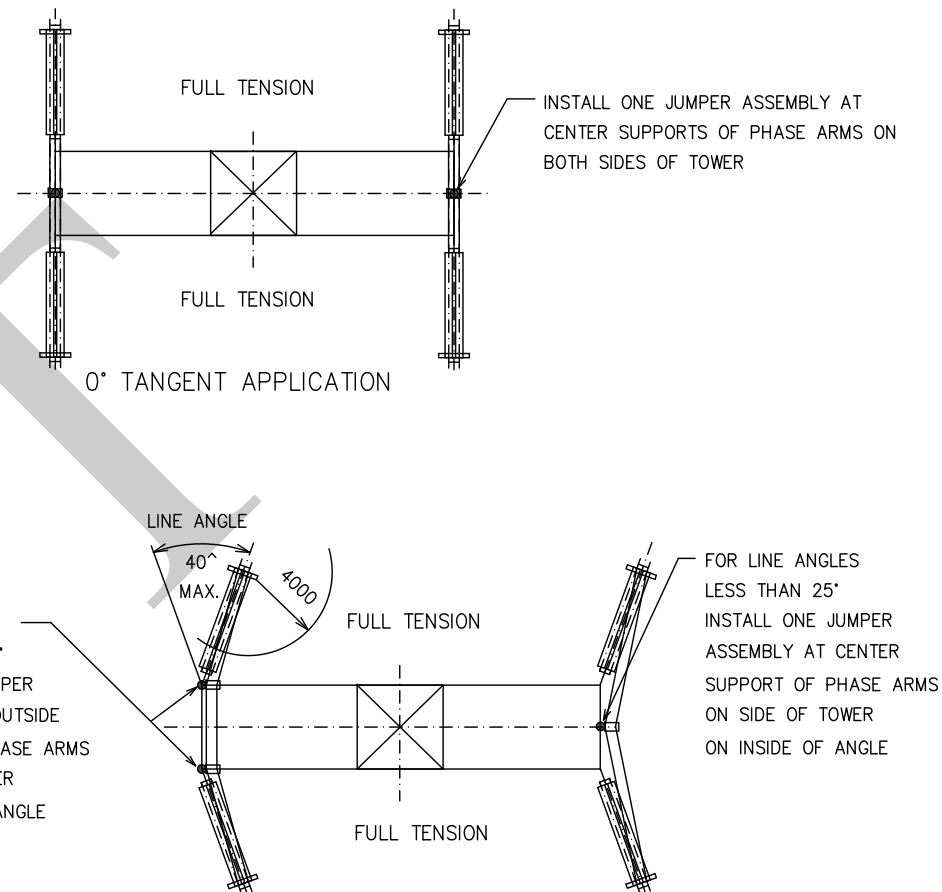
TOP PLANE



SHIELD WIRE CROSSARM



CONDUCTOR CROSSARM



APPLICATION FOR
0° < LINE ANGLE <= 40°

ELECTRICAL CLEARANCE DATA

- NORMAL SPAN 440 m
WIND SPAN 460 m AT 40°
WEIGHT SPAN 690 m
- TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCES.
MINIMUM CLEARANCE 4000 mm
- OVERHEAD GROUND WIRE SHALL PROVIDE 0° PROTECTIVE ZONE.

NOTES

- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
- ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARES.
- SEE DRAWING NO. E11-203, E11-205, E11-024 FOR DETAIL OF INSULATOR AND HARDWARE ASSEMBLIES.

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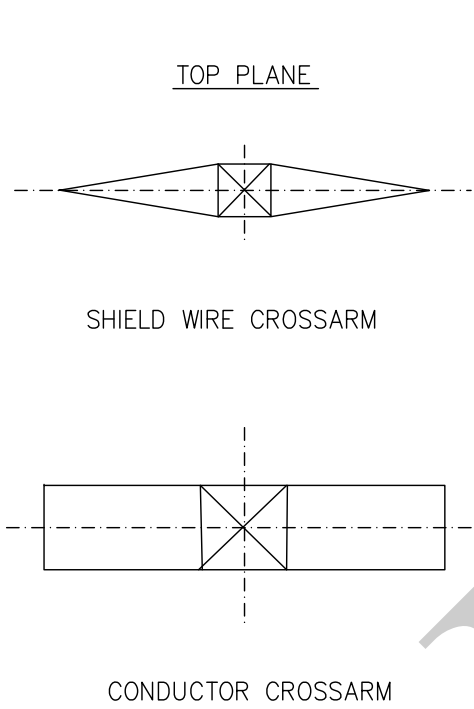
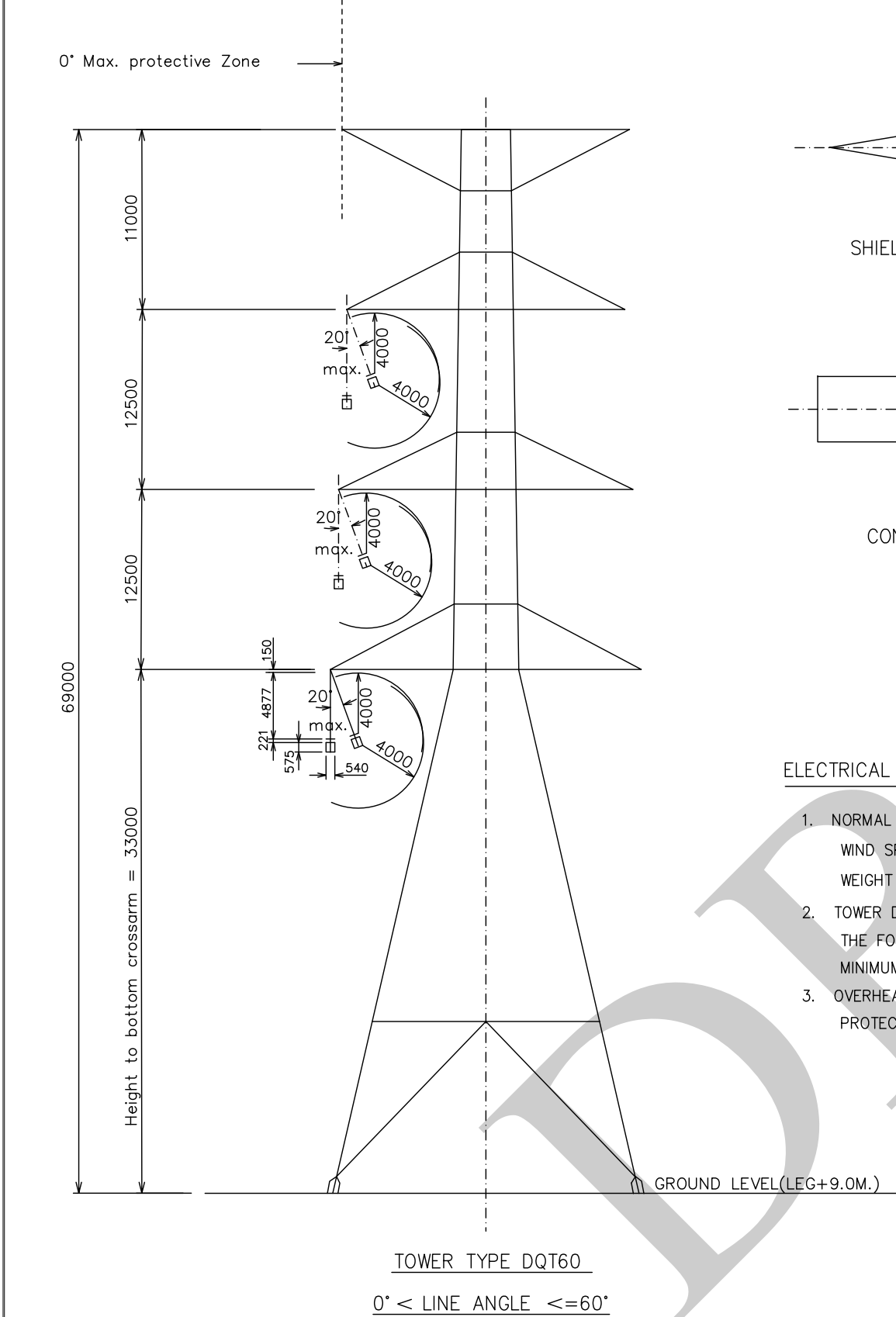
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| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
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ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | | |
|----------|-------------|--|---|-------------------------------|--|
| DRAWN | KITIPAT P. | RECOMMENDED AND VALIDATED | Kitipong | DRAWING NAME | 500 kV TRANSMISSION LINE |
| DESIGNED | PISAGORN T. | CONCURRED | Chief, Control and Protection System Engineering Department | DESCRIPTION OF DETAIL DRAWING | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQT40 |
| VERIFIED | Akanya D. | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | REPLACING DWG.NO. |
| APPROVED | Sorachai P. | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | DATE 24 Apr 2025 | | |
| | | | | DWG.NO. | E05-142 |
| | | | | REV. | - |

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| REV. | - | - | E05-143 | DWG.NO. |
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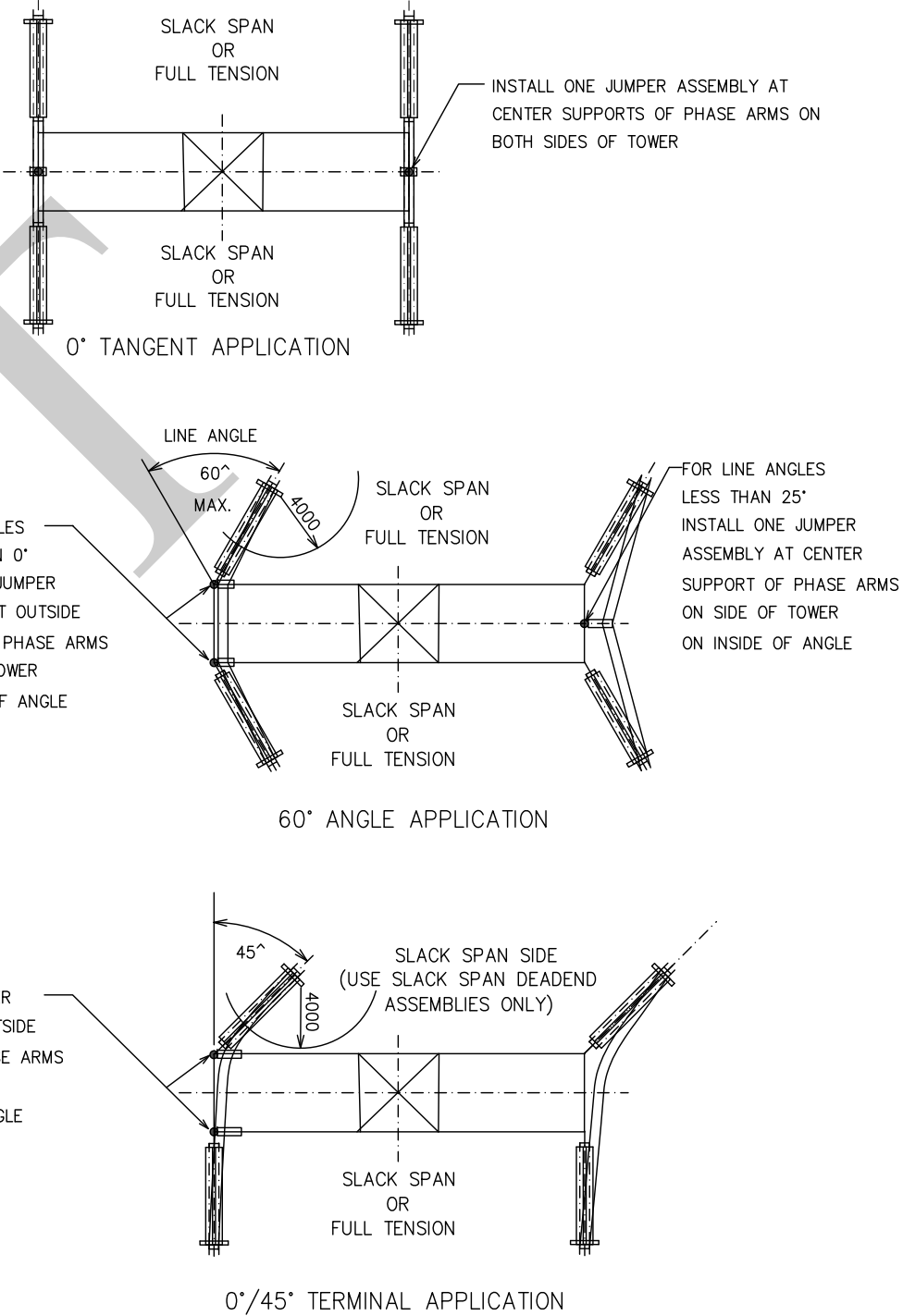


ELECTRICAL CLEARANCE DATA

- NORMAL SPAN 440 m
WIND SPAN 460 m AT 60°
WEIGHT SPAN 690 m
- TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCES.
MINIMUM CLEARANCE 4000 mm
- OVERHEAD GROUND WIRE SHALL PROVIDE 0° PROTECTIVE ZONE.

NOTES

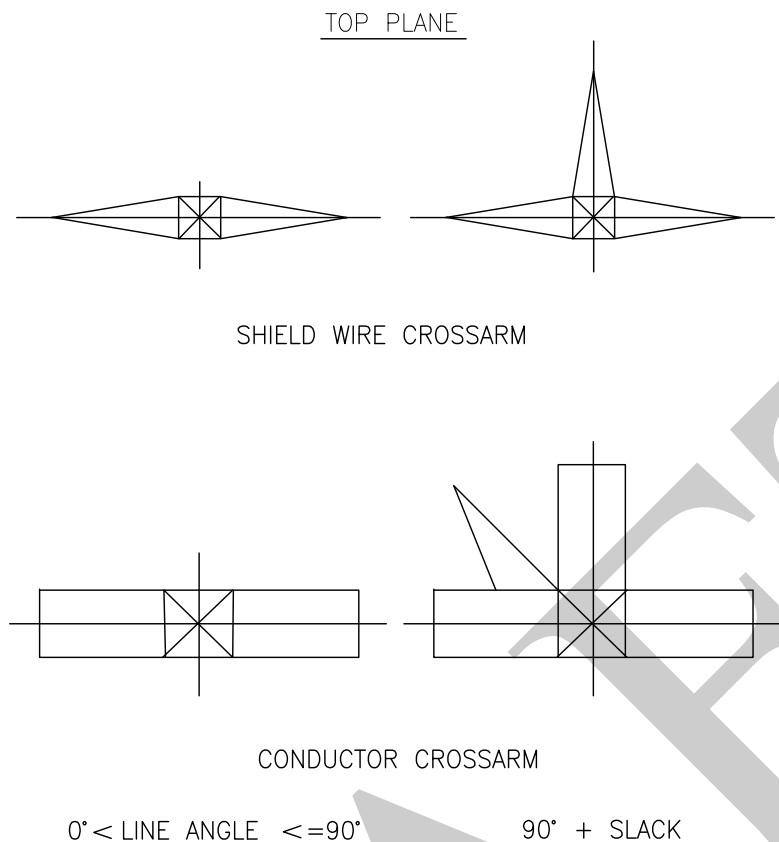
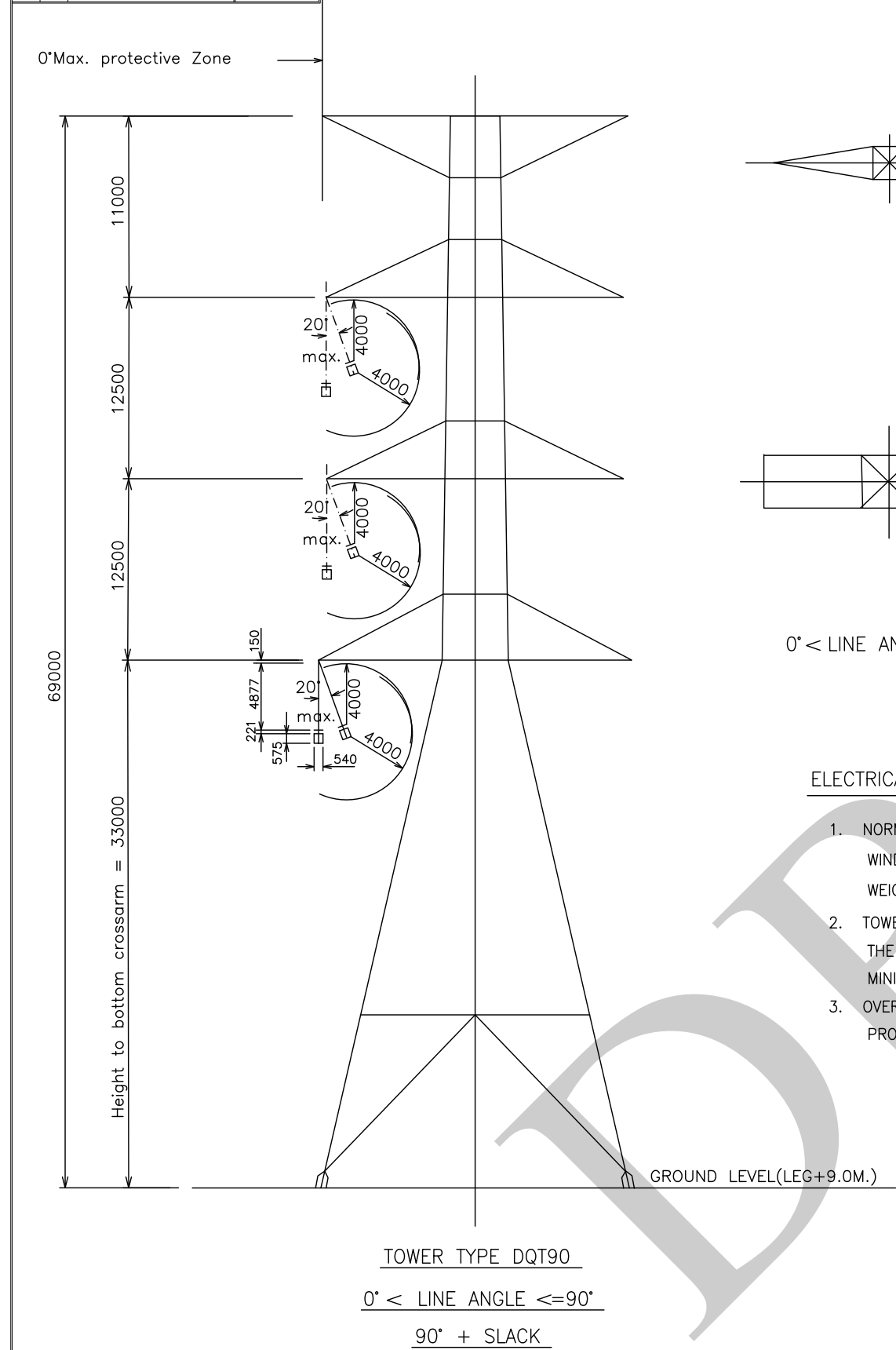
- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
- ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARES.
- SEE DRAWING NO. E11-203, E11-204, E11-205, E11-024 FOR DETAIL OF INSULATOR AND HARDWARE ASSEMBLIES.



| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
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| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|--|--|---|-------------------------------|--|---------|---------|---|------|
| DRAWN | KITPAT P. | RECOMMENDED AND VALIDATED | EtiPONG | DRAWING NAME | 500 kV TRANSMISSION LINE | | | | |
| DESIGNED | PISAGORN T. | CONCURRED | CHIEF, CONTROL AND PROTECTION SYSTEM ENGINEERING DEPARTMENT | DESCRIPTION OF DETAIL DRAWING | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQT60 | | | | |
| VERIFIED | Akarnady D. | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | REPLACING DWG.NO. | DWG.NO. | E05-143 | - | REV. |
| APPROVED | Director, Transmission System Engineering Division | DATE | 24 Apr. 2025 | - | - | - | - | - | - |

| REV. | | DWG. NO. | E05-144 |
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| - | - | - | - |

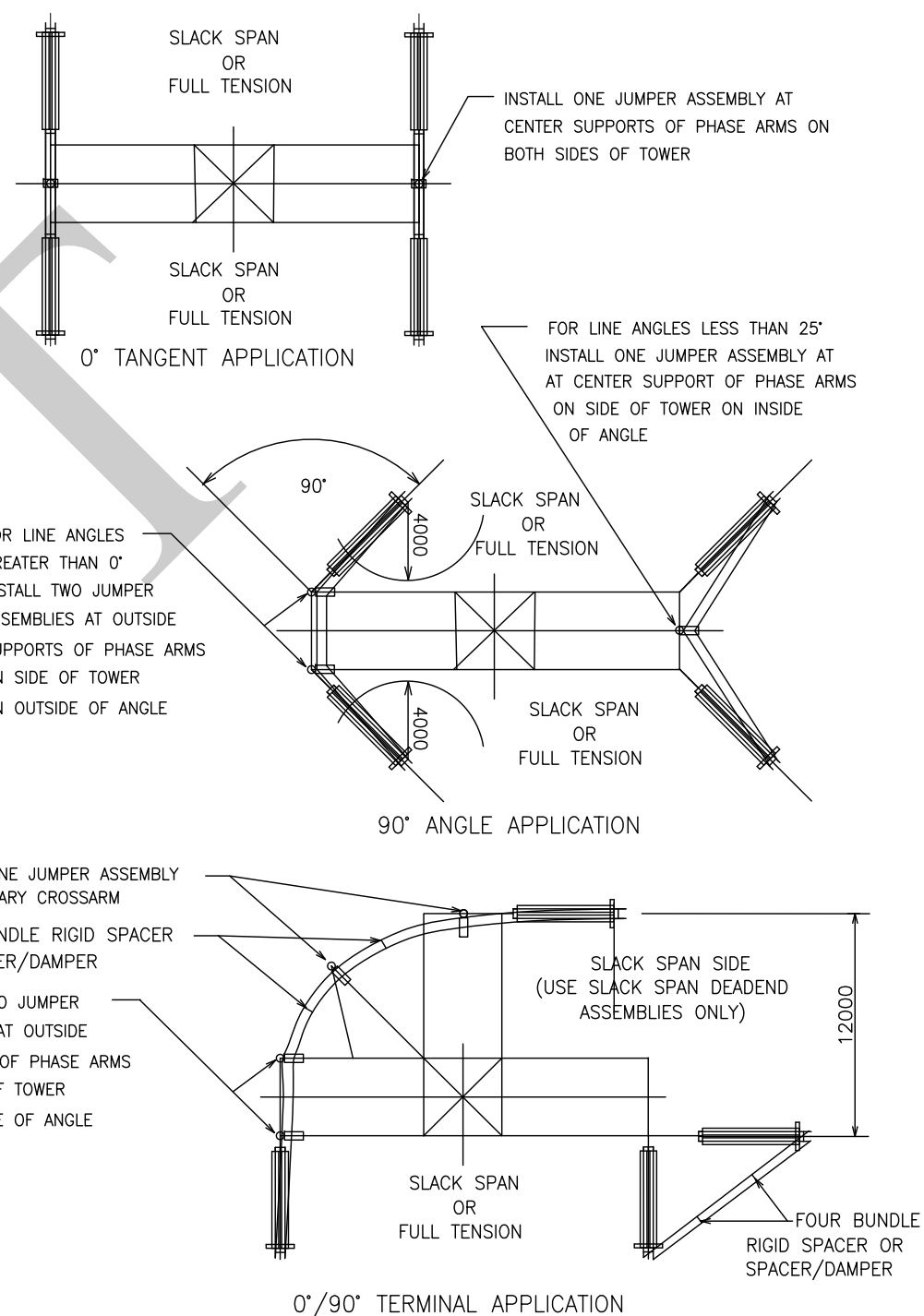


ELECTRICAL CLEARANCE DATA

- NORMAL SPAN 440 m
WIND SPAN 460 m AT 90°
WEIGHT SPAN 690 m
- TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCES.
MINIMUM CLEARANCE 4000 mm
- OVERHEAD GROUND WIRE SHALL PROVIDE 0° PROTECTIVE ZONE.

NOTES

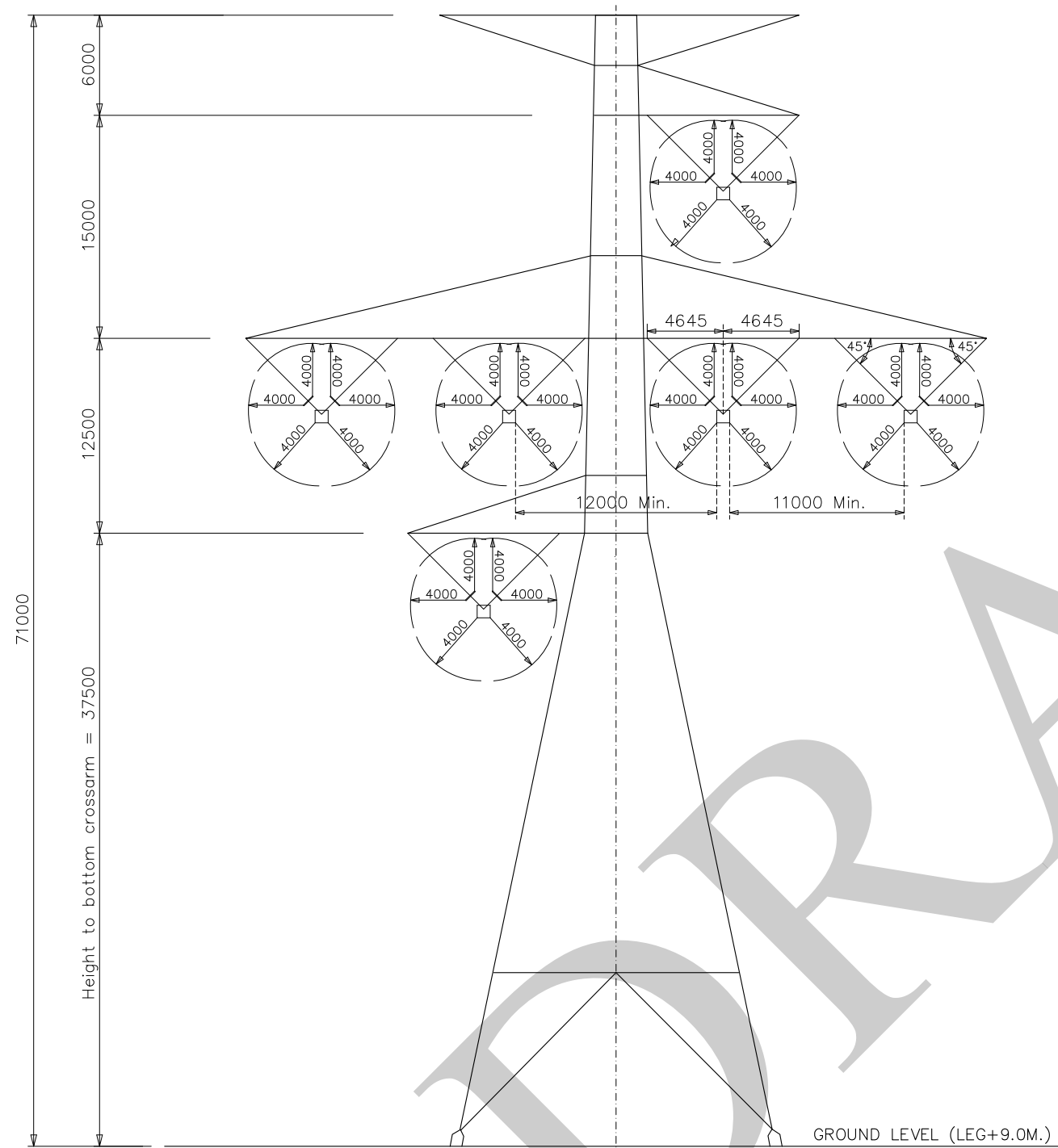
- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
- ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARES.
- SEE DRAWING NO. E11-203, E11-204, E11-205, E11-024 FOR DETAIL OF INSULATOR AND HARDWARE ASSEMBLIES.



| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
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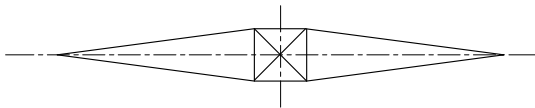
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | DRAWING NAME | | | |
|--|--|-------------|--|---------------------------|--|--|--|-------------------------------|--|--|--|----------|--|
| DRAWN | | KITIPAT P. | | RECOMMENDED AND VALIDATED | | EtiPONG | | DRAWING NAME | | 500 kV TRANSMISSION LINE | | | |
| DESIGNED | | PISAGORN T. | | CONCURRED | | CHIEF, CONTROL AND PROTECTION SYSTEM ENGINEERING DEPARTMENT | | DESCRIPTION OF DETAIL DRAWING | | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQT90 | | | |
| VERIFIED | | Aksorn D. | | APPROVED | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | | REPLACING DWG. NO. | | DWG. NO. | |
| DO NOT AMEND MANUALLY | | REV. NO. | | JOB NO. | | JOB DESCRIPTION | | DATE | | 24 Apr 2025 | | E05-144 | |

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| - | - | E05-145 | DWG.NO. |
| REV. | - | | |

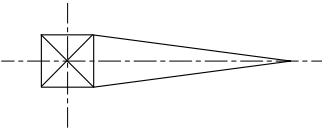


TOWER TYPE DQTR

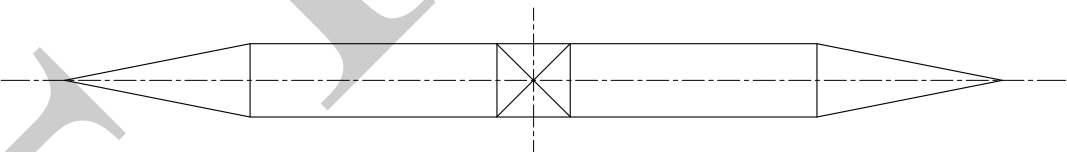
TOP PLANE



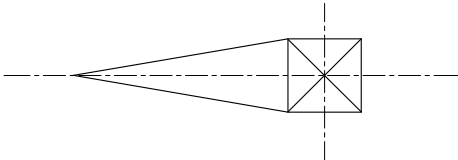
SHIELD WIRE CROSSARM



TOP CONDUCTOR CROSSARM



MIDDLE CONDUCTOR CROSSARM



BOTTOM CONDUCTOR CROSSARM

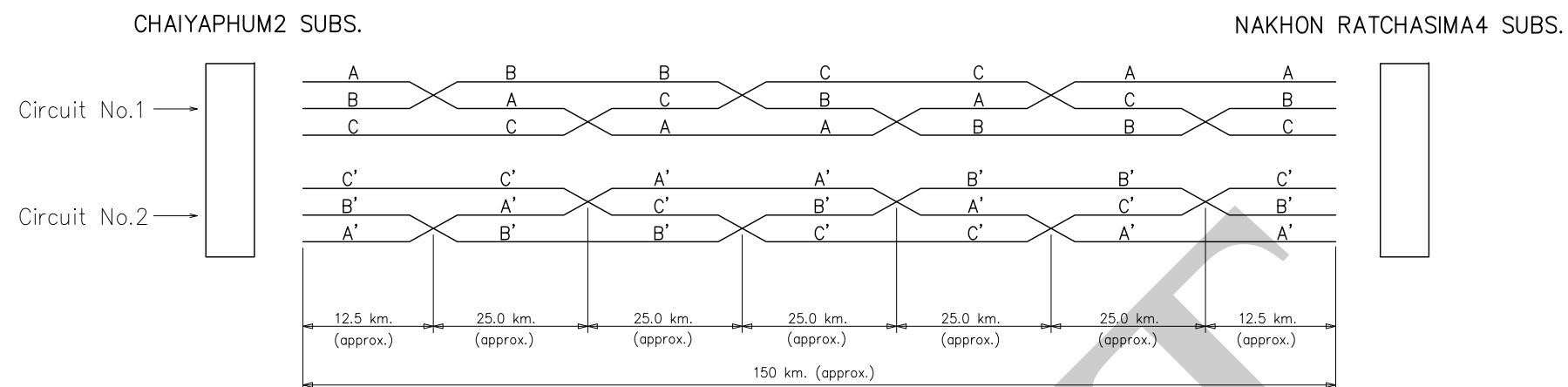
ELECTRICAL CLEARANCE DATA

- NORMAL SPAN 440 m
WIND SPAN 460 m at 0°
WEIGHT SPAN 690 m
- TOWER DESIGN SHALL PROVIDE AT LEAST THE FOLLOWING ELECTRICAL CLEARANCES:
MINIMUM CLEARANCE 4000 mm

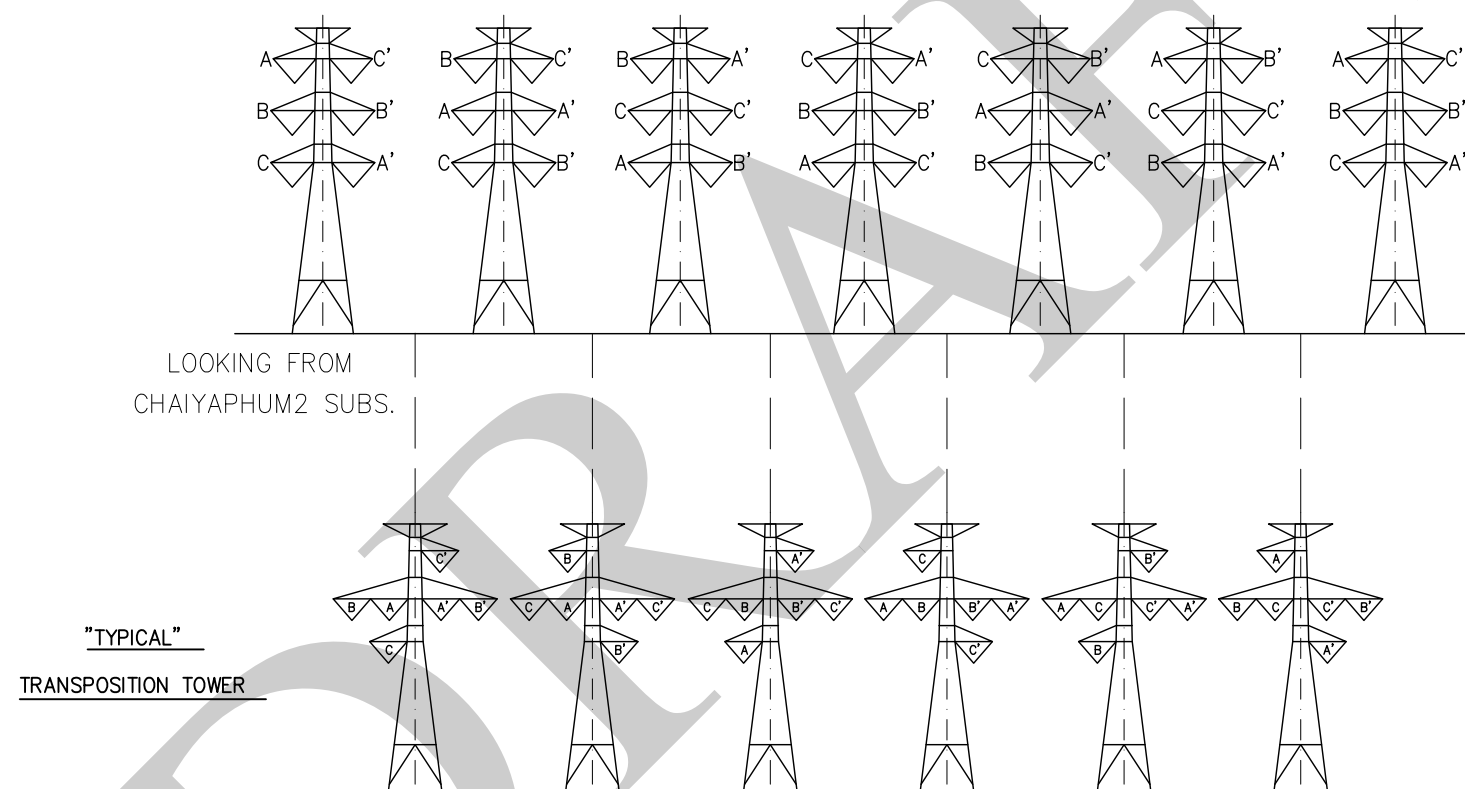
NOTES

- ALL DIMENSIONS ARE IN MILLIMETER EXCEPT AS NOTED.
- CLEARANCE DIMENSIONS ARE MINIMUM FROM SURFACE OF STEEL (NOT FROM MEMBER GAGE OR WORKING LINES) TO THE NEAREST POINT ON THE CONDUCTOR OR HARDWARE.
- ALL CABLE ATTACHMENT DEVICES SHALL BE SUPPLIED WITH TOWER, MINIMUM PROOF LOADS SHALL BE EQUAL TO THOSE OF HARDWARES.
- SEE DRAWING NO. E11-197 (ASSEMBLY 3D) AND E11-024 (SHIELD WIRE) FOR DETAILS OF INSULATOR AND HARDWARE ASSEMBLIES.

| | | | | | | | | | | | | | | | | | | | | | |
|---------|---------|-----------------|--|---|---|---|---|---|---|---|--|---|--|--|---|--------------------------|-------------------|---------|---------|------|--|
| | | | | | | | | | | | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | |
| | | | | | | | | | | | DRAWN | SARUTA S. | RECOMMENDED AND VALIDATED | <i>tipong</i> CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | DRAWING NAME | 500 kV TRANSMISSION LINE | | | | | |
| | | | | | | | | | | | DESIGNED | <i>PISAGORN T.</i> | CONCURRED | | DESCRIPTION OF DETAIL DRAWING | | | | | | |
| | | | | | | | | | | | VERIFIED | <i>Akanya D.</i> | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | ELECTRICAL AND GROUND CLEARANCE FOR TOWER TYPE DQTR | | | | | | |
| - | - | - | | - | - | - | - | - | - | - | APPROVED | <i>Soratchai Pichan</i> DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | DATE | 24 Apr 2025 | JOB NO. | REPLACING DWG.NO. | DWG.NO. | - | REV. | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | | | | | | | | | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | - | REV. | |
| | | | | | | | | | | | | | | | | | | | E05-145 | - | |



TRANSPOSITION SYSTEM

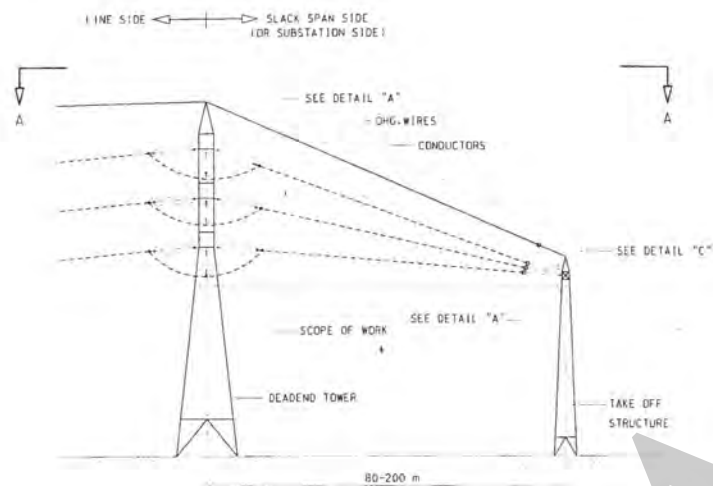


TRANSPOSITION ARRANGMENT

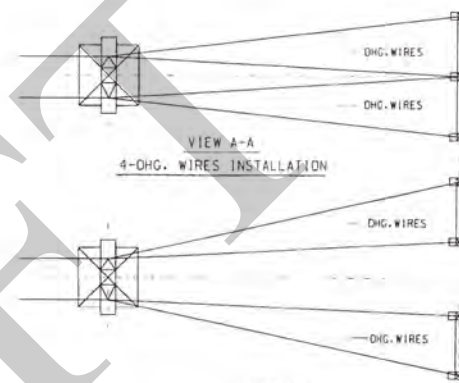
NOTES

1. ALL DIMENSIONS AER IN KILOMETER.
2. ONE COMPLETE TRANSPOSITIONS ARE REQUIRED.
3. SPECIFIED DISTANCES BETWEEN TRANSPOSITION TOWERS ARE APPROXIMATE.
4. PHASING SIGNS ARE TO BE INSTALLED ON BOTH TOWERS ADJACENT TO A TRANSPOSITION TOWER.

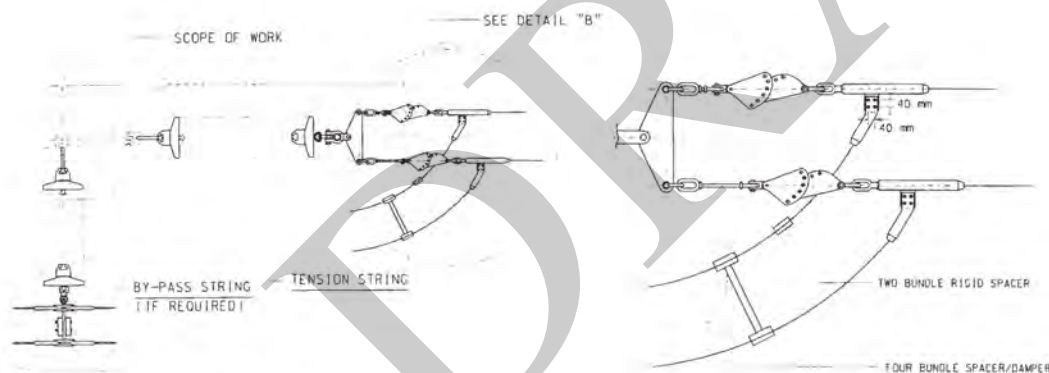
| | | | | | | | | | | | | | | | | | | | |
|---------|---------|-----------------|--|--|--|-------|----------|----------|-----------|-------------|-----------|--|------|---|--|--|--|---------|--|
| | | | | | | | | | | | | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | |
| | | | | | | | | | | | | DRAWN ARNON W. | | RECOMMENDED AND VALIDATED CHIEF, TRANSMISSION LINE ENGINEERING DEPARTMENT | | DRAWING NAME 500 kV TRANSMISSION LINE | | | |
| | | | | | | | | | | | | DESIGNED PISAGORN T. | | CONCURRED | | DESCRIPTION OF DETAIL DRAWING | | | |
| | | | | | | | | | | | | VERIFIED Alexander D. | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | TRANSPPOSITION | | | |
| | | | | | | | | | | | | APPROVED | | JOB NO. | | REPLACING DWG.NO. | | DWG.NO. | |
| | | | | | | | | | | | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | DATE 12/4/68 | | TIEC-03-L02 | | E07-091 | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | | | | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | | | | | | |
| - | - | - | | | | - | - | - | - | - | - | - | - | | | | | | |



INSTALLATION OF DOUBLE CIRCUIT CONDUCTORS
AND OHG. WIRES ON SLACK SPAN



VIEW A-A
4-OHG. WIRES INSTALLATION



DETAIL "A"

DETAIL "B"



DETAIL "C"

OHG. WIRE ATTACHMENTS
DEADEND TOWER

ELECTRICITY GENERATING AUTHORITY OF THAILAND

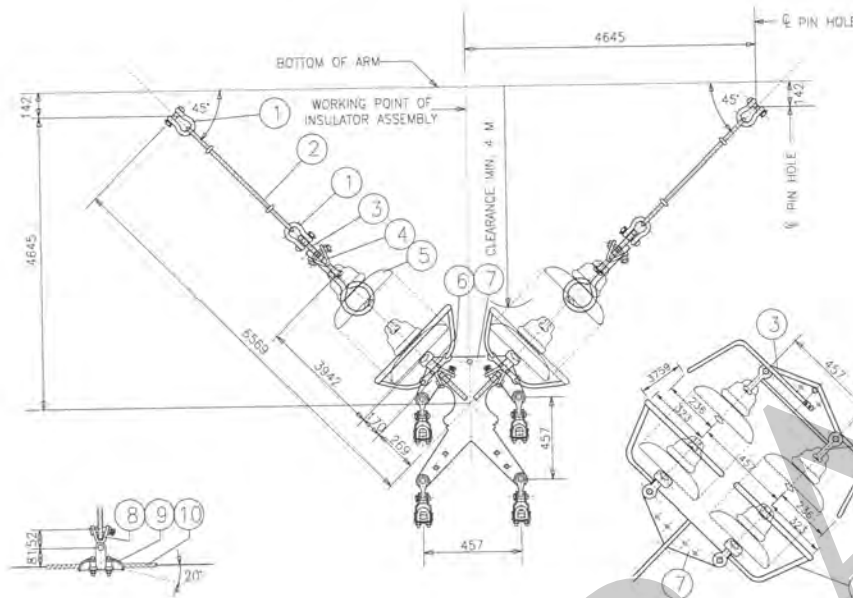
| | | | | |
|----------|-------------|-------------|---------------------------------------|---------------------------------------|
| DESIGNED | V. PHUCHONG | DATE | 14 May 01 | 500 KV TRANSMISSION LINE |
| DESIGNED | | RECOMMENDED | | INSTALLATION OF CONDUCTOR & OHG. WIRE |
| VERIFIED | | CONDUCTOR | | ON SLACK TENSION APPROACH SPANS |
| APPROVED | | FUNCTION | TRANSMISSION LINE ENGINEERING SECTION | |

E08-002



MATERIAL LIST

| 45°/45° DOUBLE V-STRING SUSPENSION ASSEMBLY 3C FOR HDQV3 | | | | |
|--|------------|-------------|------------------------------------|--|
| ITEM NO. | QUANTITY | CATALOG NO. | MINIMUM RATE STRENGTH (METRIC TON) | DESCRIPTION |
| 1 | 4 | | 32.6 | ANCHOR SHACKLE W/BNC,BOLT Ø 25 MM |
| 2 | 2 | | 32.6 | CH.EYE/CH.EYE EXTENSION LINK |
| 3 | 2 | | 32.6 | TRIANGULAR YOKE PLATE |
| 4 | 4 | | 16.3 | BALL Y-CLEVIS |
| * 5 | 2 X 2 X 27 | | 16.3 | SUSPENSION INSULATOR, ANSI CLASS 52-8 |
| 6 | 4 | | 16.3 | SOCKET Y-CLEVIS |
| 7 | 1 | | 32.6 | STEEL YOKE PLATE (4-CONDUCTOR) |
| 8 | 4 | | 8.2 | Y-CLEVIS EYE |
| 9 | 4 | | 8.2 | SUSPENSION CLAMP, MIN 20° TAKE-OFF ANGLE |
| 10 | 4 SETS | | | ARMOR RODS |
| 11 | 4 | | | ARCING HORN |
| 12 | 4 | | | CORONA RING |



45°/45° DOUBLE V-STRING SUSPENSION WITH ARCING HORN
TOWER TYPE HDQV3
ASSEMBLY 3C

GENERAL NOTES:

- ALL FERROUS PLATES HOT DIP GALVANIZED PER ASTM STD A-123.
- ALL FERROUS FASTENERS HOT DIP GALVANIZED PER ASTM STD A-153.
- BALL AND SOCKET FITTINGS TO FIT ANSI CLASS 52-8.
- ALL COTTER KEYS WILL BE HUMP BACK, STAINLESS STEEL, TYPE 304.
ALL COTTER KEYS SHALL BE SPREAD TO PREVENT REMOVAL DURING SERVICE.
- ALL HARDWARE SHALL HAVE HOT-LINE MAINTENANCE CAPABILITY.
- ALL CONDUCTOR HARDWARE SHALL BE DESIGNED FOR CORONA-FREE EMP OPERATION.
- ALL DIMENSIONS SHOWN ARE IN MILLIMETERS. DIMENSIONS OF INDIVIDUAL HARDWARE ITEMS MAY BE VARIED PROVIDED THAT OVERALL ASSEMBLY DIMENSIONS ARE NOT CHANGED.
- CATALOG NUMBERS ARE LISTED FOR PURPOSES OF GENERAL DESCRIPTION ONLY.
- IN AREAS OF HEAVY CONTAMINATION, INCREASED LEAKAGE DISTANCE WILL BE USED.
STANDARD 52-8 INSULATORS MARKED WITH * WILL BE REPLACED WITH THE SAME QUANTITY OF FOG TYPE 36,000 lbs. WITH 432 mm OR GREATER LEAKAGE DISTANCE.
- SEE TOWER DRAWINGS FOR ATTACHMENT PLATE DETAILS.
- STRENGTH OF ALL HARDWARE SHALL BE SUCH THAT THE MINIMUM STRENGTH OF THE ENTIRE ASSEMBLY IS NOT LESS THAN THAT OF THE INSULATORS OR COMBINATION OF INSULATORS USED IN THAT ASSEMBLY.
- ALL WELDING SHALL BE PER AWS.D1.1
- CONDUCTOR IS 1272 MCM ACSR/GA OR 1272 MCM ACSR/AW.
- CLEARANCE BETWEEN TOP SURFACE OF ARCING HORN AND STEEL TOWER SHOULD BE MORE THAN 4 m.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

500 KV TRANSMISSION LINE
500 KV TOWER CROSSING 500 KV LINE
INSULATOR AND HARDWARE DETAILS
FOR SUSPENSION ASSEMBLY - ASSEMBLY 3C

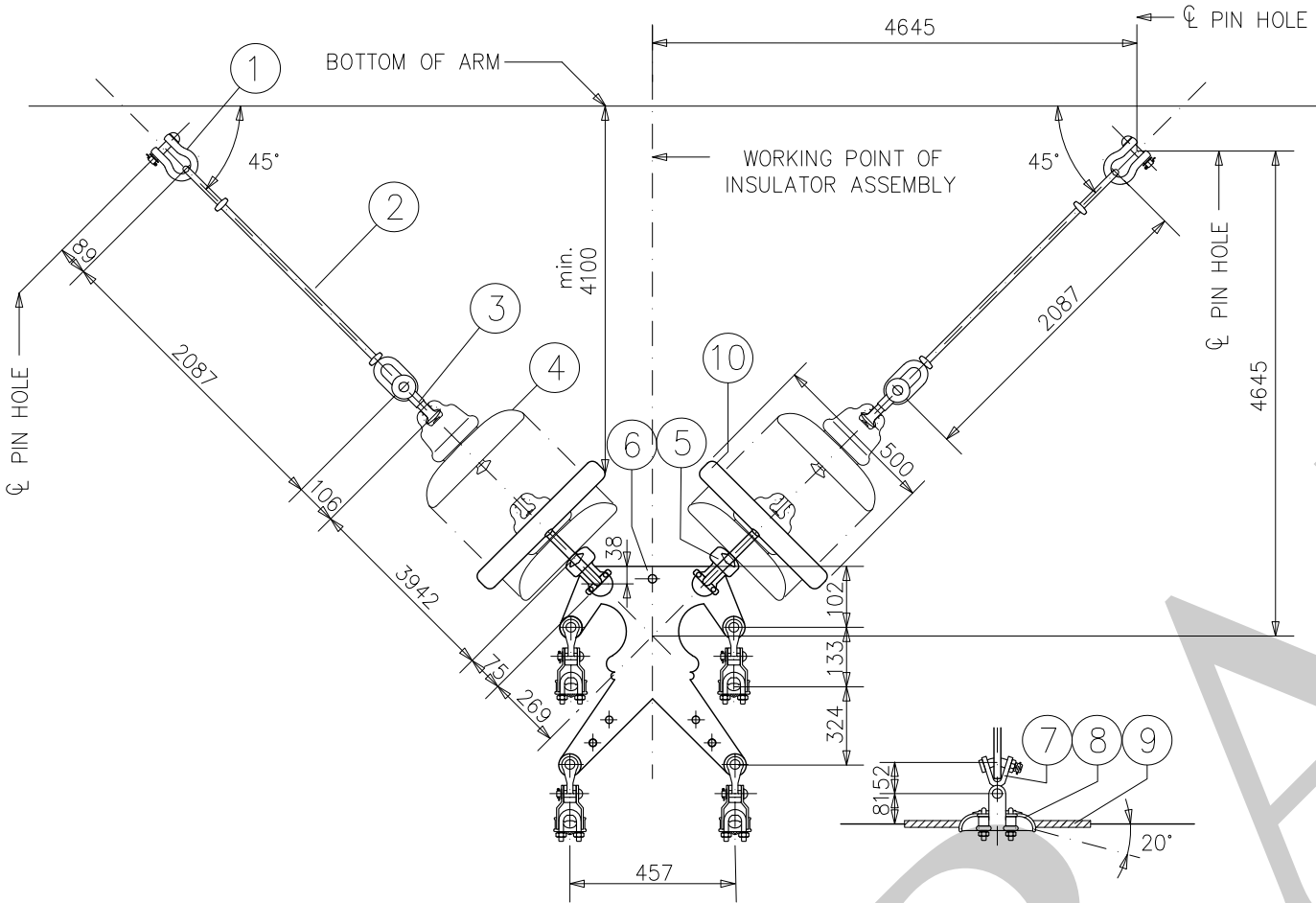
E11-186

MATERIAL LIST

| 45°/45° V-STRING SUSPENSION : ASSEMBLY 3D FOR DQV3 | | | | |
|--|----------|-------------|------------------------------------|---|
| ITEM NO. | QUANTITY | CATALOG NO. | MINIMUM RATE STRENGTH (METRIC TON) | DESCRIPTION |
| 1 | 2 | | 16.3 | ANCHOR SHACKLE W/BNC, BOLT ϕ 22 mm |
| 2 | 2 | | 16.3 | CH.EYE/90°CH.EYE EXTENSION LINK, 2087 mm LONG |
| 3 | 2 | | 16.3 | BALL CLEVIS |
| * 4 | 2 X 27 | | 16.3 | SUSPENSION INSULATOR; ANSI CLASS 52-8 |
| 5 | 2 | | 16.3 | SOCKET Y-CLEVIS |
| 6 | 1 | | 16.3 | STEEL YOKE PLATE (4-CONDUCTOR) |
| 7 | 4 | | 8.0 | Y-CLEVIS EYE |
| 8 | 4 | | 8.0 | SUSPENSION CLAMP; MIN.20°TAKE-OFF ANGLE |
| 9 | 4 SETS | | | ARMOR RODS |
| 10 | 2 | | | GRADING RING |
| | | | | |

GENERAL NOTES:

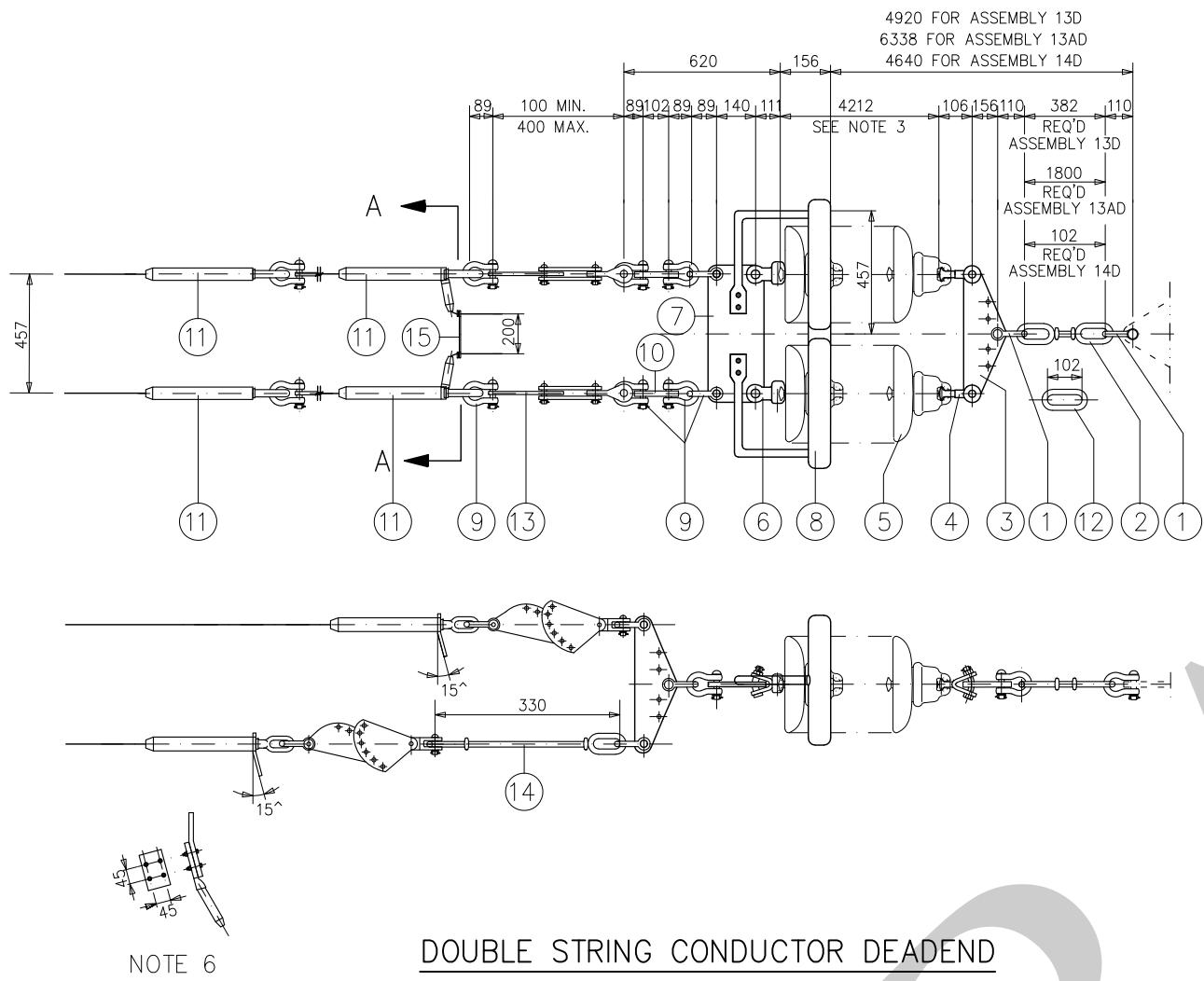
1. ALL FERROUS PLATES HOT DIP GALVANIZED PER ASTM STD A-123.
2. ALL FERROUS FASTENERS HOT DIP GALVANIZED PER ASTM STD A-153.
3. BALL AND SOCKET FITTINGS TO FIT NEMA CLASS 52-8.
4. ALL COTTER KEYS WILL BE HUMP BACK, STAINLESS STEEL, TYPE 304
ALL COTTER KEYS SHALL BE SPREAD TO PREVENT REMOVAL DURING SERVICE.
5. ALL HARDWARE SHALL HAVE HOT-LINE MAINTENANCE CAPABILITY.
6. ALL CONDUCTOR HARDWARE SHALL BE DESIGNED FOR CORONA-FREE EHV OPERATION.
7. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS. DIMENSIONS OF INDIVIDUAL
HARDWARE ITEMS MAY BE VARIED PROVIDED THAT OVERALL ASSEMBLY
DIMENSIONS ARE NOT CHANGED.
8. CATALOG NUMBERS ARE LISTED FOR PURPOSES OF GENERAL DESCRIPTION ONLY.
9. IN AREAS OF ANTI POLLUTION ZONE, INCREASED LEAKAGE DISTANCE WILL BE USED.
STANDARD 52-8 INSULATORS MARKED WITH * WILL BE REPLACED WITH THE SAME
QUANTITY OF FOG TYPE 36,000 lbs. WITH 432 MM OR GREATER LEAKAGE DISTANCE.
10. SEE TOWER DRAWINGS FOR ATTACHMENT PLATE DETAILS.
11. STRENGTH OF ALL HARDWARE SHALL BE SUCH THAT THE MINIMUM STRENGTH OF THE
ENTIRE ASSEMBLY IS NOT LESS THAN THAT OF THE INSULATORS OR COMBINATION OF
INSULATORS USED IN THAT ASSEMBLY.
12. ALL WELDING SHALL BE PER AWS.D1.1
13. CONDUCTOR IS 1272 MCM ACSR/GA OR 1272 MCM ACSR/AW.



45°/45° V-STRING SUSPENSION
TOWER TYPES DQV3 AND DQTR
ASSEMBLY 3D

| | | | | | | | | | | | |
|---------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|---|
| | | | | | | | | | | | |
| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE | |
| - | - | - | - | - | - | - | - | - | - | - | - |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | | |
|--|--|--|--|--|--|--|---------|-------------------|---------|---|------|
| DRAWN ARNON W. | | | RECOMMENDED AND VALIDATED Etipong | | | DRAWING NAME 500 kV TRANSMISSION LINE | | | | | |
| DESIGNED Kitipat P. | | | CONCURRED | | | DESCRIPTION OF DETAIL DRAWING | | | | | |
| VERIFIED Akarady D. | | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | INSULATOR AND HARDWARE DETAILS FOR SUSPENSION ASSEMBLY - ASSEMBLY 3D | | | | | |
| APPROVED | | | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | DATE 24 Apr 2025 | JOB NO. | REPLACING DWG.NO. | DWG.NO. | | REV. |
| | | | | | | | - | - | E11-197 | - | - |



DOUBLE STRING CONDUCTOR DEADEND

ASSEMBLIES 13D, 13AD AND 14D

MATERIAL LIST

| CONDUCTOR DEADEND | | | | - ASSEMBLY 13D FOR DQT60 AND DQT90 STRUCTURE - ASSEMBLY 13AD FOR DQT90 STRUCTURE (90°ANGLE APPLICATION), FOR DQT60 (0°/45° TERMINAL APPLICATION)* - ASSEMBLY 14D FOR DQT20 AND DQT40 STRUCTURE |
|-------------------|----------|-------------|------------------------------------|---|
| ITEM NO. | QUANTITY | CATALOG NO. | MINIMUM RATE STRENGTH (METRIC TON) | DESCRIPTION |
| 1 | 2 | | 45.4 | ANCHOR SHACKLE W/BNC, BOLT Ø 32 mm |
| 2 | 1 | | 45.4 | CHAIN EYE-CHAIN EYE EXTENSION LINK(382 mm FOR ASSEMBLY 13D AND 1800 mm FOR ASSEMBLY 13AD AND 102 mm FOR ASSEMBLY 14D) |
| 3 | 1 | | 45.4 | YOKE PLATE,TRIANGULAR |
| 4 | 2 | | 22.7 | BALL Y-CLEVIS |
| ** 5 | 2 X 27 | | 22.7 | SUSPENSION INSULATOR; ANSI CLASS 52-11 |
| 6 | 2 | | 22.7 | SOCKET Y-CLEVIS |
| 7 | 1 | | 45.4 | YOKE PLATE,RECTANGULAR |
| 8 | 1 | | - | GRADING RING |
| 9 | 12 | | 22.7 | ANCHOR SHACKLE W/BNC |
| 10 | 2 | | 22.7 | YOKE PLATE, TRIANGULAR |
| 11 | 4 | | - | COMPRESSION DEADEND ASSEMBLY WITH STEEL EYE & JUMPER TERMINAL. |
| 12 | 1 | | 45.4 | CHAIN LINK(102 mm) FOR ASSEMBLY 14D ONLY |
| 13 | 4 SETS | | 12.0 | TENSION ADJUSTING PLATES |
| 14 | 2 | | 12.0 | 90° CHAIN EYE-CHAIN EYE EXTENSION LINK (330 mm) |
| 15 | - | | - | TWO BUNDLE RIGID SPACER |
| | | | | |
| | | | | |

* HARDWARE ASSEMBLY 13AD SHALL BE USED FOR TOWER TYPE DQT60 (0°/45° TERMINAL APPLICATION) OF WHICH THE ORIENTATION ANGLE IS MORE THAN 30°.

NOTES:

1. SEE DRAWING NO. E11-197 FOR GENERAL NOTES.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED.
3. IN AREAS OF ANTI POLLUTION ZONE, INCREASED LEAKAGE DISTANCE WILL BE USED.

52-11 INSULATORS MARKED WITH ** WILL BE REPLACED WITH SAME QUANTITY OF FOG TYPE 50,000 lbs.
WITH 545 MM OR GREATER LEAKAGE DISTANCE.
4. INSTALL FOUR (4) BUNDLE RIGID SPACERS OR SPACER DAMPERS EQUIDISTANT ALONG JUMPER LOOP LENGTH FOR DETERMINATION OF SEPARATION DISTANCE, ASSUME THE INSULATOR ASSEMBLY, YOKE (IF PRESENT) ACTS AS A FOUR BUNDLE SPACER.
5. DIMENSIONS OF INDIVIDUAL HARDWARE ITEMS MAY BE VARIED PROVIDED THAT OVERALL ASSEMBLY DIMENSIONS ARE NOT CHANGED.
6. COMPRESSION DEADEND FITTINGS FOR THE CONDUCTOR SHALL BE PROVIDED WITH 4 HOLE, AND FOR THE SHIELD WIRE WITH 2 HOLE, NEMA PAD TERMINALS.
7. OMIT 2 SPACERS FROM ANY LOOP CONTAINING 2 SETS OF I-STRING JUMPER SUPPORT ASSEMBLIES.
8. SEE DRAWING NO. E05-141, E05-142, E05-143 AND E05-144 FOR QUANTITY OF JUMPER SUPPORT INSULATOR ASSEMBLIES REQUIRED FOR EACH LINE ANGLE APPLICATION. MINIMUM CLEARANCE TO ANY STRUCTURE MEMBER, WHEN JUMPER SUPPORT INSULATOR ASSEMBLY IS NOT REQUIRED, SHALL BE 4.0 METERS.

| | | | | | | | | | | | |
|---------|---------|--|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| | | | | | | | | | | | |
| REV.NO. | JOB NO. | | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|---------------------|--|--|
| DRAWN ARNON W. | | | RECOMMENDED AND VALIDATED EITIPONG | | | DRAWING NAME 500 kV TRANSMISSION LINE | | | | | |
| DESIGNED Kitipat P | | | CONCURRED | | | DESCRIPTION OF DETAIL DRAWING | | | | | |
| VERIFIED Akarady D. | | | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | INSULATOR AND HARDWARE DETAILS FOR DEADEND ASSEMBLIES - ASSEMBLIES 13D, 13AD AND 14D | | | | | |
| APPROVED | | | DATE 24 Apr 2025 | | | JOB NO. - | | | REPLACING DWG.NO. - | | |
| DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | | | | | DWG.NO. E11-203 | | | REV. - | | |

MATERIAL LIST

CONDUCTOR DEADEND (SLACK SPAN SIDE)-ASSEMBLY 15D

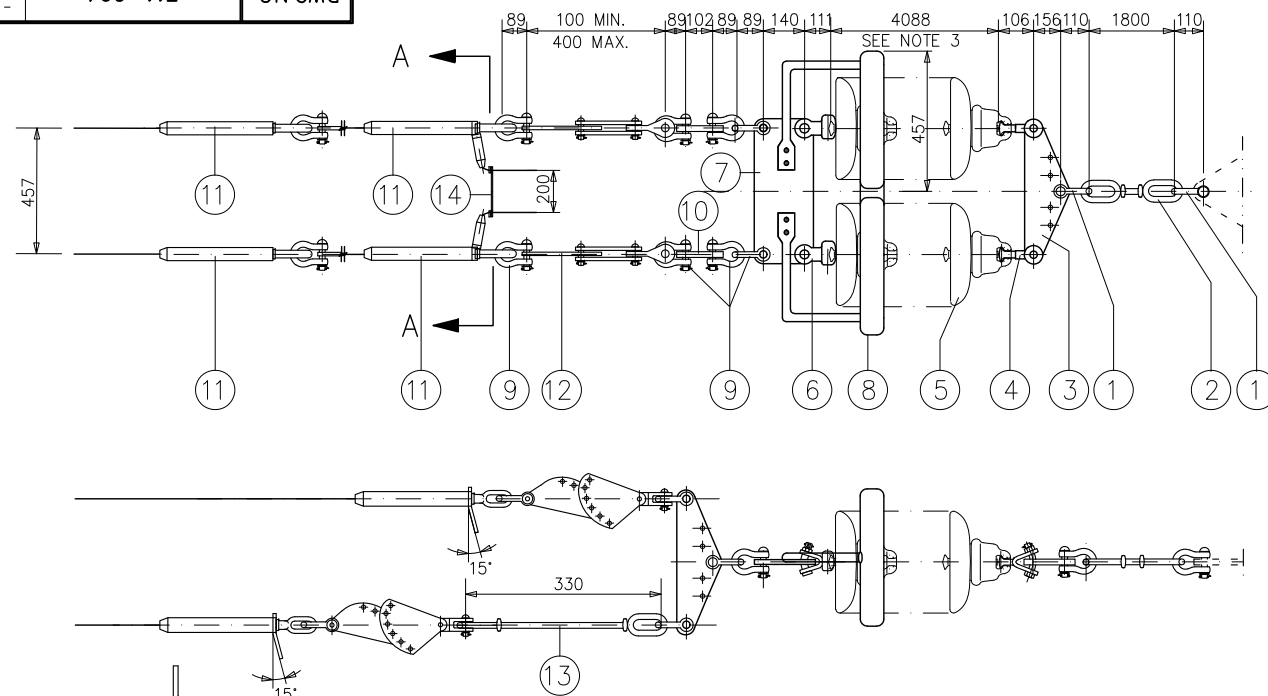
| ITEM NO. | QUANTITY | CATALOG NO. | MINIMUM RATE STRENGTH (METRIC TON) | DESCRIPTION |
|----------|----------|-------------|------------------------------------|--|
| 1 | 2 | | 16.3 | ANCHOR SHACKLE W/BNC, BOLT ϕ 32 mm |
| 2 | 1 | | 16.3 | CHAIN EYE-CHAIN EYE EXTENSION LINK(1800 mm) |
| 3 | 1 | | 16.3 | YOKE PLATE, TRIANGULAR |
| 4 | 2 | | 16.3 | BALL Y-CLEVIS |
| * 5 | 2 X 28 | | 16.3 | SUSPENSION INSULATOR; ANSI CLASS 52-8 |
| 6 | 2 | | 16.3 | SOCKET Y-CLEVIS |
| 7 | 1 | | 16.3 | YOKE PLATE, RECTANGULAR |
| 8 | 1 | | - | GRADING RING |
| 9 | 12 | | 16.3 | ANCHOR SHACKLE W/BNC |
| 10 | 2 | | 16.3 | YOKE PLATE, TRIANGULAR |
| 11 | 4 | | - | COMPRESSION DEADEND ASSEMBLY WITH STEEL EYE & JUMPER TERMINAL. |
| 12 | 4 SETS | | 12.0 | TENSION ADJUSTING PLATES |
| 13 | 2 | | 12.0 | 90° CHAIN EYE-CHAIN EYE EXTENSION LINK (330 mm) |
| 14 | - | | - | TWO BUNDLE RIGID SPACER |

NOTES:

- SEE DRAWING NO. E11-197 FOR GENERAL NOTES.
- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED.
- IN AREAS OF ANTI POLLUTION ZONE, INCREASED LEAKAGE DISTANCE WILL BE USED.
STANDARD 52-8 INSULATORS MARKED WITH * WILL BE REPLACED WITH SAME QUANTITY OF FOG TYPE 36,000 lbs. WITH 432 MM OR GREATER LEAKAGED DISTANCE,
- INSTALL FOUR (4) BUNDLE RIGID SPACERS OR SPACER DAMPERS EQUIDISTANT ALONG JUMPER LOOP LENGTH FOR DETERMINATION OF SEPARATION DISTANCE, ASSUME THE INSULATOR ASSEMBLY, YOKE (IF PRESENT) ACTS AS A FOUR BUNDLE SPACER.
- DIMENSIONS OF INDIVIDUAL HARDWARE ITEMS MAY BE VARIED PROVIDED THAT OVERALL ASSEMBLY DIMENSIONS ARE NOT CHANGED.
- COMPRESSION DEADEND FITTINGS FOR THE CONDUCTOR SHALL BE PROVIDED WITH 4 HOLE, AND FOR THE SHIELD WIRE WITH 2 HOLE,NEMA PAD TERMINALS.
- OMIT 2 SPACERS FROM ANY LOOP CONTAINING 2 SETS OF I-STRING JUMPER SUPPORT ASSEMBLIES.
- SEE DRAWING NO. E05-141, E05-142, E05-143 AND E05-144 FOR QUANTITY OF JUMPER SUPPORT INSULATOR ASSEMBLIES REQUIRED FOR EACH LINE ANGLE APPLICATION. MINIMUM CLEARANCE TO ANY STRUCTURE MEMBER, WHEN JUMPER SUPPORT INSULATOR ASSEMBLY IS NOT REQUIRED, SHALL BE 4.0 METERS.

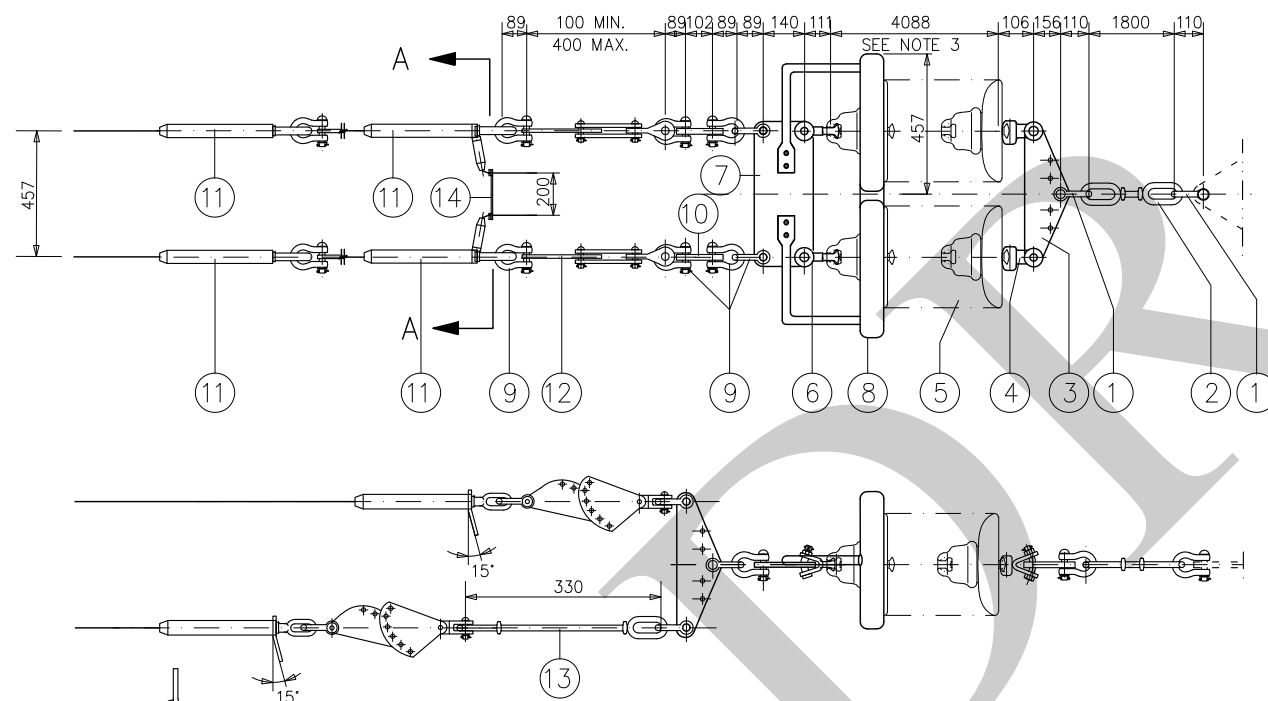
DOUBLE STRING CONDUCTOR DEADEND – TERMINAL APPLICATION
(SLACK SPAN SIDE)
ASSEMBLY 15D

NOTE 6



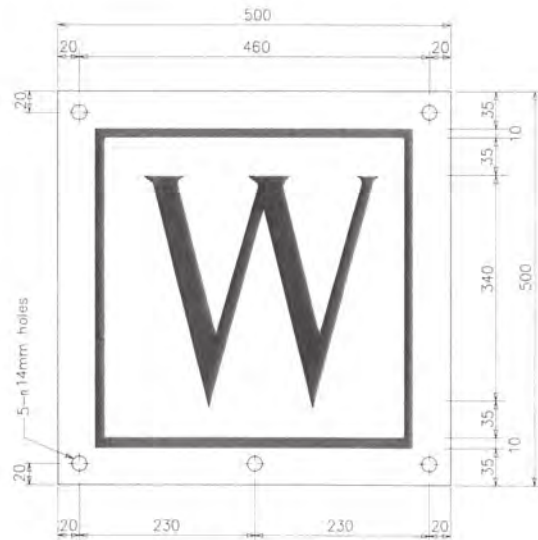
DOUBLE STRING CONDUCTOR DEADEND – TERMINAL APPLICATION
(SLACK SPAN SIDE)
ASSEMBLY 15D (INVERTED INSULATOR)

NOTE 6



ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | | |
|----------|------------|--|------------------|-------------------------------|--|
| DRAWN | ARNON W. | RECOMMENDED AND VALIDATED | Etirong | DRAWING NAME | 500 kV TRANSMISSION LINE |
| DESIGNED | Ritipat P. | CONCURRED | | DESCRIPTION OF DETAIL DRAWING | INSULATOR AND HARDWARE DETAILS FOR DEADEND ASSEMBLY – ASSEMBLY 15D |
| VERIFIED | Akanan D. | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | | JOB NO. | — |
| APPROVED | Sorarak P. | DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION | DATE 24 Apr 2025 | REPLACING DWG.NO. | — |
| | | | | DWG.NO. | E11-204 |
| | | | | | REV. |

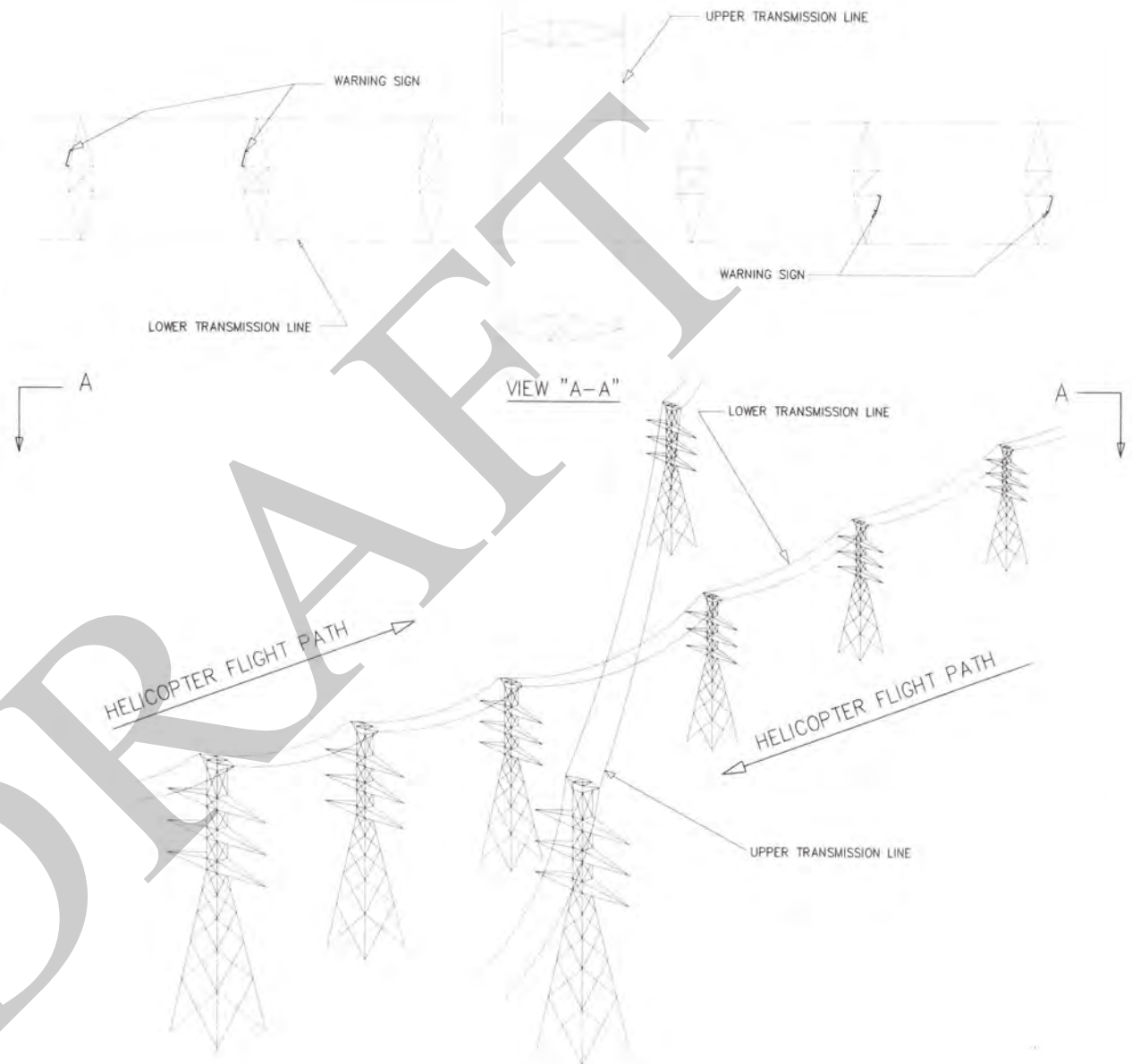


WARNING SIGN

| WARNING SIGN COLOR | |
|--------------------|--------|
| FIGURE | BLACK |
| BACKGROUND | ORANGE |

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. THE WARNING SIGNS SHALL BE POSITIONED AS FOLLOWS :
 - 2.1 ON THE FRONT MEMBERS OF THE LEFT OVERHEAD GROUND WIRE ARMS IN THE APPROACHING DIRECTION TO THE CROSSING AS SHOWN.
 - 2.2 ON TWO TOWERS BACK AND AHEAD OF THE LAST TOWER OF THE LOWER TRANSMISSION LINE PRIOR TO THE CROSSING.

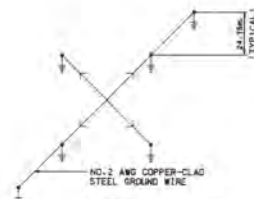


| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | |
|--|----------------------------------|----------------------------------|--|
| DRAWN P. Chaiwatt CHECKED J. Nong APPROVED | PROJECT REVISIONS DATE | PROJECT REVISIONS DATE | INSTALLATION OF WARNING SIGNS E21-037 |



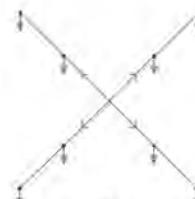
STEP 1

BOND STUB ANGLES TO FOUNDATION REINFORCING STEEL. CONNECT DIAGONALLY OPPOSITE LEGS AND INSTALL GROUND RODS AS SHOWN. MEASURE TOWER FOOTING RESISTANCE.



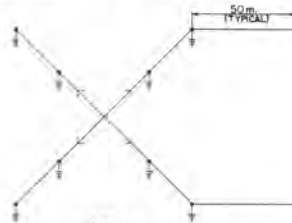
STEP 2

TO BE USED IF THE FOOTING RESISTANCE MEASURED IN STEP 1 IS GREATER THAN 10 OHMS. CONNECT TWO DIAGONALLY OPPOSITE GROUND RODS TO TWO ADDITIONAL GROUND RODS AS SHOWN. MEASURE TOWER FOOTING RESISTANCE.



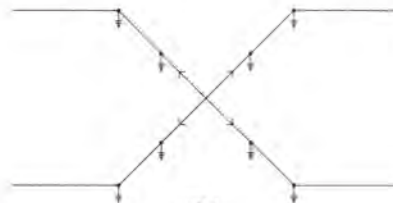
STEP 3

TO BE USED IF THE FOOTING RESISTANCE MEASURED IN STEP 2 IS GREATER THAN 10 OHMS. CONNECT REMAINING TWO GROUND RODS ALONG SECOND TOWER DIAGONAL TO TWO ADDITIONAL GROUND RODS AS SHOWN. MEASURE TOWER FOOTING RESISTANCE.



STEP 4

TO BE USED IF THE FOOTING RESISTANCE MEASURED IN STEP 3 IS GREATER THAN 10 OHMS. INSTALL COUNTERPOISE PARALLEL TO PHASE CONDUCTORS ON ONE SIDE OF TOWER AS SHOWN. MEASURE TOWER FOOTING RESISTANCE.



STEP 5

TO BE USED IF THE FOOTING RESISTANCE MEASURED IN STEP 4 IS GREATER THAN 10 OHMS. INSTALL COUNTERPOISE PARALLEL TO PHASE CONDUCTORS ON SECOND SIDE OF TOWER AS SHOWN. MEASURE TOWER FOOTING RESISTANCE.

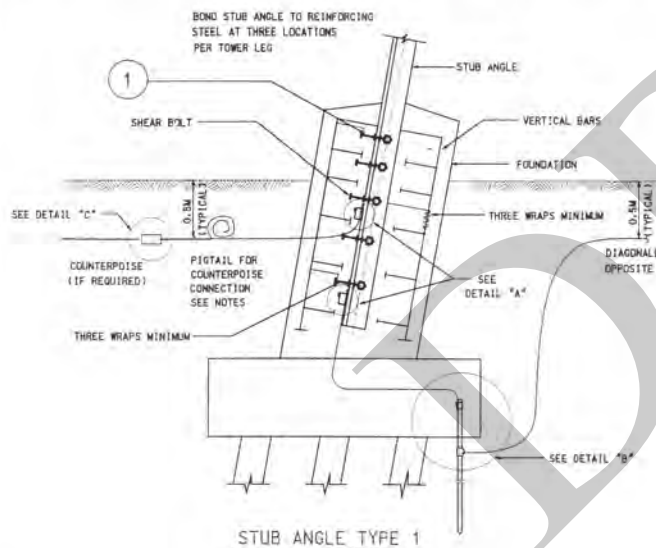
MATERIAL LIST

| ITEM NO. | DESCRIPTION | QUANTITY (PER TOWER) | | | | |
|----------|---|----------------------------|--------|--------|--------|--------|
| | | STEP 1 | STEP 2 | STEP 3 | STEP 4 | STEP 5 |
| 1 | 8 AWG DEAD SOFT GALVANIZED STEEL WIRE. | 12m. ± 15m. | - | - | - | - |
| 2 | NO. 2 AWG. COPPER-CLAD STEEL WIRE. | 75m. 70m. 70m. 100m. 100m. | - | - | - | - |
| 3 | EXOTHERMIC CONNECTOR TYPE CS FOR CABLE TO STEEL SURFACE. (SEE DETAIL "A" & "D") | 4** | - | - | - | - |
| 4 | EXOTHERMIC CONNECTOR TYPE CR1 FOR PARALLEL CABLE TO GROUND ROD. (SEE DETAIL "B") | 4 | 2 | 2 | - | - |
| 5 | EXOTHERMIC CONNECTOR TYPE CR2 FOR PERPENDICULAR CABLE TO GROUND ROD. (SEE DETAIL "B") | 4 | - | - | 2 | 2 |
| 6 | EXOTHERMIC CONNECTOR TYPE CC FOR CABLE TO CABLE. (SEE DETAIL "C") | - | 2 | 2 | - | - |
| 7 | 16 mm x 3 mm (5/8" x 3/16") COPPER CLAD STEEL GROUND ROD. | 4 | 2 | 2 | - | - |

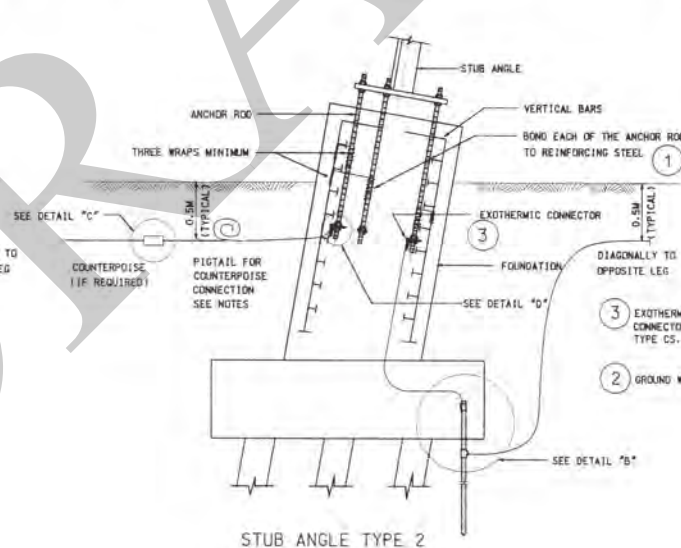
- ** FOR STUB ANGLE TYPE 2
- ** QUANTITY IS ADDITIONAL TO PREVIOUS STEP
- EXAMPLE: TOTAL QUANTITY REQUIRED IN STEP 3 IS 200-245 M.
- *** IF REQUIRED BY EGAT, THE QUANTITY SHALL BE CHANGED FROM 4 TO 8

NOTES

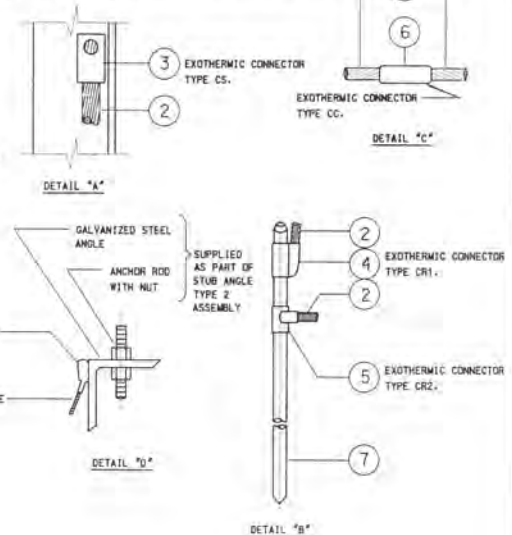
- STEP 1 GROUNDING IS TO BE INSTALLED SUBSEQUENT TO EXCAVATION BUT PRIOR TO PLACEMENT OF FOUNDATION. ADDITIONAL STEPS, IF REQUIRED, ARE TO BE INSTALLED AFTER FOUNDATION WORK HAS BEEN COMPLETED.
- IF TOWER FOOTING RESISTANCE MEASURED AFTER INSTALLATION OF STEP 1 IS GREATER THAN 10 OHMS, PIGTAIL FOR CONNECTION OF COUNTERPOISE SHALL BE LEFT EXTENDING FROM FOUNDATION AS SHOWN.
- IF TOWER FOOTING RESISTANCE MEASURED AFTER INSTALLATION OF STEP 5 IS GREATER THAN 10 OHMS, ADDITIONAL GROUNDING MAY BE INSTALLED AT THE DISCRETION OF EGAT.
- THE USE OF SECTIONAL GROUND RODS IN ANY STEP MAY BE REQUIRED AT THE DISCRETION OF THE ENGINEER.
- THE QUANTITY OF NO. 2 AWG. COPPER-CLAD STEEL WIRE SHOWN ON TABLE "MATERIAL LIST" IS APPROXIMATE AND PROVIDED AS PRIMARY INFORMATION ONLY. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CAREFULLY EXAMINING THE EXACT QUANTITY.



STUB ANGLE TYPE 1



STUB ANGLE TYPE 2



DO NOT AMEND MANUALLY

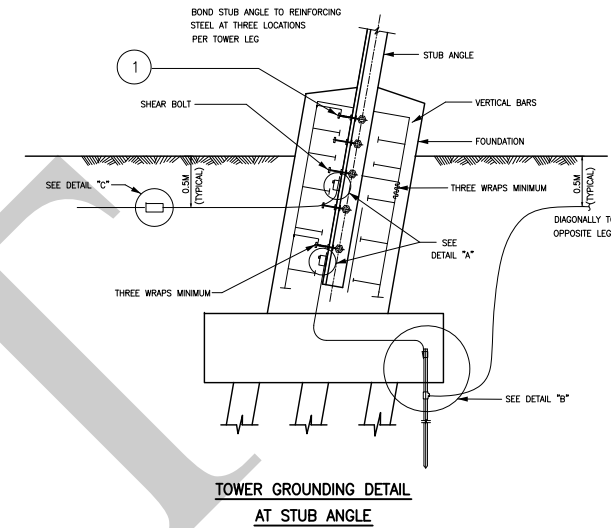
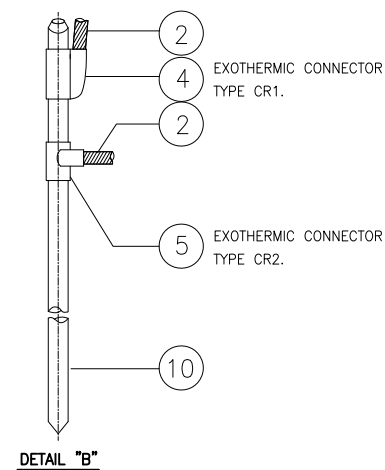
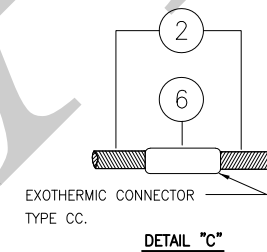
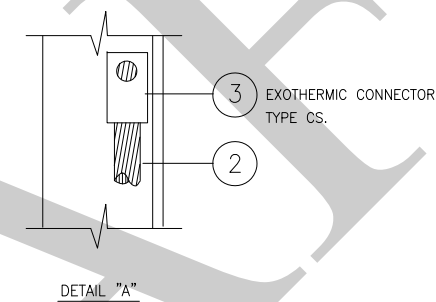
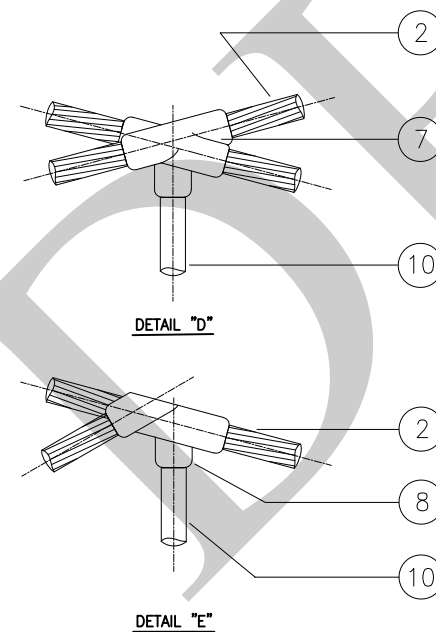
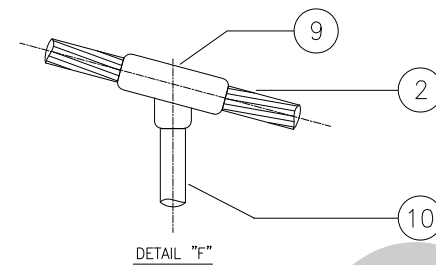
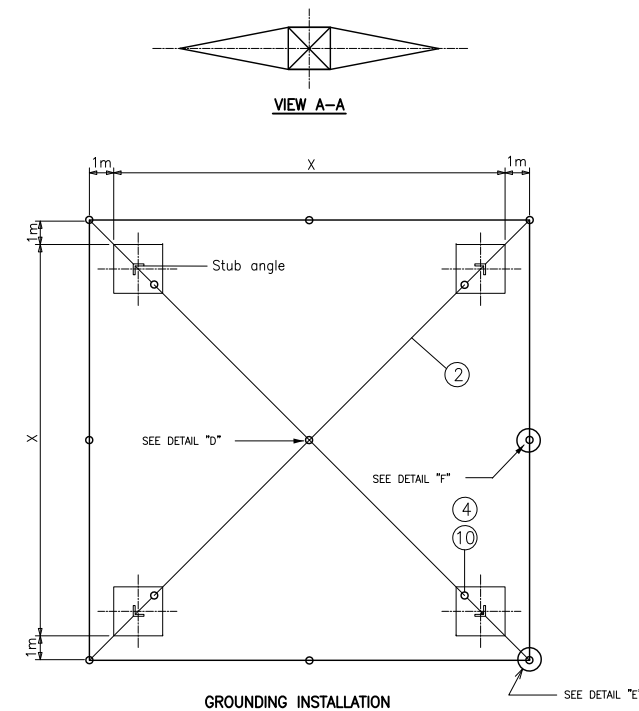
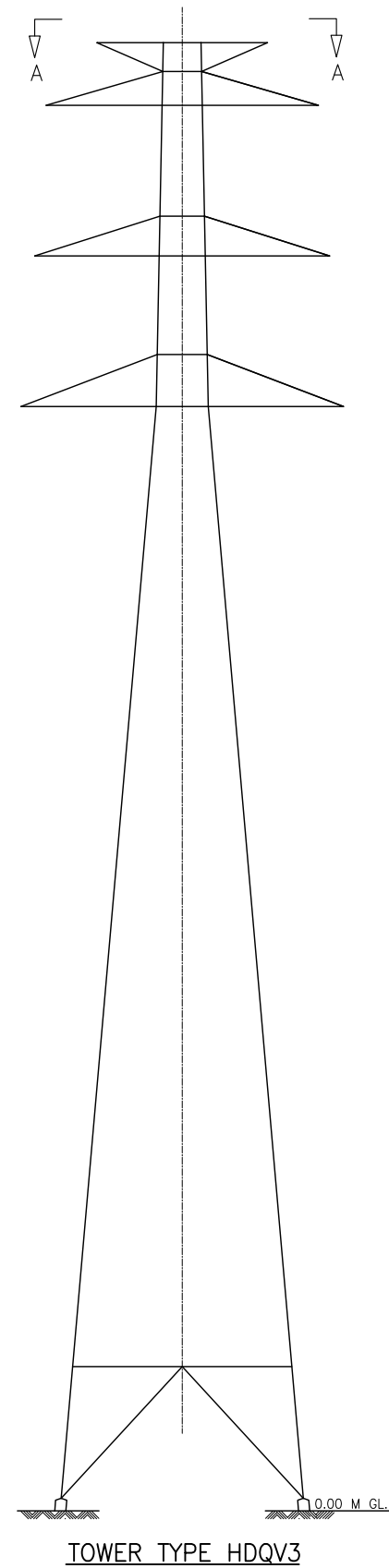
REVISIONS

REVISIONS

REVISIONS

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | |
|------------------|--------------------------|------|----------|
| DESIGNED | V. PHUCHONG | DATE | 11/11/17 |
| REVIEWED | P. PATTANAKUL | DATE | 11/11/17 |
| APPROVED | P. PATTANAKUL | DATE | 11/11/17 |
| PROJECT NO. | 500 kV TRANSMISSION LINE | | |
| PROJECT NAME | TOWER GROUNDING | | |
| PROJECT LOCATION | E31-003 | | |



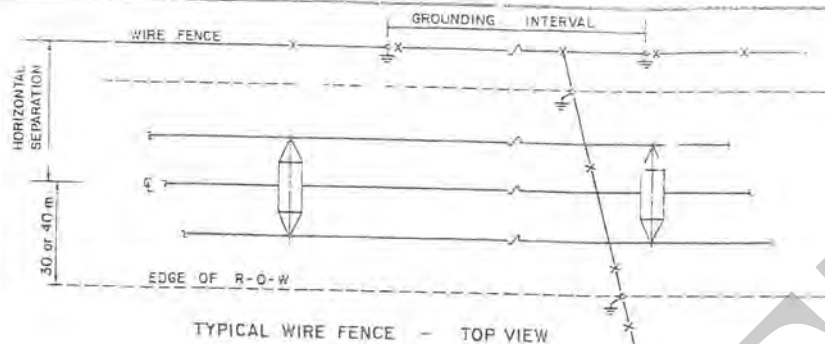
| ITEM NO. | DESCRIPTION | QUANTITY (PER TOWER) |
|----------|--|----------------------|
| 1 | 8 AWG. DEAD SOFT GALVANIZED STEEL WIRE | 12 m |
| 2 | NO. 2 AWG. COPPER-CLAD STEEL WIRE | LUMP SUM |
| 3 | EXOTHERMIC CONNECTOR TYPE CS FOR CABLE TO STEEL SURFACE (SEE DETAIL "A") | 8 |
| 4 | EXOTHERMIC CONNECTOR TYPE CR1 FOR PARALLEL CABLE TO GROUND ROD (SEE DETAIL "B") | 4 |
| 5 | EXOTHERMIC CONNECTOR TYPE CR2 FOR PERPENDICULAR CABLE TO GROUND ROD (SEE DETAIL "B") | 4 |
| 6 | EXOTHERMIC CONNECTOR TYPE CC FOR CABLE TO CABLE (SEE DETAIL "C") | 4 |
| 7 | EXOTHERMIC CONNECTOR FOR CABLE TO CABLE AND GROUND ROD (SEE DETAIL "D") | 1 |
| 8 | EXOTHERMIC CONNECTOR FOR CABLE TO CABLE AND GROUND ROD (SEE DETAIL "E") | 4 |
| 9 | EXOTHERMIC CONNECTOR FOR CABLE TO CABLE AND GROUND ROD (SEE DETAIL "F") | 4 |
| 10 | 16 MM X 3 M (5/8" X 10') COPPER CLAD STEEL GROUND ROD | 13 |
| | | |

NOTES:

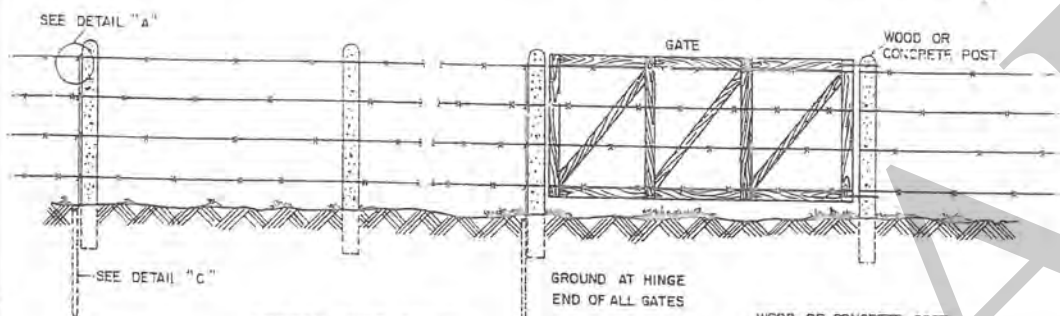
1. ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT AS NOTED.
2. GROUNDING SHALL BE INSTALLED AFTER EXCAVATION BUT PRIOR TO INSTALLATION OF FOUNDATION, ADDITIONAL STEPS SHALL BE PERFORMED IMMEDIATELY AFTER THE COMPLETION OF FOUNDATION WORK.
3. IF GROUND RESISTANCE MEASURED AFTER COMPLETION OF INSTALLATION OF EACH TYPE IS GREATER THAN 10 OHMS, ADDITIONAL GROUNDING MAY BE INSTALLED, USING GROUND ROD OR COUNTERPOISE AS DIRECTED BY EGAT. HOWEVER THE TOTAL LENGTH OF EACH COUNTERPOISE WIRE SHALL BE EXCEED 60 M.
4. HAND-HAMMERING OF STANDARD GROUND ROD OR SECTIONAL GROUND ROD IS NOT PERMITTED. DRIVING OF GROUND RODS SHALL BE PERFORMED BY THE USE OF HAND-OPERATED WEIGHT PIPE. IF THE SOIL IS HARD OR DENSE, IT IS REQUIRED TO USE MECHANICALLY OPERATED HAMMER, EITHER ELECTRIC PNEUMATIC OR PETROL ENGINE DRIVE. DRAWINGS OF SUCH MECHANICALLY OPERATED HAMMER SHALL BE SUBMITTED FOR APPROVAL PRIOR TO DRIVING.
5. QUANTITIES OF MATERIALS AS SPECIFIED IN THE MATERIAL LIST ARE FOR THE TOWER HDQV3.

TABLE 1

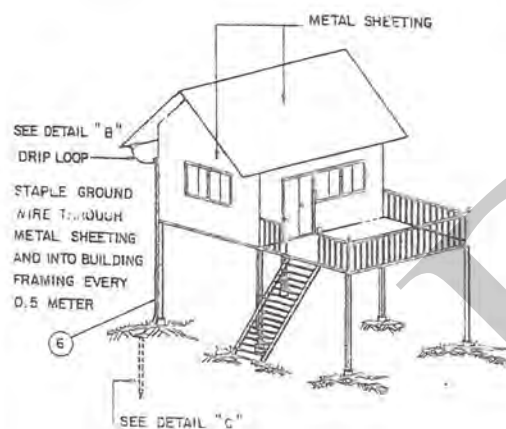
| AVERAGE HORIZONTAL SEPARATION | APPROXIMATE GROUNDING INTERVAL |
|-------------------------------|--------------------------------|
| 30 m. | 25 m. |
| 40 m. | 35 m. |
| 50 m. | 45 m. |
| 100 m. | 60 m. |



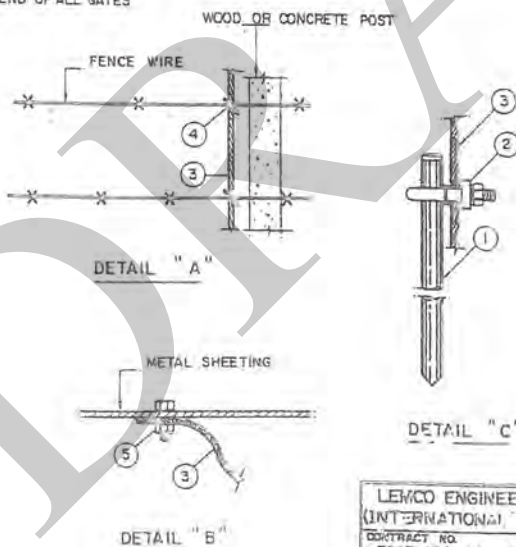
TYPICAL WIRE FENCE - TOP VIEW



TYPICAL WIRE FENCE



TYPICAL METAL STRUCTURE



BILL OF MATERIAL

| ITEM NO. | DESCRIPTION | QUANTITY PER FENCE GROUND | QUANTITY PER METAL OBJECT GND. |
|----------|--|---------------------------|--------------------------------|
| ① | 16 mm x 3 m. (5/8" x 10') | 1 | 1 |
| ② | GALVANIZED DOUBLE SADDLE GROUND ROD CLAMP | 1 | 1 |
| ③ | 8 mm. (5/16") 17-STRAND GALVANIZED STEEL GROUND WIRE | 2 m. | AS REQ'D (EST. 5 m.) |
| ④ | GALVANIZED CRIMPET | AS REQ'D (EST. 4) | — |
| ⑤ | 19 mm. DIA. BRONZE SPLIT BOLT | — | AS REQ'D (EST. 1) |
| ⑥ | 9.5 mm. (3/8") GALVANIZED STEEL STAPLES | — | AS REQ'D (EST. 14) |

NOTES

1. FENCES CROSSING UNDER THE 500 kV TRANSMISSION LINE ARE TO BE GROUNDED AT EACH EDGE OF THE RIGHT OF WAY. FENCES PARALLELING THE TRANSMISSION LINE ARE TO BE GROUNDED AT INTERVALS GIVEN IN TABLE 1. GROUNDING INTERVALS MAY BE ADJUSTED AT THE DISCRETION OF EGAT.
2. ALL LARGE CONDUCTING OBJECTS OR LARGE PARTS OF OBJECTS WITHIN 60 METERS OF THE TRANSMISSION LINE CENTERLINE ARE TO BE GROUNDED, THIS REQUIREMENT MAY BE VARIED AT THE DISCRETION OF EGAT.
3. ALL FENCE WIRE AND METAL SURFACES TO WHICH GROUND WIRES ARE TO BE CONNECTED SHALL BE CLEANED OF SCALE AND RUST AND THEN COATED WITH AN OXIDE-INHIBITING COMPOUND.
4. EGAT WILL DETERMINE WHAT GROUNDING, IF ANY, IS REQUIRED FOR ELECTRIC FENCES.
5. GALVANIZING SHALL BE IN ACCORDANCE WITH ASTM A153 EXCEPT THAT THE WEIGHT OF ZINC COATING SHALL EXCEED THAT REQUIRED BY ASTM BY THIRTY PERCENT.

LEMCO ENGINEERS
(INTERNATIONAL) INC.CONTRACT NO.
EGAT 47/1-30-5036

DESIGNED BY: [Signature]

REVIEWED BY: [Signature]

SUBMITTED BY: [Signature]

APPROVED BY: [Signature]

DATE: [Signature]

ELECTRICITY GENERATING AUTHORITY OF THAILAND

DESIGNED BY: [Signature] 500 kV TRANSMISSION SYSTEM PROJECT

REVIEWED BY: [Signature]

SUBMITTED BY: [Signature]

APPROVED BY: [Signature]

DATE: [Signature]

JEP-GEN. CHAIRMAN - HYDRO POWER AND TRANS. SYSTEM DEVELOPMENT

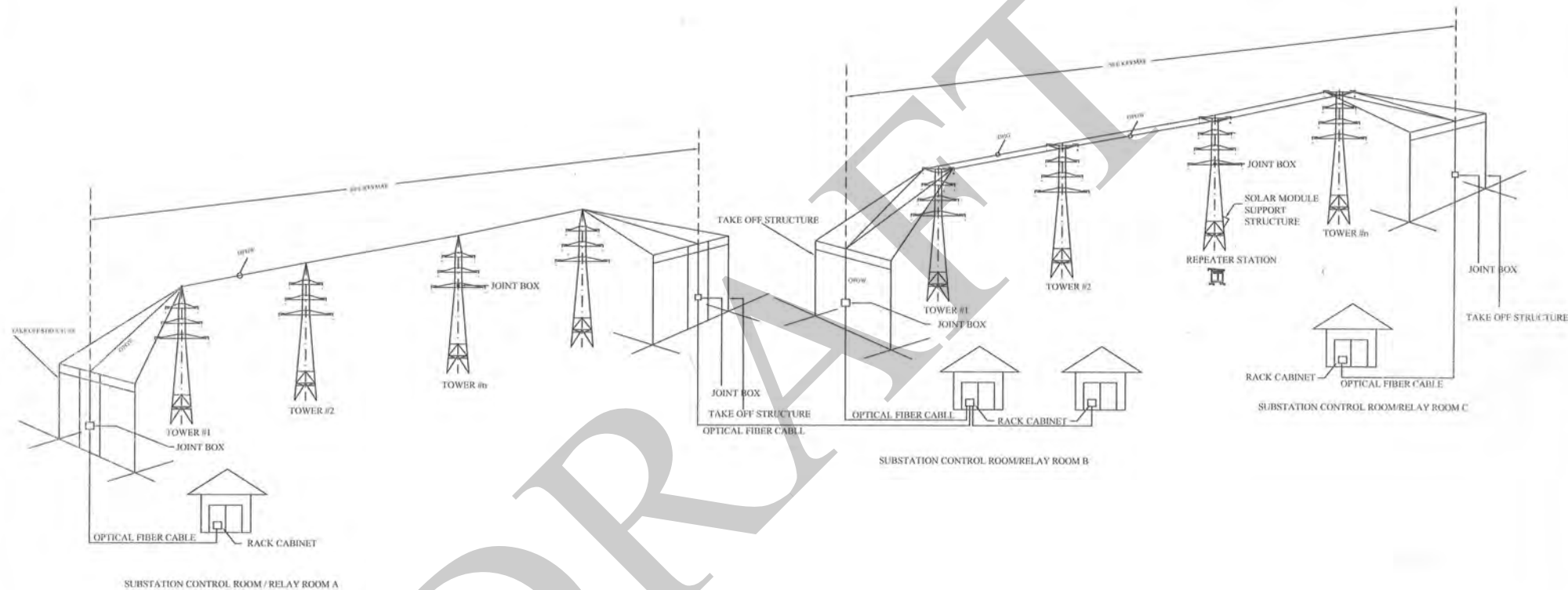
FENCE & METAL OBJECT GROUNDING
500 kV TRANSMISSION SYSTEM

JOB NO. [Signature]

REPLACING DUE TO [Signature]

MM-ENVE-T-15.2 5-7. EN-T-15.2

REVISI
NO DATE
REVISION
CONCURRED APPROVED



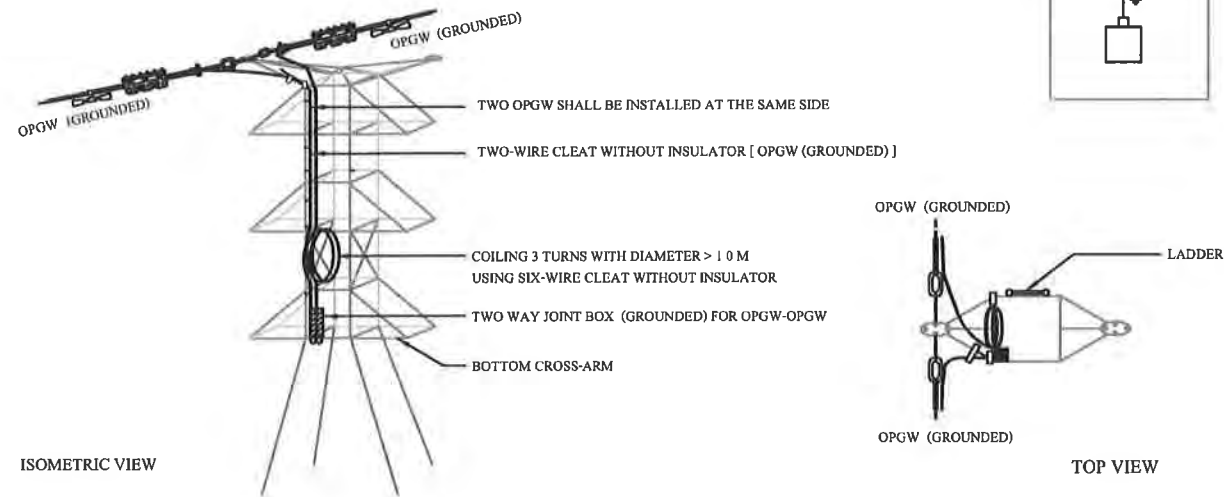
NOTE :

- 1 THE BIDDER SHALL DESIGN THE BURRIED CABLE ROUTE BY USING SUBSTATION GENERAL LAYOUT
- 2 SOLAR MODULE SUPPORT STRUCTURE SEE DRAWING NO. DW-FOT-D01-216-01
- 3 REPEATER STATION LOCATION SEE DRAWING NO. DW-FOT-D01-217

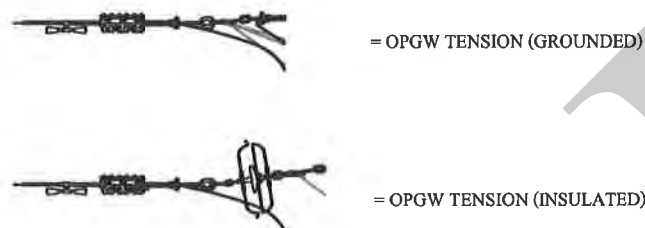
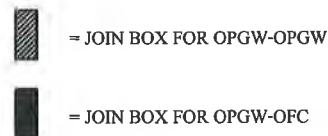
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|------|-------------|-------------|------------|--|-------------|--|----------------|
| | | DESIGNED | REVISED BY | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | REVISION |
| | | DRAWN | | COMMUNICATION SYSTEM DIVISION | | | 0002 |
| | | CHECKED | DATE | DRAWING NAME GENERAL CONFIGURATION OF OPGW IN POWER TRANSMISSION LINK(SINGLE/DOUBLE CIRCUIT) | | | DWG. NO. |
| | | APPROVED BY | DATE | REGION/STATION | | | DW-FOT-D01-202 |
| | | | | EQUIPMENT | | | 111-01 |
| DATE | DESCRIPTION | | | PROJECT | PAGE NO. P1 | | CPE JOB NO. |

TYPE AND INSTALLATION OF JONT BOX FOR 115 KV , 230 KV & 500 KV (GROUNDED)

TWO WAY JOINT BOX (GROUNDED) FOR OPGW-OPGW



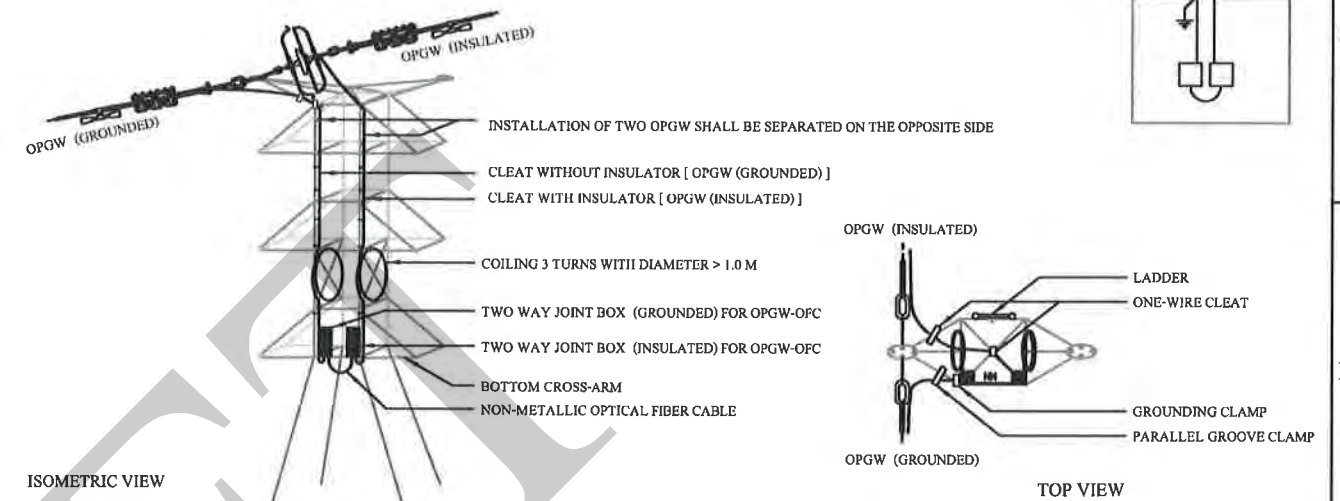
NOTE:
OPGW = COMPOSITED OVERHEAD GROUND WIRE WITH OPTICAL FIBER
NM = NON-METALLIC OPTICAL FIBER CABLE



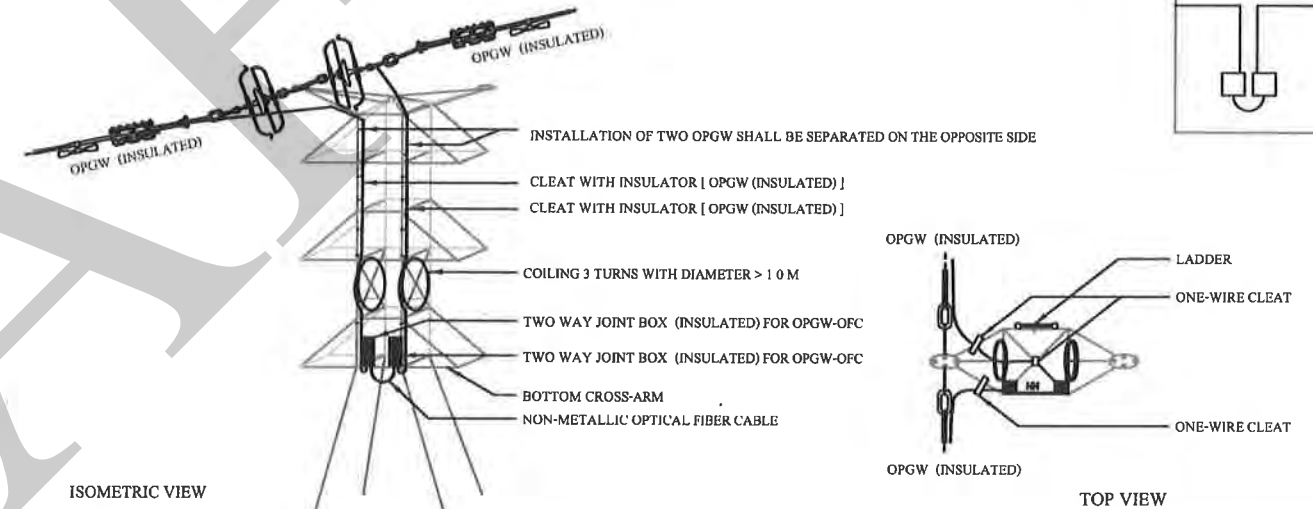
* JUMPER CLAMPS SHALL BE PROVIDED & INSTALLED IF SPECIFIED IN PRICE SCHEDULE.

TYPE AND INSTALLATION OF JONT BOX FOR 500 KV (GROUNDED & INSULATED)

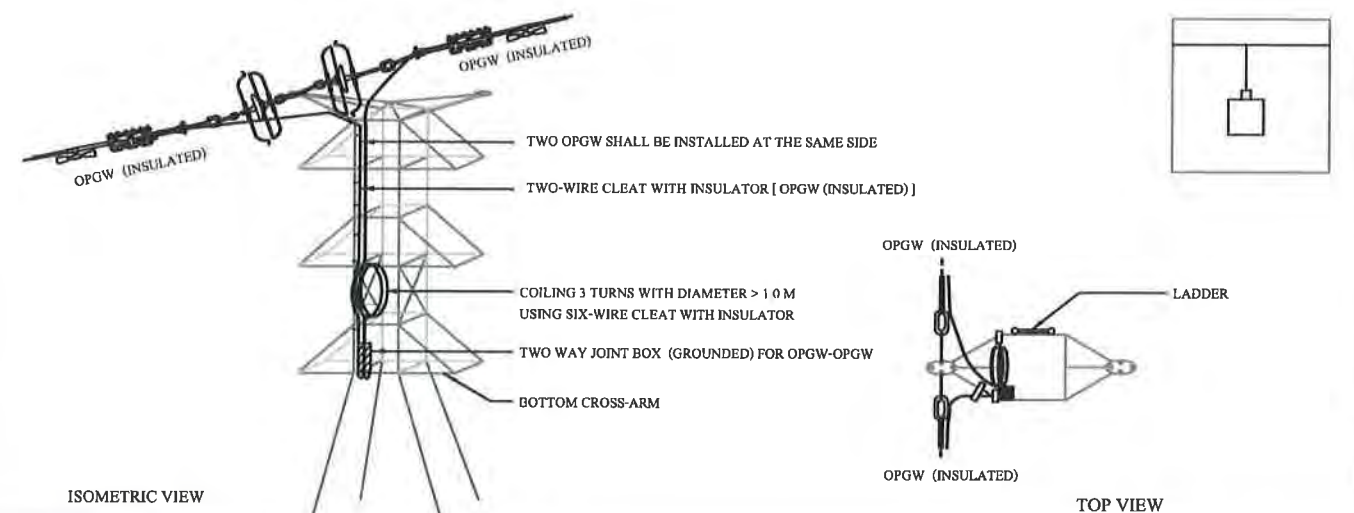
TWO WAY JOINT BOX (GROUNDED) FOR OPGW-OFC AND TWO WAY JOINTBOX (INSULATED) FOR OPGW-OFC



TWO WAY JOINT BOX (INSULATED) OPGW- OFC AND TWO WAY JOINTBOX (INSULATED) FOR OPGW- OFC

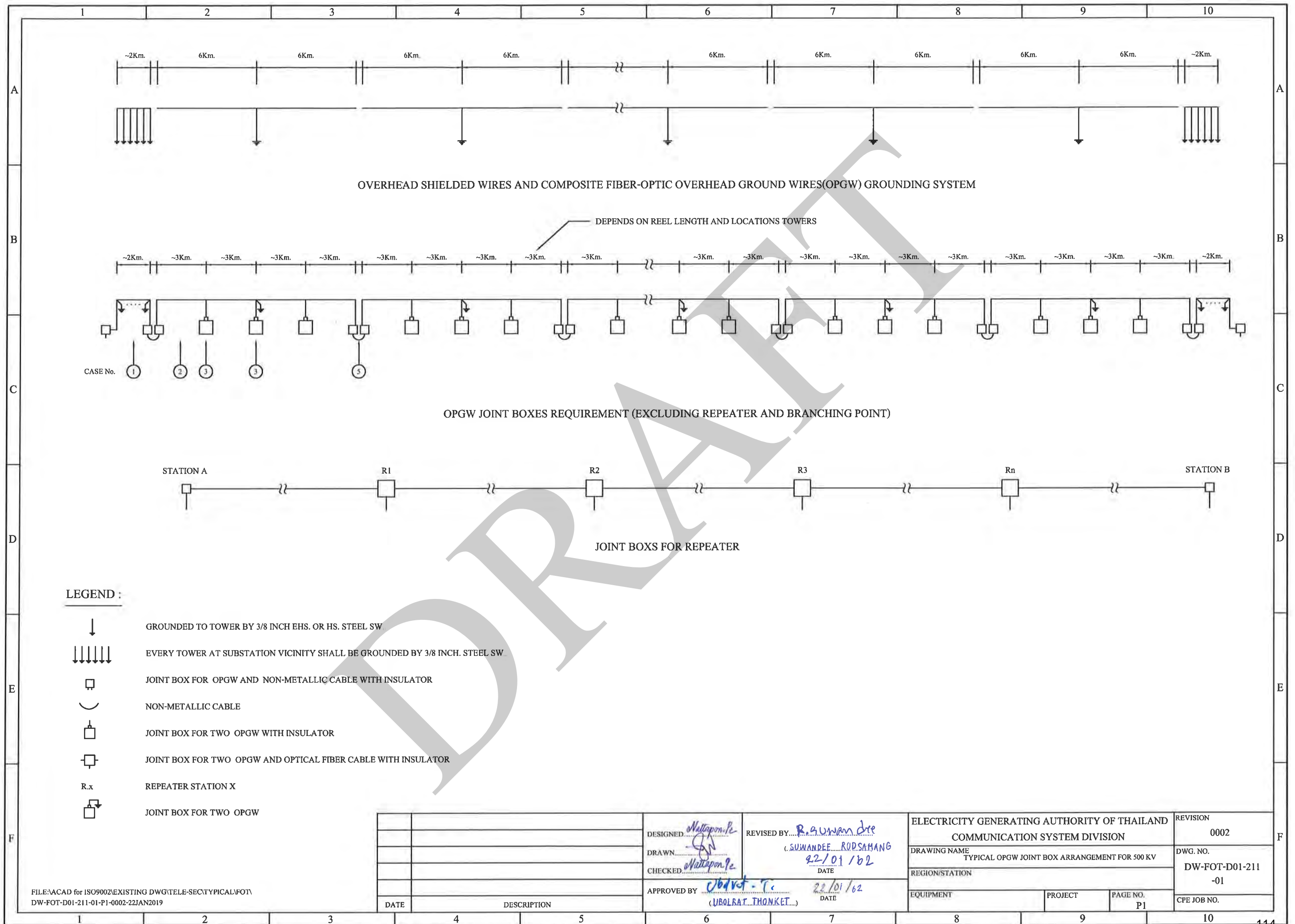


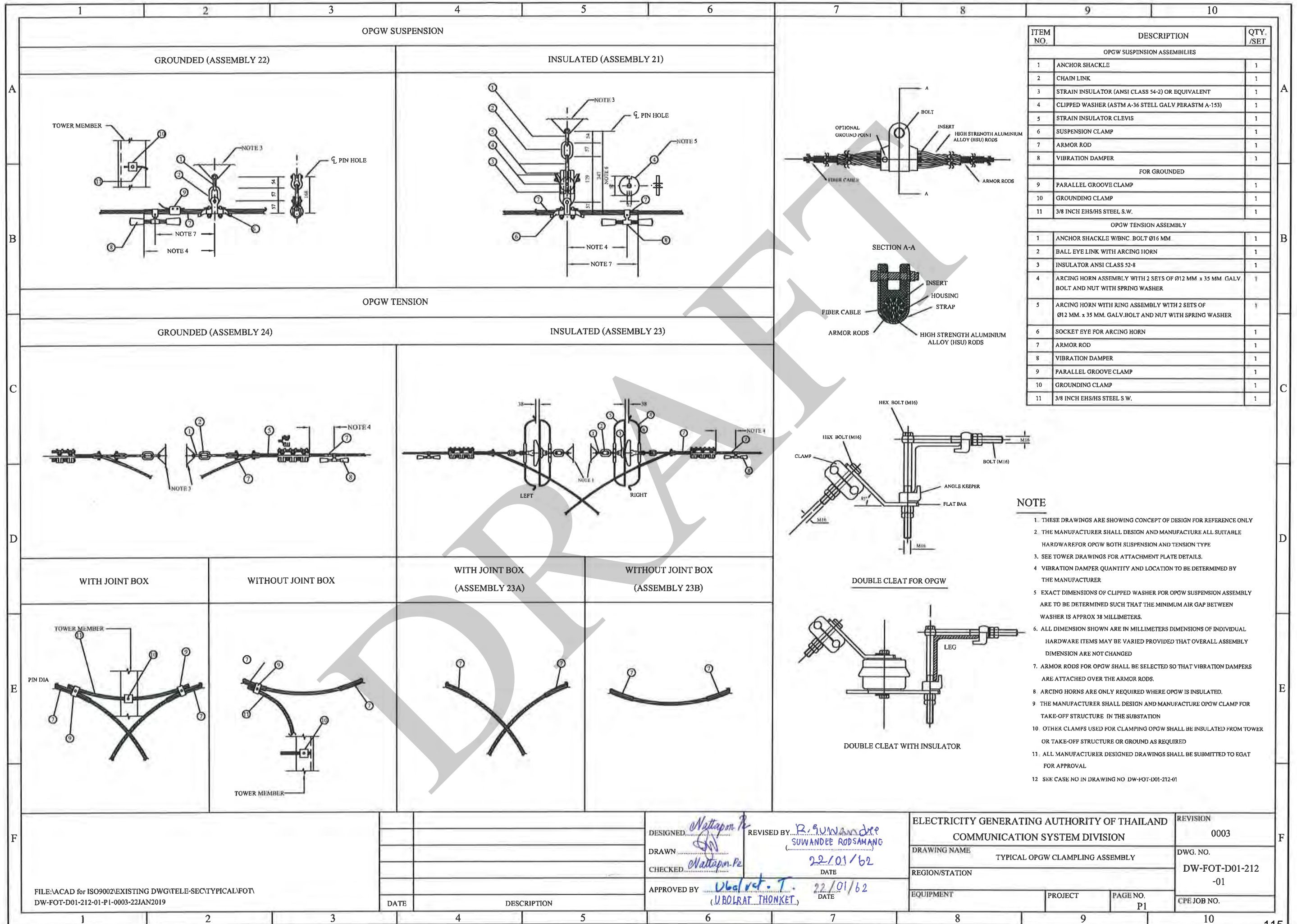
TWO WAY JOINT BOX (INSULATED) OPGW- OPGW

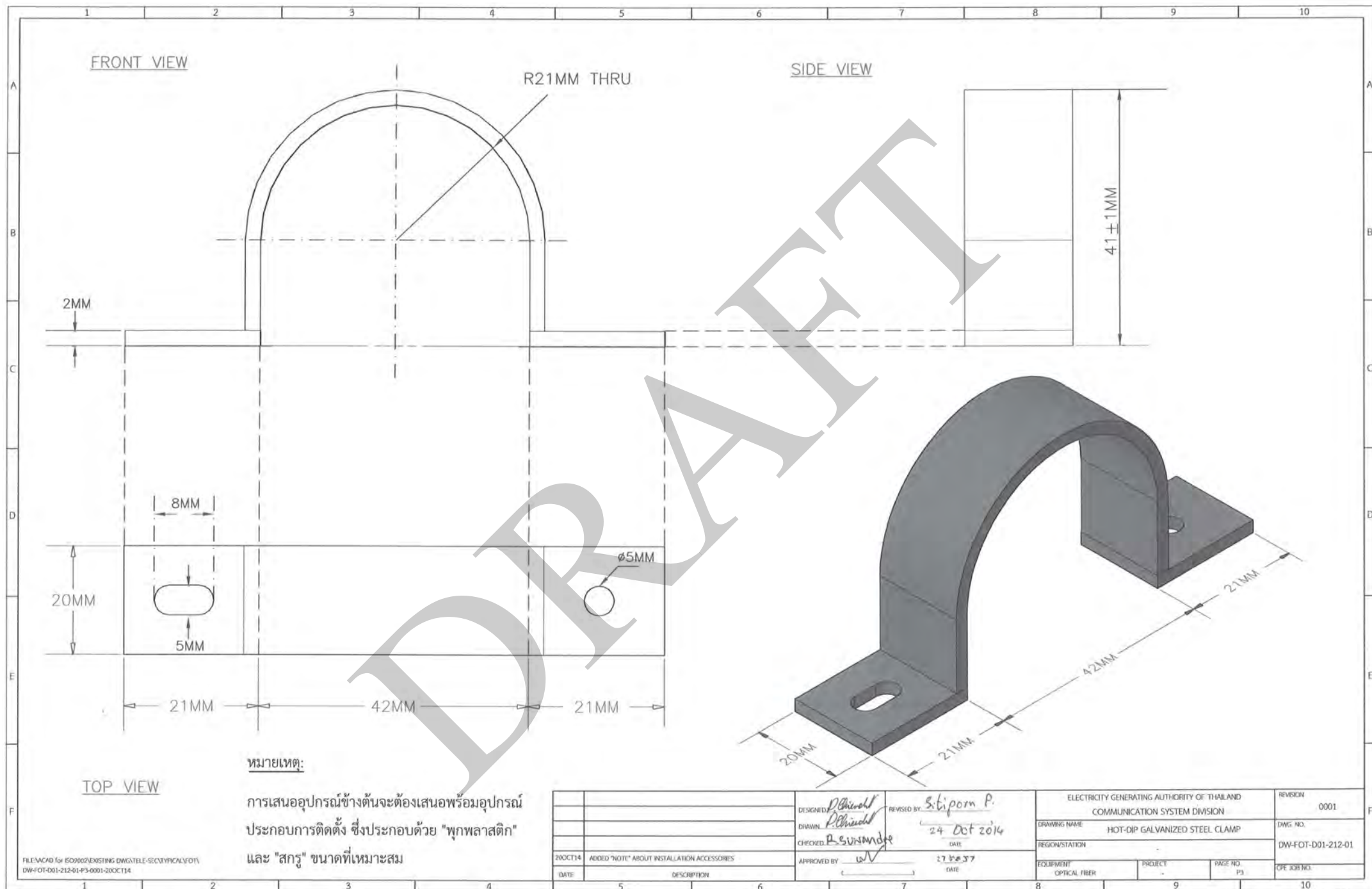


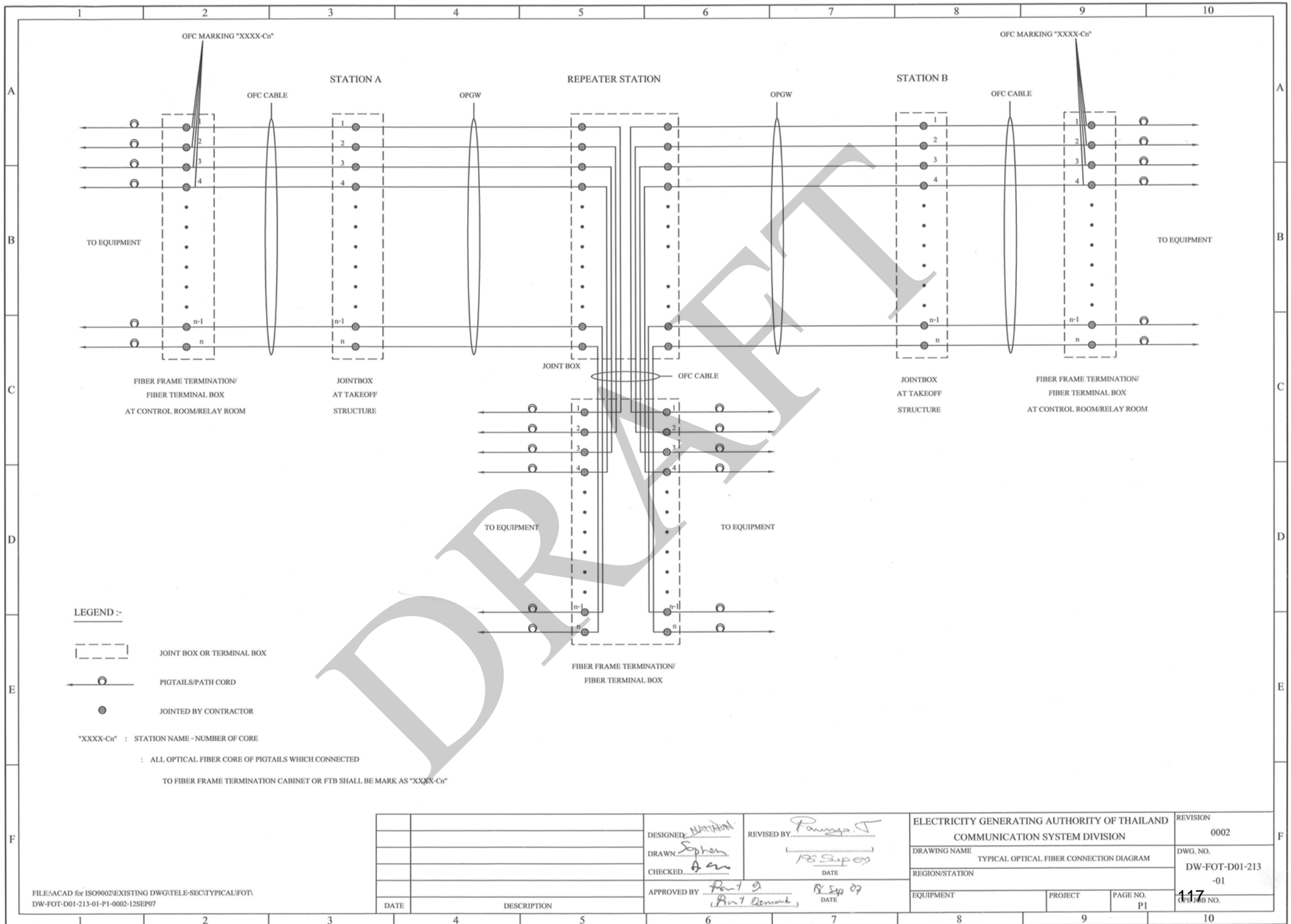
DESIGNED *Nattapon P.* REVISD BY *R. Suwandee*
DRAWN *Nattapon P.* *SUWANDEE RODSAMANG*
CHECKED *Nattapon P.* *22/01/62*
DATE
APPROVED BY *Ubolrat T.* *22/01/62*
DATE
(UBOLRAT THONKHET)

| | | | |
|--|---------|----------|-------------------|
| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | REVISION |
| COMMUNICATION SYSTEM DIVISION | | | 0003 |
| DRAWING NAME | | | DWG. NO. |
| TYPE AND INSTALLATION OF JOINT BOX | | | DW-FOT-D01-207-01 |
| REGION/STATION | | | CPE JOB NO. |
| TYPICAL | | | |
| EQUIPMENT | PROJECT | PAGE NO. | |
| OPGW & OFC | | P1 | |

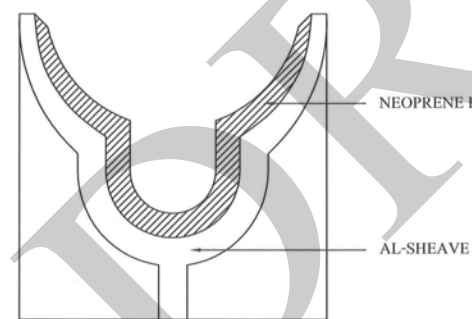
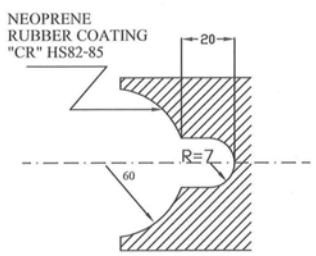
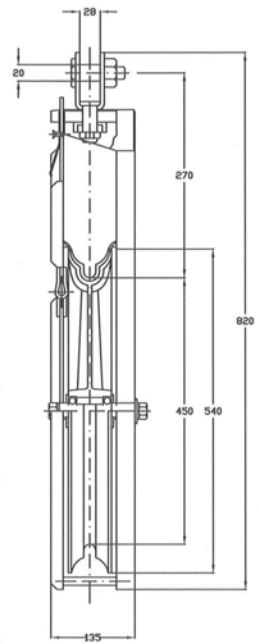
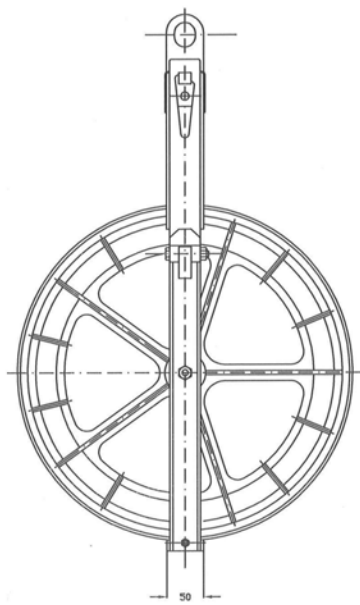




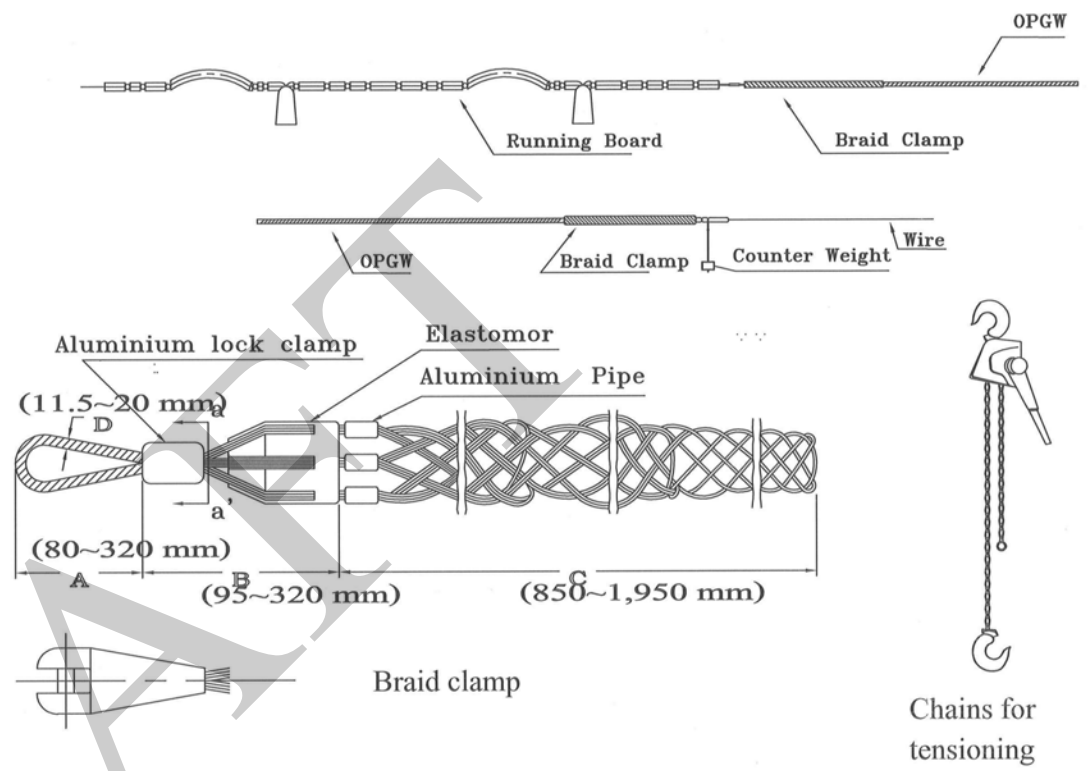




| | | | | | | | |
|------|--|----------------------------|---------------------------|--|--|----------------|--|
| | | DESIGNED <i>Marion</i> | REVISED BY <i>Panna T</i> | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | REVISION | |
| | | DRAWN <i>Sophon</i> | DATE <i>18 Sep 07</i> | COMMUNICATION SYSTEM DIVISION | | 0002 | |
| | | CHECKED <i>A. C.</i> | | DRAWING NAME | | DWG. NO. | |
| | | | | TYPICAL OPTICAL FIBER CONNECTION DIAGRAM | | DW-FOT-D01-213 | |
| | | APPROVED BY <i>Panna T</i> | DATE <i>18 Sep 07</i> | REGION/STATION | | -01 | |
| | | | | EQUIPMENT | | JOB NO. | |
| DATE | | DESCRIPTION | | PROJECT | | PAGE NO. P1 | |

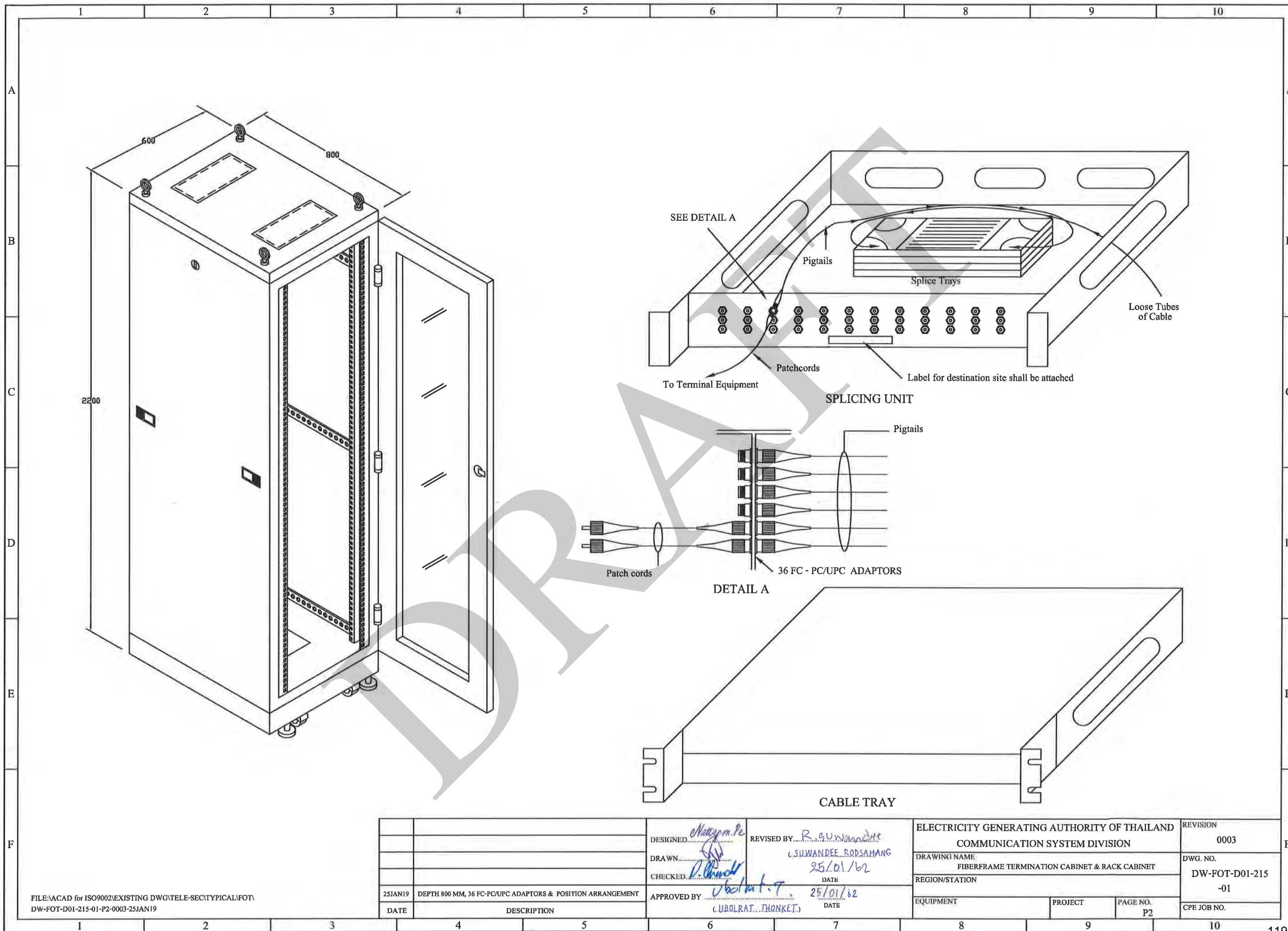


OPGW Stringing Block



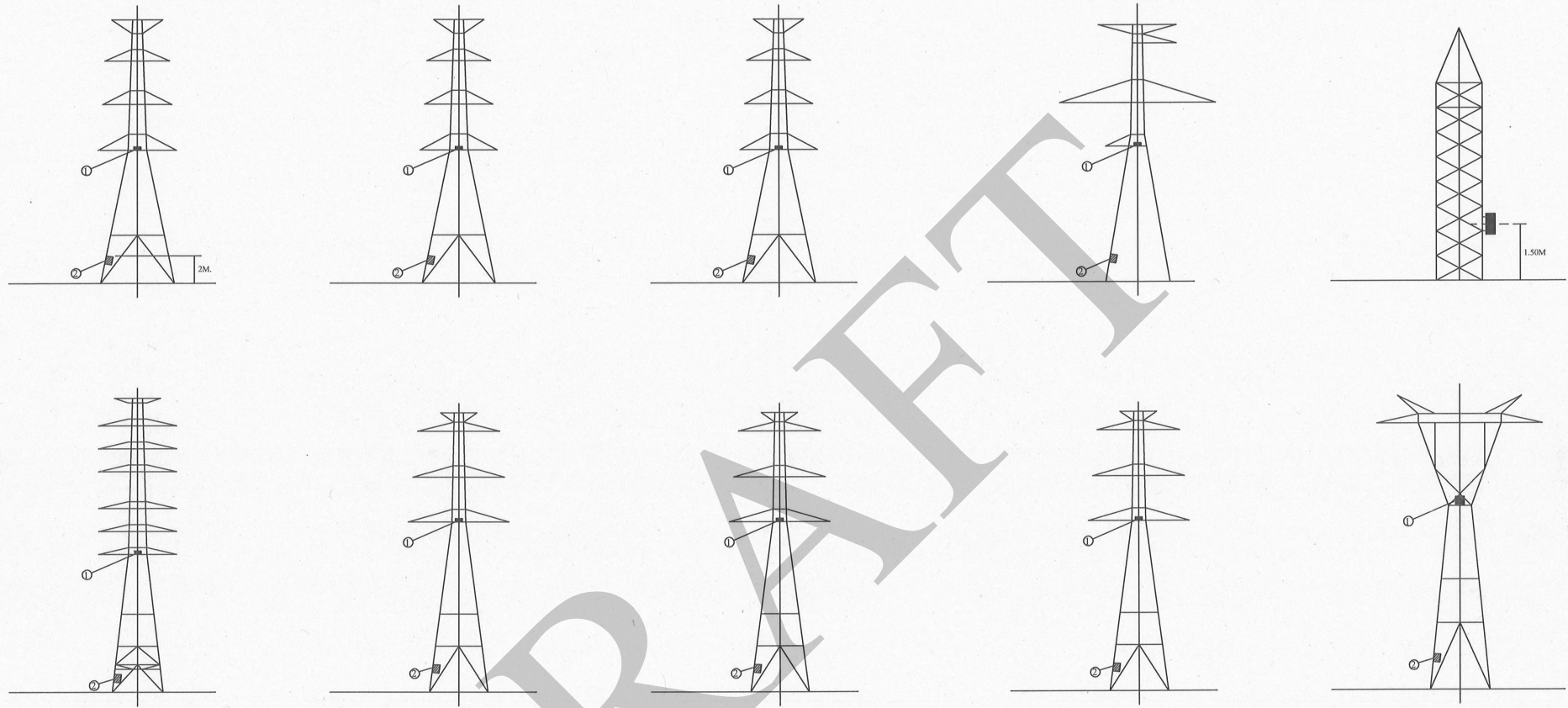
NOTE:
1. ALL DIMENSION ARE IN MILLIMETERS.

| | | | | | | | | |
|------|-------------|----------------------------|--------------------------|--|--|--|----------------|-----|
| | | DESIGNED <u>M. N. N.</u> | REVISED BY <u>Pamgaj</u> | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | REVISION | |
| | | DRAWN <u>Sophon</u> | <u>B. Supon</u> | COMMUNICATION SYSTEM DIVISION | | | 0002 | |
| | | CHECKED <u>B. N.</u> | DATE | DRAWING NAME | | | DWG. NO. | |
| | | | | TYPICAL INSTALLATION EQUIPMENT FOR OPGW | | | DW-FOT-D01-214 | |
| | | APPROVED BY <u>B. N. 2</u> | <u>B. Supon</u> | REGION/STATION | | | -01 | |
| | | <u>B. N. 2</u> | DATE | EQUIPMENT | | | DWG. NO. | |
| DATE | DESCRIPTION | | | PROJECT | | | PAGE NO. | 118 |
| | | | | | | | P1 | |



FILE:\ACAD for ISO9002\EXISTING DWG\TELE-SEC\TYPICAL\FOT\ DW-FOT-D01-215-01-P2-0003-25JAN19

| | | | | | | | |
|---------|--|---|-----------------------------------|---|--|----------------|-------------|
| | | DESIGNED..... <i>Matipon Pe</i> | REVISED BY..... <i>R. g. unan</i> | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | REVISION | |
| | | DRAWN..... <i>D. Phuch</i> | (<i>SUWANDEE BODSAMANG</i>) | COMMUNICATION SYSTEM DIVISION | | 0003 | |
| | | CHECKED..... <i>Ubolrat Thonket</i> | 25/01/62 | DRAWING NAME: | | DWG. NO. | |
| | | APPROVED BY..... <i>Ubolrat Thonket</i> | 25/01/62 | FIBERFRAME TERMINATION CABINET & RACK CABINET | | DW-FOT-D01-215 | |
| | | | | REGION/STATION | | -01 | |
| 25JAN19 | DEPTH 800 MM, 36 FC-PC/UPC ADAPTORS & POSITION ARRANGEMENT | | | EQUIPMENT | | PAGE NO. | CPE JOB NO. |
| DATE | DESCRIPTION | | | | | P2 | |



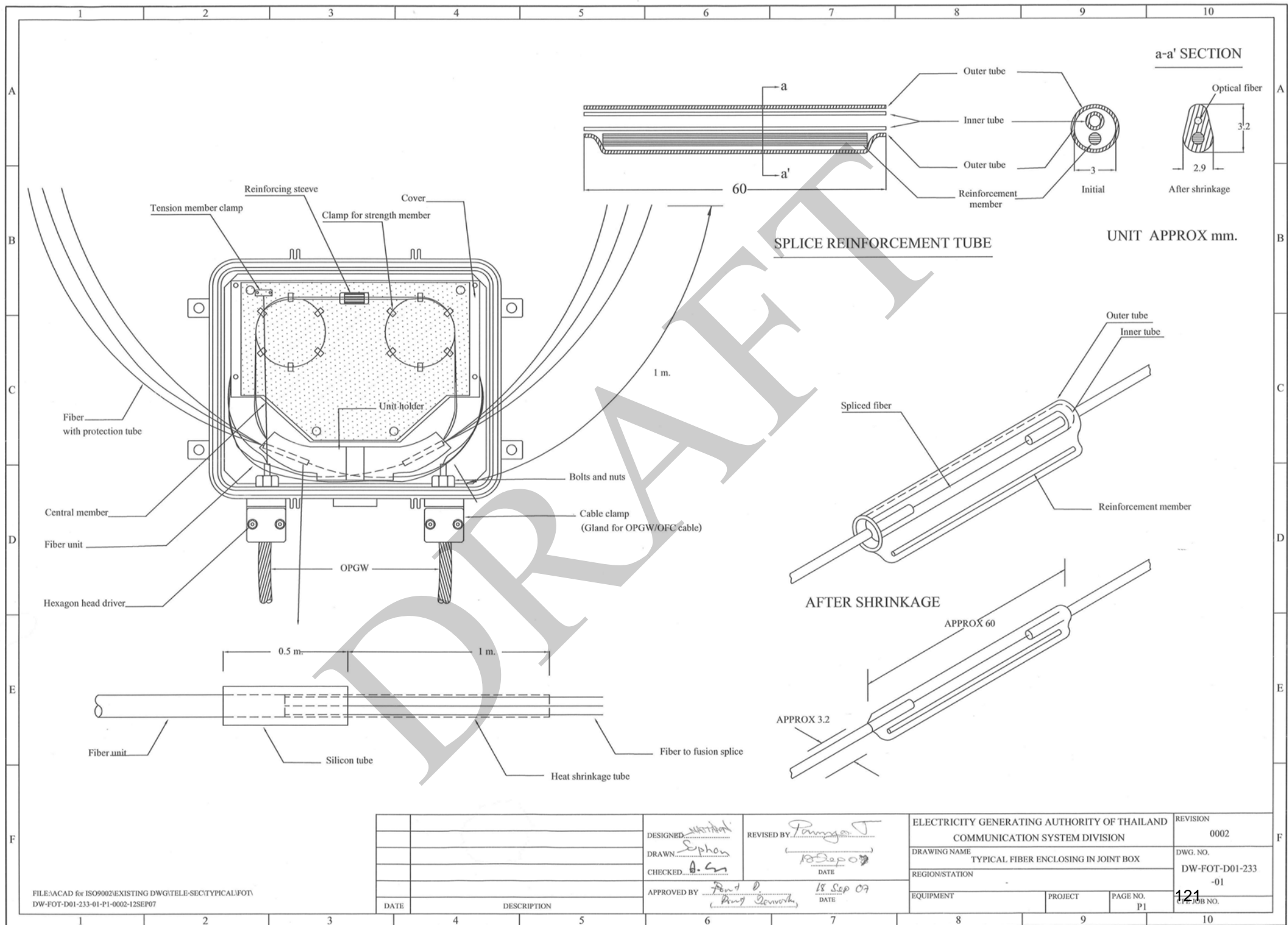
NOTE :

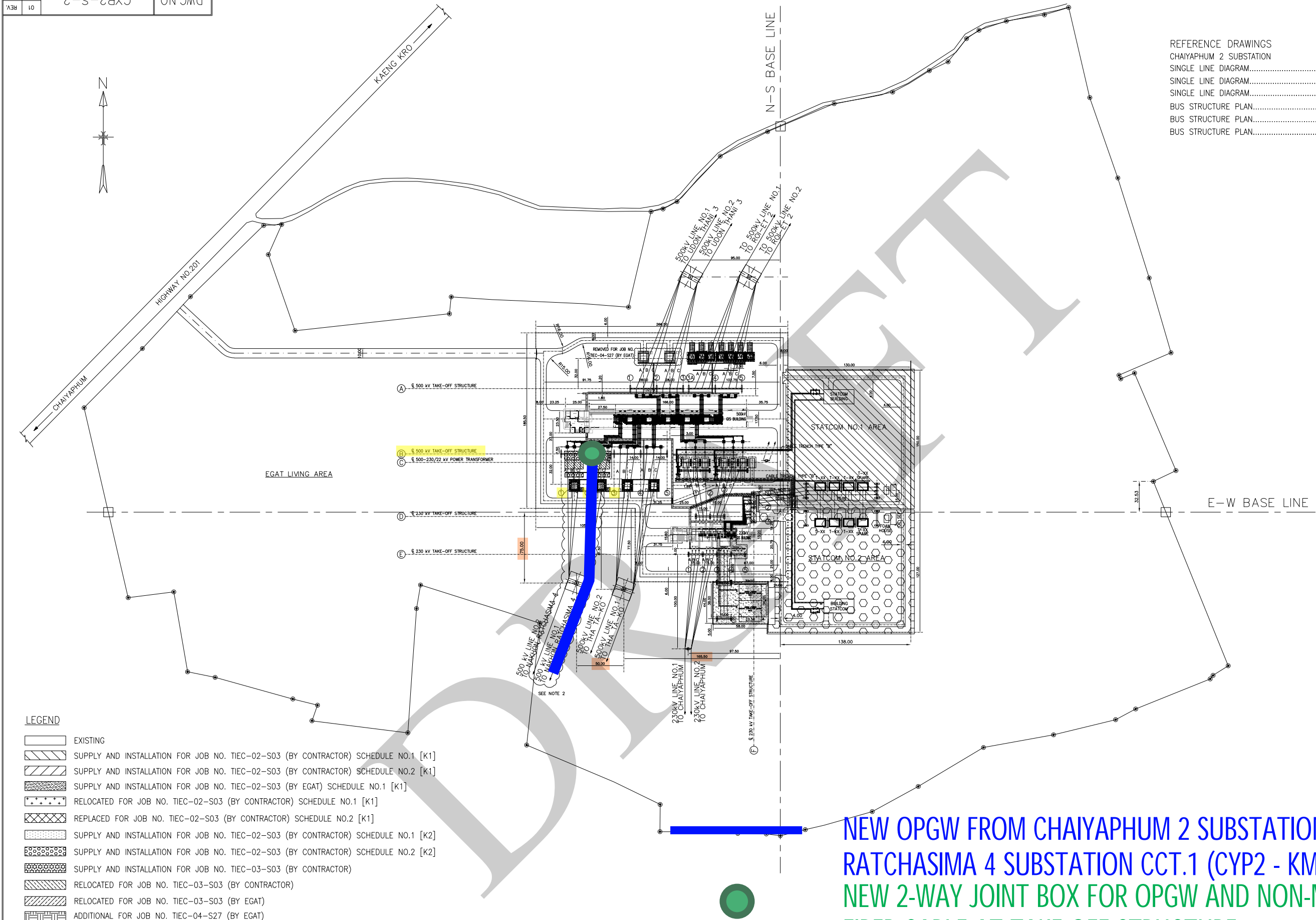
- 1 ALL JOINT BOXES(INSULATED) SHALL BE SEPARATED FROM STEEL STRUCTURE BY INSULATOR WITH INSULATION LEVEL NOT LESS THAN 20 KV.(LOW FREQUENCY WET FLASHOVER)
- 2 JOINT BOXES AND SUITABLE MOUNTING METHOD SHALL BE DESIGNED BY MANUFACTURER FOR FIELD INSTALLATION
- 3 ALL MANUFACTURER DESIGNED DRAWINGS SHALL BE SUBMITTED TO EGAT FOR APPROVALS
- 4 SEE TOWER DRAWING FOR DIMENSION AND ATTACHMENT MEMBERS DETAILS
- 5 SEPARATION BETWEEN TWO JOINT BOXES ON THE SAME TOWER SHALL NOT BE LESS THAN 50.00CM
- 6 WARNING SIGNS ARE TO BE FIELD INSTALLED ON ALL TOWER TO WHICH JOINT BOXES ARE ATTACHED DETAILS OF SUCH SIGNS ARE TO BE APPROVED BY EGAT REFER TO DRAWING CONTAINED HERIN
- 7 THE OPGW SHALL HAVE THE SURPLUS LENGTH FOR COILING OF 1-2 TURNS WITH THE DIAMETER OF 1 METER TO BE ATTACHED WITH SUITABLE CLAMP ABOVE THE JOINT BOX

NOTE :

- ① ■ JOINT BOX
② ■ WARNING SIGN AND DANGER SIGN

| | | | | |
|------------------|--------------|--|--|----------------|
| DESIGNED..... | REVISOR..... | ELECTRICITY GENERATING AUTHORITY OF THAILAND | | REVISION |
| DRAWN..... | DATE..... | COMMUNICATION SYSTEM DIVISION | | 0002 |
| CHECKED..... | DATE..... | DRAWING NAME | | DWG. NO. |
| APPROVED BY..... | DATE..... | TYPICAL OPGW JOINT BOX MOUNTING POSITION | | DW-FOT-D01-221 |
| DATE | DESCRIPTION | REGION/STATION | | -01 |
| | | EQUIPMENT | | CPE NO. |
| | | PROJECT | | 120 |
| | | PAGE NO. | | |
| | | P1 | | |





| REFERENCE DRAWINGS | |
|--------------------------|------------------------|
| CHAIYAPHUM 2 SUBSTATION | |
| SINGLE LINE DIAGRAM..... | DWG.NO. CYP2-S-1-01/03 |
| SINGLE LINE DIAGRAM..... | DWG.NO. CYP2-S-1-02/03 |
| SINGLE LINE DIAGRAM..... | DWG.NO. CYP2-S-1-03/03 |
| BUS STRUCTURE PLAN..... | DWG.NO. CYP2-S-3-01/03 |
| BUS STRUCTURE PLAN..... | DWG.NO. CYP2-S-3-02/03 |
| BUS STRUCTURE PLAN..... | DWG.NO. CYP2-S-3-03/03 |

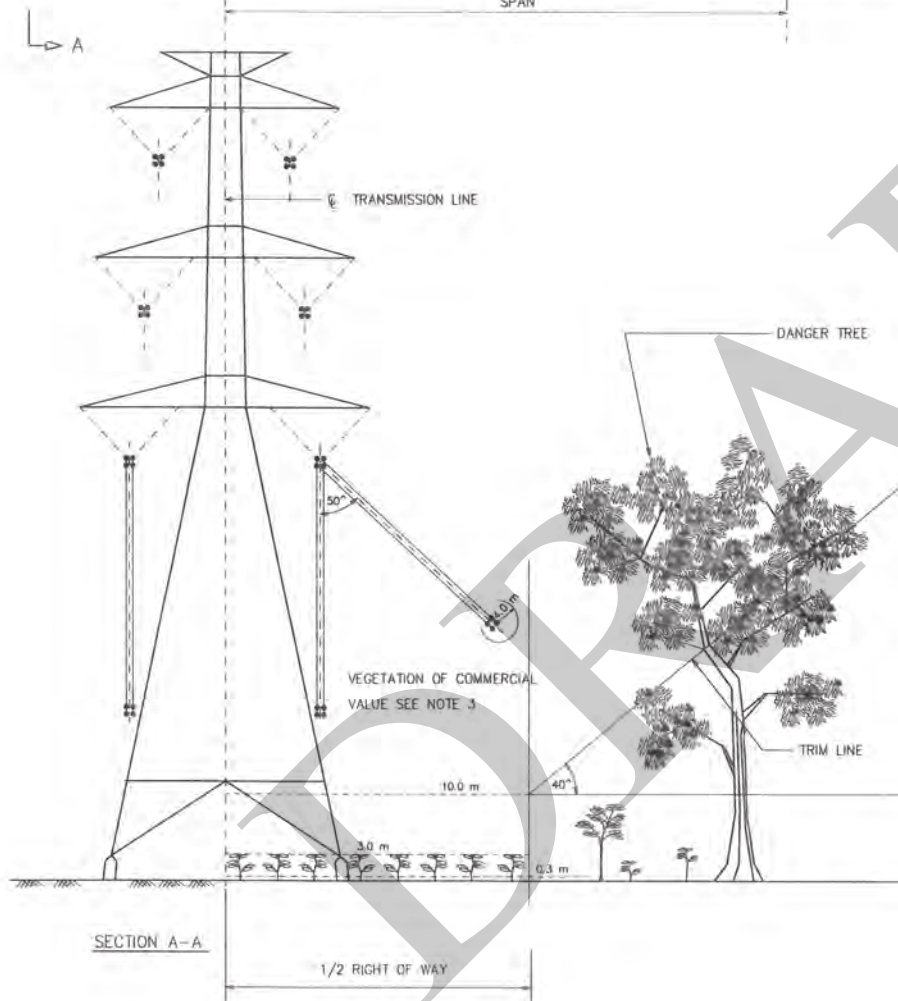
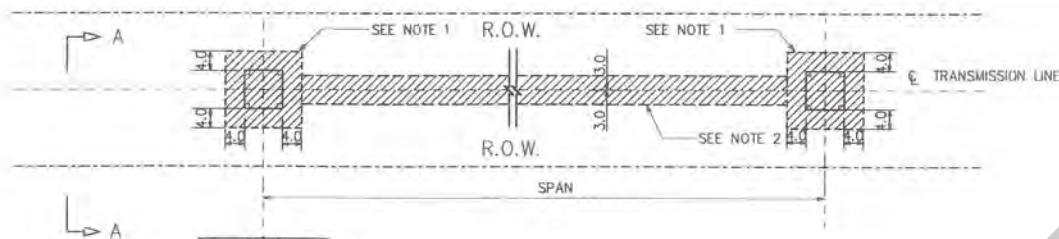
LEGEND

- EXISTING
- SUPPLY AND INSTALLATION FOR JOB NO. TIEC-02-S03 (BY CONTRACTOR) SCHEDULE NO.1 [K1]
- SUPPLY AND INSTALLATION FOR JOB NO. TIEC-02-S03 (BY CONTRACTOR) SCHEDULE NO.2 [K1]
- SUPPLY AND INSTALLATION FOR JOB NO. TIEC-02-S03 (BY EGAT) SCHEDULE NO.1 [K1]
- RELOCATED FOR JOB NO. TIEC-02-S03 (BY CONTRACTOR) SCHEDULE NO.1 [K1]
- REPLACED FOR JOB NO. TIEC-02-S03 (BY CONTRACTOR) SCHEDULE NO.2 [K1]
- SUPPLY AND INSTALLATION FOR JOB NO. TIEC-02-S03 (BY CONTRACTOR) SCHEDULE NO.1 [K2]
- SUPPLY AND INSTALLATION FOR JOB NO. TIEC-02-S03 (BY CONTRACTOR) SCHEDULE NO.2 [K2]
- SUPPLY AND INSTALLATION FOR JOB NO. TIEC-03-S03 (BY CONTRACTOR)
- RELOCATED FOR JOB NO. TIEC-03-S03 (BY CONTRACTOR)
- RELOCATED FOR JOB NO. TIEC-03-S03 (BY EGAT)
- ADDITIONAL FOR JOB NO. TIEC-04-S27 (BY EGAT)
- REPLACED FOR JOB NO. TIEC-04-S27 (BY EGAT)
- REMOVED FOR THE JOB NO. AS INDICATED
- FUTURE

NEW OPGW FROM CHAIYAPHUM 2 SUBSTATION TO NAKHON RATCHASIMA 4 SUBSTATION CCT.1 (CYP2 - KM.68)
NEW 2-WAY JOINT BOX FOR OPGW AND NON-METALLIC OPTICAL FIBER CABLE AT TAKE-OFF STRUCTURE

| REV.NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|---------|-------------|--|-------|----------|----------|-----------|-------------|-----------|----------|------|
| 0 | TIEC-04-S27 | REPLACEMENT OF 500kV LINE SHUNT REACTOR FOR 500kV LINE NO.1 & NO.2 TO CHAIYAPHUM 2 - KHON KAEN 4 FROM 110 Mvar TO 165 Mvar | - | - | - | - | - | - | - | - |
| 0 | TIEC-03-S03 | ADDITION OF RELATED EQUIPMENT FOR 500kV LINE NO.1 & NO.2 TO NAKHON RATCHASIMA 4 | - | - | - | - | - | - | - | - |
| 0 | TIEC-02-S03 | ADDITION OF RELATED EQUIPMENT FOR STATCOM NO.1 (+300/-300 Mvar) AND 2x72 Mvar 230 kV C-BANK [K1], ADDITION OF RELATED EQUIPMENT FOR STATCOM NO.2 (+300/-300 Mvar) [K2] | - | - | - | - | - | - | - | - |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|------------|---------------------------|--|---|--|-------------------|--|---------------|--|
| DRAWN | Chayut J. | RECOMMENDED AND VALIDATED | CHIEF, SUBSTATION ENGINEERING DEPARTMENT | | | | | | |
| DESIGNED | Chayut J. | CONCURRED | ASSISTANT DIRECTOR, TRANSMISSION SYSTEM ENGINEERING DIVISION-2 | | | | | | |
| VERIFIED | S. Wachana | APPROVED | HEAD, PLANNING AND ENGINEERING DIVISION, COMMUNICATION DEPARTMENT. | | | | | | |
| DATE | | February 17, 2025 | | JOB NO. | | REPLACING DWG.NO. | | DWG.NO. | |
| | | | | TIEC-02-S03 TIEC-03-S03 TIEC-04-S27 | | | | CYP2-S-2-OPGW | |
| | | | | | | | | 01 REV. | |
| | | | | | | | | 01 0 | |



GENERAL NOTES

1. ALL VEGETATION WITHIN THE BOUNDARY OF TOWER LEGS AND THE AREA 4 METERS AROUND THE BOUNDARY OF TOWER LEGS SHALL BE CUT OFF AS CLOSE TO THE GROUND AS PRACTICABLE.
2. ALL VEGETATION WITHIN THE AREA 3 METERS EACH SIDE OF THE TRANSMISSION LINE CENTER LINE SHALL BE CUT OFF AS CLOSE TO THE GROUND AS PRACTICABLE; EXCEPT ANNUAL PLANTS AND CEREAL.
3. ALL VEGETATION OUTSIDE THE AREAS SPECIFIED IN 1 AND 2 UP TO THE EDGE OF THE RIGHT-OF-WAY SHALL BE CUT OFF AS CLOSE TO THE GROUND AS PRACTICABLE, EXCEPT
 - (a) ANNUAL PLANTS AND CEREAL.
 - (b) TREES OR CROPS OF COMMERCIAL VALUE HAVING A MAXIMUM MATURE HEIGHT NOT MORE THAN 3 METERS.
4. TREES TO BE STAMPED "FOREST DEPARTMENT" ACCORDING TO THE APPLICABLE FOREST ACT SHALL BE CUT TO A HEIGHT TO NOT MORE THAN 30 CENTIMETERS ABOVE THE GROUND.
5. TEAKS AND RUBBER TREES SHALL BE CUT OFF AT A HEIGHT OF ABOUT 30 CENTIMETERS ABOVE GROUND AFTER THE FOLLOWING HAVE BEEN CARRIED OUT
 - (a) ISSUE OF AN APPLICATION FOR PERMISSION FOR PLANTATION OF TEAKS WHICH ARE NOT IN THE FOREST ACCORDING TO THE REGULATIONS OF DEPARTMENT OF FORESTRY, MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT.
 - (b) ISSUE OF AN APPLICATION FOR PERMISSION FOR PLANTATION OF RUBBER TREES WHICH ARE NOT IN THE FOREST ACCORDING TO THE REGULATIONS OF DEPARTMENT OF FORESTRY, MINISTRY OF NATURAL RESOURCES AND ENVIRONMENT.
6. ALL SUGAR CANES GROWN SHALL BE CUT OFF AND THEIR STUMPS SHALL COMPLETELY BE DUG OUT.
7. DANGER TREES ON THE OUTSIDE OF THE RIGHT-OF-WAY SHALL BE TRIMMED OR REMOVED AS DIRECTED BY EGAT.
8. IN DEEP VALLEYS WHERE "SPECIAL CLEARING" IS NOTED ON THE PLAN AND PROFILE, CLEARING MAY BE LIMITED TO A WIDTH OF 15 METERS EITHER SIDE OF THE TRANSMISSION LINE CENTER LINE AS DIRECTED BY EGAT.
9. FELLED TREES STAMPED "FOREST DEPARTMENT" SHALL BE TRIMMED AND PILED AT THE SIDE OF THE RIGHT-OF-WAY OR AS DIRECTED BY EGAT.

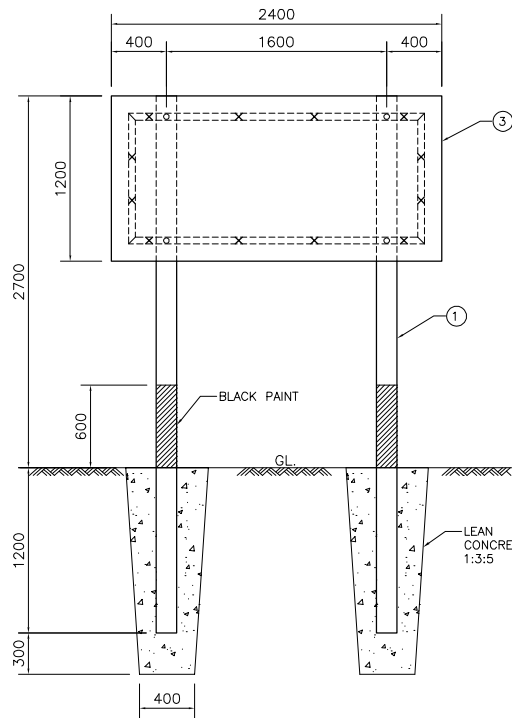


DO NOT AMEND MANUALLY

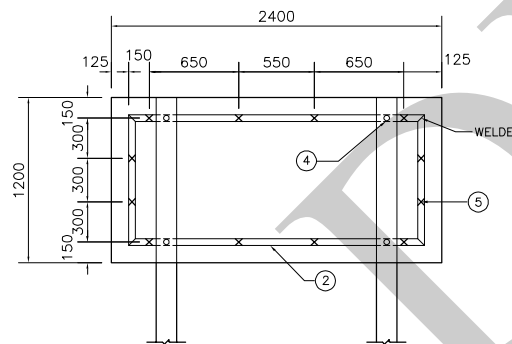
TP-000

ELECTRICITY GENERATING AUTHORITY OF THAILAND

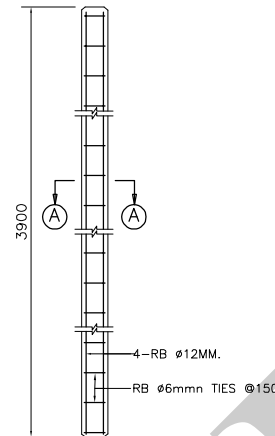
| | | |
|-----------------------|-------------------------|--------------------------|
| DESIGNED J. NARONG | REVIEWED [Signature] | 500 kV TRANSMISSION LINE |
| CHECKED P. PITHAK | APPROVED [Signature] | RIGHT OF WAY CLEARING |
| APPROVED J. UJ | DATE 6/12/18 | TP-135C rev.1 |



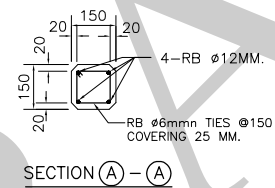
INSTALLATION DETAIL



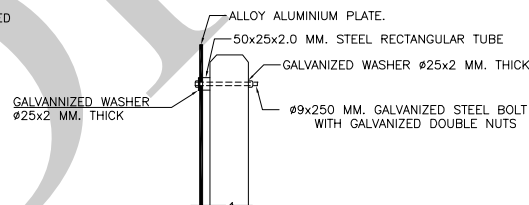
FRAME DETAIL



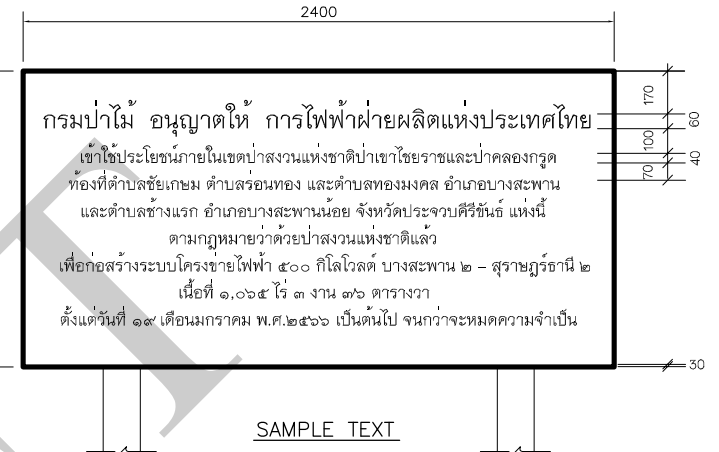
REINFORCE CONCRETE POST DETAIL



SECTION (A) - (A)



FIXING OF SIGN PLATE



SAMPLE TEXT

MATERIAL LIST

| ITEM NO. | QTY. | DESCRIPTION |
|----------|------|--|
| ① | 2 | WHITE CONCRETE POST |
| ② | 1 | STEEL RECTANGULAR TUBE 50X25X2.0 MM. |
| ③ | 1 | 2400 X 1200 MM. ALLOY ALUMINIUM PLATE THICKNESS 2.00 MM. CONFORM TIS-331 -BACKGROUND COLOUR : YELLOW (C0 M19 Y89 K0) -FIGURE COLOUR : BLACK (C80 M70 Y70 K100) -FIGURE FONT : TH NIRAMIT AS |
| ④ | 4 | DIAMETER 9X250 MM. GALV. BOLT,NUT WITH WASHER |
| ⑤ | 12 | DIAMETER 9X35 MM. GALV. BOLT,NUT WITH SPRING WASHER |

NOTE

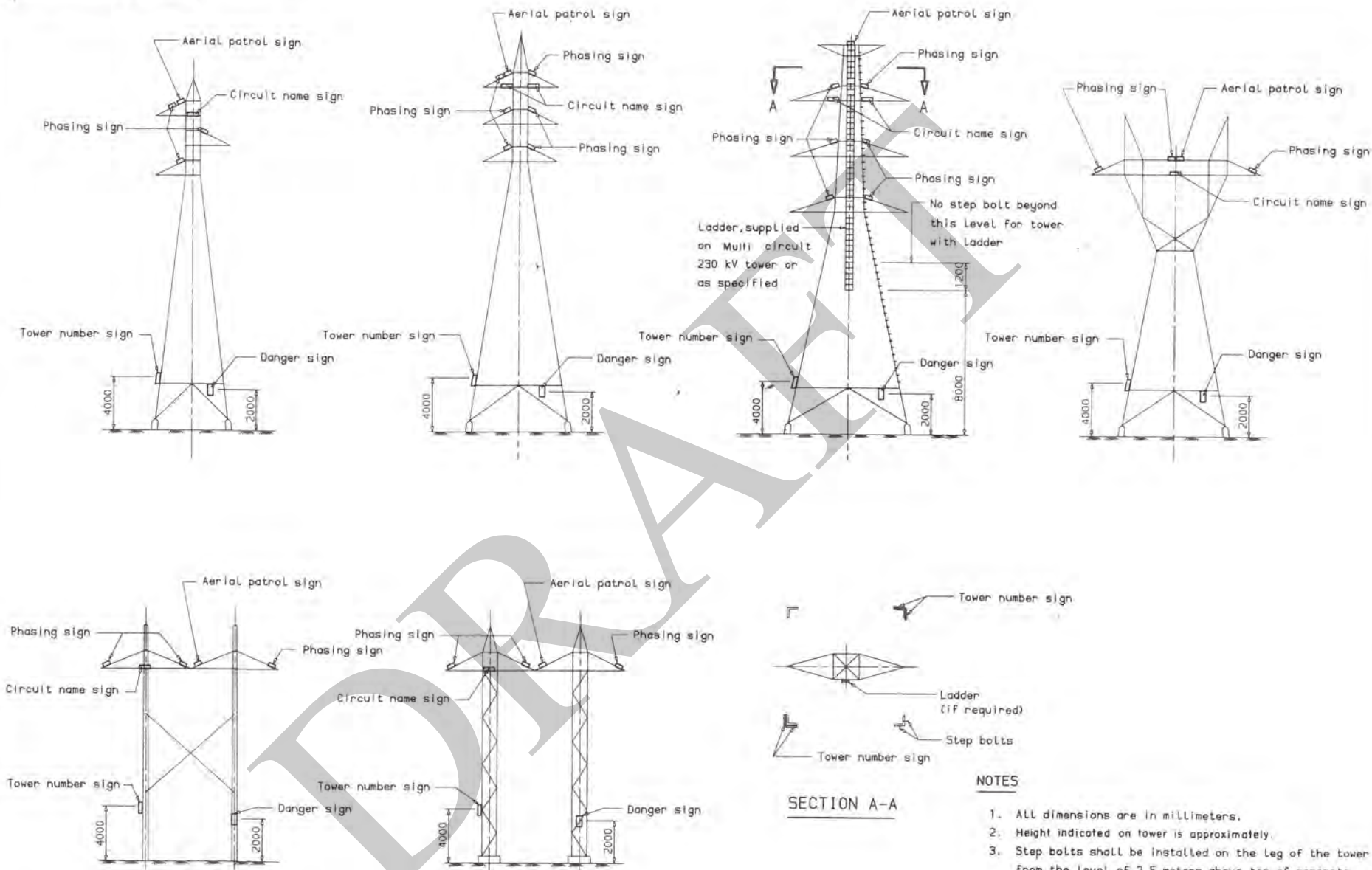
- 1.ALL DIMENSION ARE IN MILLIMETERS EXCEPT AS NOTED.
- 2.SIGN SHALL BE PREDOMINANTLY INSTALLED ON THE EDGE OF THE RIGHT-OF-WAY BY FACING OUT AT EVERY ENTRANCE TO THE PRESERVED FOREST.
- 3.CONCRETE SHALL HAVE A CYLINDRICAL COMPRESSIVE STRESS OF 210 KSC. IN 28 DAYS.
- 4.ALL REINFORCING BARS SHALL CONFORM TO TIS-20 FOR ROUND BARS AND TIS-24 GRADE SD40 FOR DEFORMED BARS.
- 5.ALL STEEL PARTS SHALL BE HOT-DIP GALVANIZED ACCORDING TO ASTM A123
- 6.ALL BOLT,NUT AND SPRING WASHER SHALL BE HOT-DIP GALVANIZED ACCORDING TO ASTM A153.

| REVNO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|--------|---------|-----------------|-------|----------|----------|-----------|-------------|-----------|----------|------|
| | | | | | | | | | | |

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|--|-----------|-----------|--|--|--|--|--|--|--|
| DESIGNED | APPROVED | VALIDATED | | | | | | | |
| VERIFIED | CONCURRED | | | | | | | | |
| APPROVED | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

R.O.W ACCESS SIGN FOR PRESERVED FORESTS

| JOB NO. | REPLACING DWG.NO. | DWG.NO. | REV. |
|---------|-------------------|---------|------|
| | TP-161B | TP-161C | |



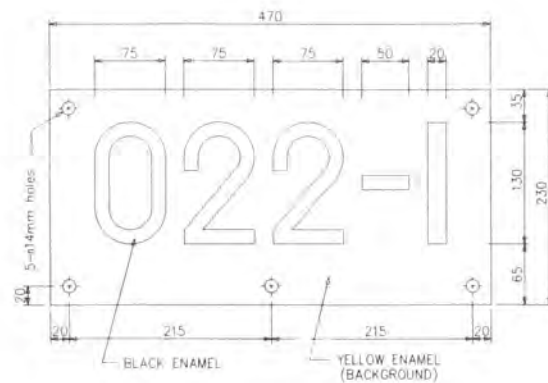
TP-109A

CAD

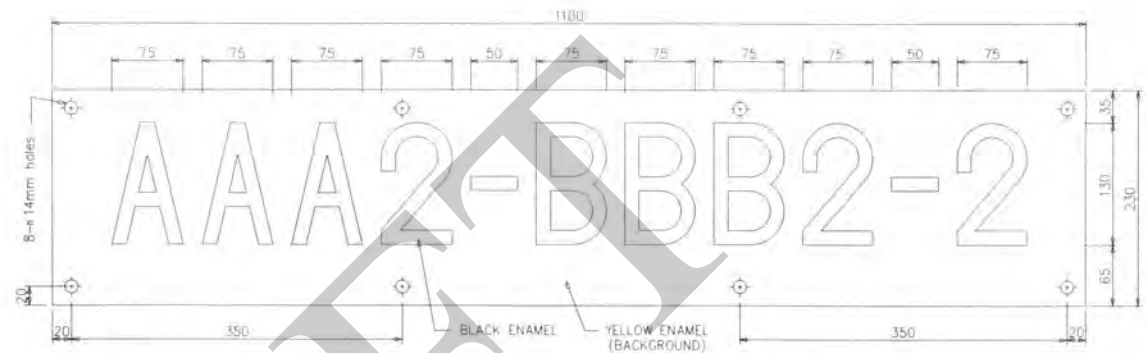
ENTER
DO NOT AMEND
MANUALLY

-JAN-91 09:30:19
R
D

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | | TOWER ACCESSORIES INSTALLATION | | | |
|--|--------------|-----------|-------------|-----------|----------|------|---------|--------------------|----------|--------------------------------|------|----|----|
| DESIGNED | DRW. | SUBMITTED | RECOMMENDED | CONCURRED | APPROVED | DATE | JOB NO. | REPLACING DWG. NO. | DWG. NO. | 00 | REV. | 00 | 01 |
| DESIGNED | | | | | | | | TP-109 | TP-109A | | | | |
| DRAWN | P. Panyayong | | | | | | | | | | | | |
| CHECKED | Wongkiet | | | | | | | | | | | | |
| APPROVED | | | | | | | | | | | | | |



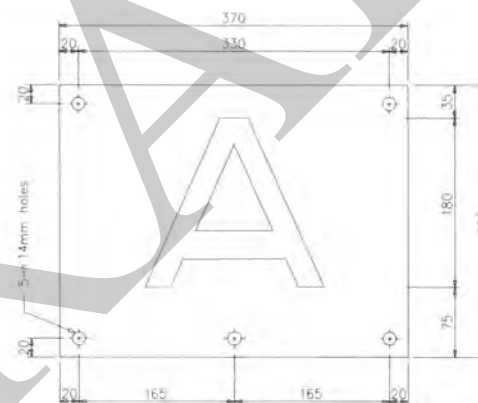
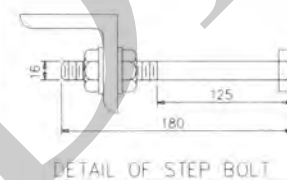
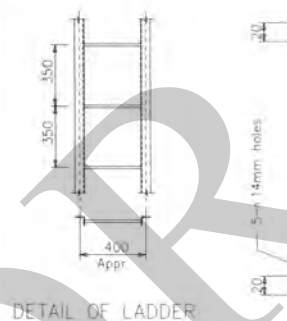
AERIAL PATROL SIGN



CIRCUIT NAME SIGN



DANGER SIGN



PHASING SIGN

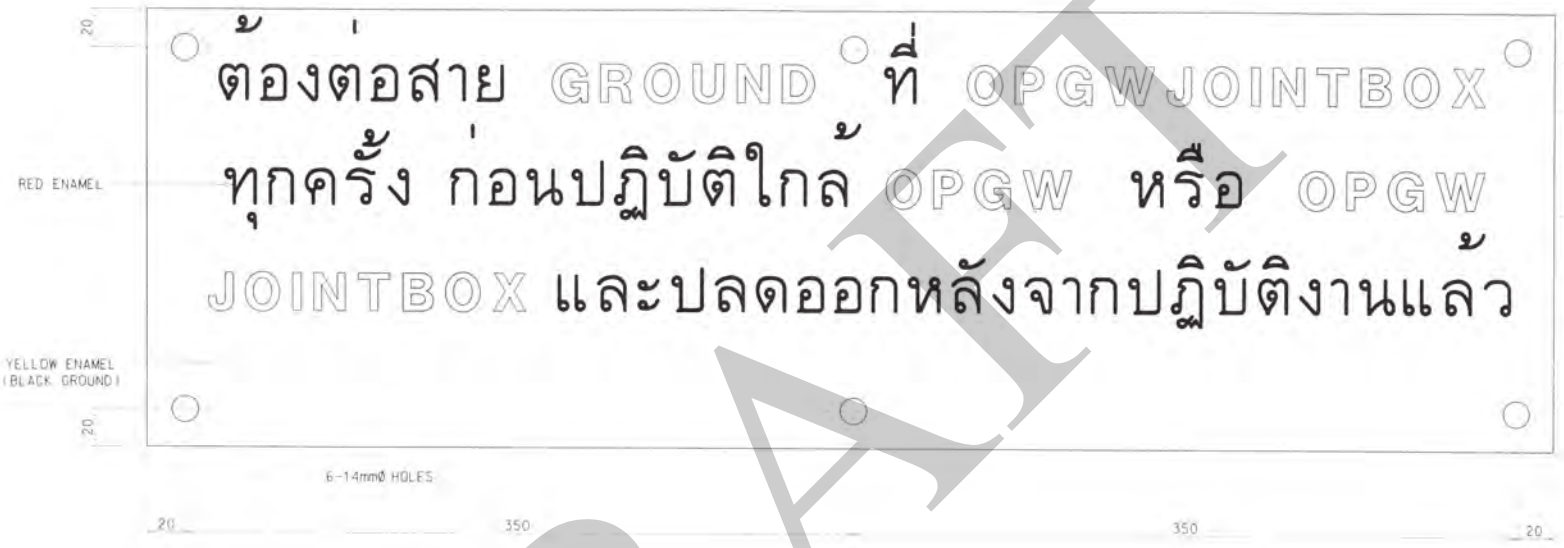
| PHASING SIGN COLOR | | | |
|--------------------|-------|--------|-------|
| PHASING SIGN | A | B | C |
| FIGURE | WHITE | BLACK | WHITE |
| BACKGROUND | RED | YELLOW | BLUE |

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. LOCATIONS OF ALL SIGNS SHALL BE AS INDICATED ON DWGNO. TP-109A
3. TOWER NUMBER SIGN SHALL BE STENCILED AT 4.0 METERS ABOVE GROUND LEVEL AND SHALL NOT BE ON THE SAME LEG WITH STEP BOLTS
4. ALL SIGNS EXCEPT DANGER SIGN SHALL BE DOUBLE-SIDED AND MOUNTED SUCH THAT THEY ARE VISIBLE FROM BOTH SIDES OF THE TOWER
5. STEP BOLTS SHALL BE INSTALLED ON THE LEG OF THE TOWER FROM THE LEVEL OF 2.5 METERS ABOVE TOP OF CONCRETE
6. ONE SET OF PHASING SIGN SHALL CONSIST OF 3 PLATES A, B & C
7. AERIAL PATROL SIGN NUMBER SHALL CONFORM TO STRUCTURE LIST
8. LETTERS IN CIRCUIT NAME SIGN SHALL BE SYMMETRICALLY ADJUSTED ACCORDING TO NUMBER OF LETTERS REQUIRED

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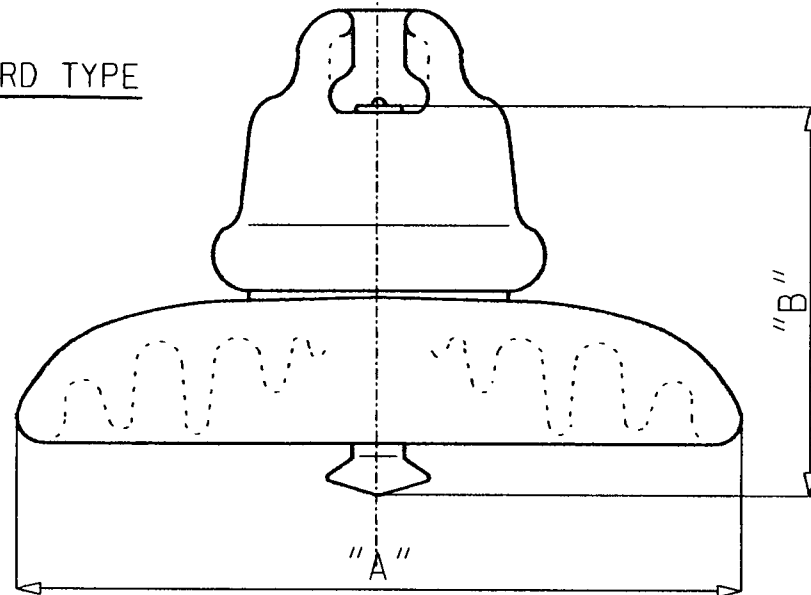
WARNING SIGN

NOTES

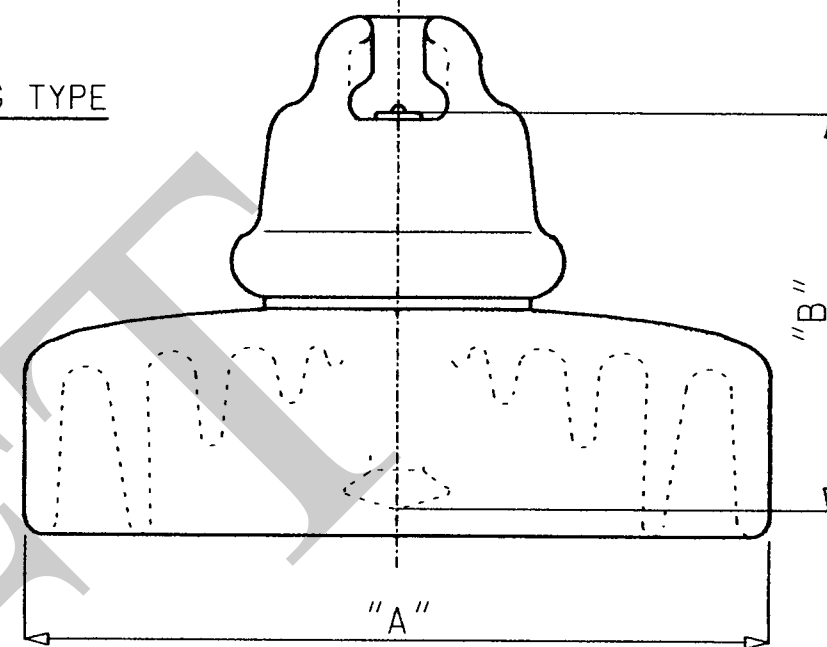
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. WARNING SIGNS ARE TO BE SUPPLIED AS A SET, CONSISTING OF THE SIGN DETAILED ON THIS DRAWING AND THE STANDARD DANGER SIGN SHOWN ON DRAWING TP-150B.
3. WARNING SIGNS ARE TO BE ATTACHED ADJACENT TO THE ACCOMPANYING JOINT BOX, ON EVERY TOWER AT WHICH A JOINT BOX IS INSTALLED.
4. MATERIALS SHALL BE THE SAME FOR WARNING SIGNS AND DANGER SIGNS.

| ELECTRICITY GENERATING AUTHORITY OF THAILAND | | | | | | | | | |
|---|--|---|---|--|--|--|--|--|--|
| DRAWN: P. Jongsomjit DESIGNED: P. Jongsomjit VERIFIED: S. Jongsomjit APPROVED: S. Jongsomjit | CHECKED: P. Jongsomjit RECOMMENDED: P. Jongsomjit CONCURRED: P. Jongsomjit | DATE: 21/10/63 PROJECT: 500 KV TRANSMISSION LINE WARNING SIGN | JOB NO.: REPLACING (JOB NO.): DWT. NO.: REV. | | | | | | |
| TP-150.1 | | | | | | | | | |

STANDARD TYPE



FOG TYPE



CHARACTERISTICS

| PARTICULARS | | RATING | | | | | | | | |
|---|------|--------------------------|-------------------|--------|---------------|---------------|-----------|-----------|---------------|---------------|
| | | STANDARD TYPE-ANSI CLASS | | | | | FOG TYPE | | | |
| | | 52-3 15,000lbs | 52-3 18,000lbs | 52-5 | 52-8 | Δ 52-11 | 18,000lbs | 25,000lbs | 36,000lbs | Δ 50,000lbs |
| Dimensions | | | | | | | | | | |
| Maximum disc diameter "A" | mm | 273 | 273 | 273 | 298 | 311 | 273 | 273 | 298 | 330 |
| Unit spacing "B" | mm | 146 | 146 | 146 | 146 | 156 | 146 | 146 | 146 | 178 |
| Leakage distance | mm | 292 | 292 | 279 | 279 | 381 | 430 | 430 | 430 | 545 |
| Mechanical Values | | | | | | | | | | |
| Combined mechanical and electrical strength | kg | 6,800 | 8,000 | 11,300 | 16,300 | 22,600 | 8,000 | 11,300 | 16,300 | 22,600 |
| Mechanical impact strength | m-kg | 0.63 | | 0.69 | 1.04 | 1.04 | 1.15 | 1.15 | 1.15 | 1.04 |
| Tension proof | kg | 3,400 | 4,000 | 5,650 | 8,150 | 11,300 | 4,000 | 5,650 | 8,150 | 11,300 |
| Electrical Values | | | | | | | | | | |
| Low-frequency dry flashover | kV | 80 | 80 | 80 | 80 | 80 | Δ 80 | Δ 80 | Δ 80 | Δ 80 |
| Low-frequency wet flashover | kV | 50 | 50 | 50 | 50 | 50 | Δ 50 | Δ 50 | Δ 50 | Δ 50 |
| Critical-impulse flashover, positive | kV | 125 | 125 | 125 | 125 | 140 | Δ 125 | Δ 125 | Δ 125 | Δ 140 |
| Critical-impulse flashover, negative | kV | 130 | 130 | 130 | 130 | 140 | Δ 130 | Δ 130 | Δ 130 | Δ 140 |
| Low-frequency puncture | kV | 110 | 110 | 110 | 110 | 125 | Δ 110 | Δ 110 | Δ 110 | Δ 125 |
| Radio-Influence-Voltage Data | | | | | | | | | | |
| Low-frequency test voltage, rms to ground | kV | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| Maximum riv. at 1,000 kHz | uV | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Coupling type | | B | B | J | K | K | B | J | K | K |
| Glaze color (if porcelain insulator are supplied) | | Brown | Brown | Brown | Grey or Brown | Grey or Brown | Brown | Brown | Grey or Brown | Grey or Brown |

NOTE :

1. Pins for fog type insulators shall be corrosion proof type.
- Δ 2. Withstand voltage of fog type at ESDD 0.06 mg/cm² (Light Contamination Level) must not be less than 13.0 kV/unit.

ISO
9001
TSE 81999

CAD
CENTER

DO NOT AMEND
MANUALLY

*****DATE
*****NAME

| REV. NO. | JOB NO. | JOB DESCRIPTION | DRAWN | DESIGNED | VERIFIED | VALIDATED | RECOMMENDED | CONCLUDED | APPROVED | DATE |
|----------|---------|--|-------|----------|----------|-----------|-------------|-----------|----------|------|
| Δ | | Revised electrical value of fog type insulator and delete time load item. | | | | | | | | |
| Δ | | Add characteristics of 52-11 standard type and 50,000 lbs fog type insulators. | | | | | | | | |

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | | | | | | | | |
|----------|------------|--------------------|---------|--|--|--|--|--|--|--|
| DRAWN | J. ANUCHA | VALIDATED | | | | | | | | |
| DESIGNED | P. Channat | ENGINEERED | | | | | | | | |
| VERIFIED | P. Pithak | CHECKED | | | | | | | | |
| APPROVED | J. A | DATE | 26/5/10 | | | | | | | |
| JOB NO. | - | REPLACING ENG. NO. | TP-126 | | | | | | | |
| ENG. NO. | TP-126A | | | | | | | | | |

| CLASS OF SOIL | QUALITY OF SOIL | AVERAGE UNIT WEIGHT OF SOIL (Ton/m ³) | ANGLE OF REPOSE (Degree) | NET ULTIMATE SOIL BEARING CAPACITY (Ton/m ²) | HEIGHT OF WATER TABLE | RECOMMENDED TYPE OF FOUNDATION (See note item 5) |
|---------------|---|---|--------------------------|--|--------------------------------|---|
| I | VERY SOFT -Very poor bearing material with very low resistance to uplift loads. | compression 1.4 | 0 | < 10.0 | up to ground level | -Concrete long pile with tie beam CLPBI-A CLPBI-B |
| | | uplift 0.9 | | App.ultimate skin friction 1,000 kg/m ² | | -Concrete long pile without tie beam CLPI -C CLPI -D CLPI -E CLPI -F |
| II | SOFT -Poor bearing material with low resistance to uplift loads. | compression 1.5 | 5 | > 10.0 | | -Concrete short pile CSPII-A CSPII-B CSPII-C |
| | | uplift 1.0 | | App.ultimate skin friction 2,000 kg/m ² | | -Raft RFII |
| III | FAIR -Fair bearing material with fair resistance to uplift loads. | 1.2 | 15 | > 25.0 | See note 2 | -Concrete pad CIII |
| IV | GOOD -Firm material of good bearing capacity and good resistance to uplift loads in all seasons. | 1.7 | 20 | > 50.0 | below the bottom of foundation | -Concrete pad CIV |
| V | HARD -Firm material of very good bearing capacity and very good resistance to uplift loads in all seasons.Decomposed rock is considered to be in this class. | 1.9 | 30 | > 75.0 | | -Concrete pad CV |
| S | SPECIAL -Any material consisting of fair bearing capacity below 3.5 meter depth but poor bearing capacity or low resistance to uplift loads above this depth. | 1.1 | 10 | > 20.0 | See note 2 | -Special concrete pad CS |
| R | ROCK -Any rock in situ occur in mass or bedded deposit except disintegrated rock,soluble limestone,shale,slate,hard pan,organic rock or other similar type of rock. | | | > 150 | | -Rock foundation R |
| | | | | App.ultimate skin friction 10 Ton/m ² | | |

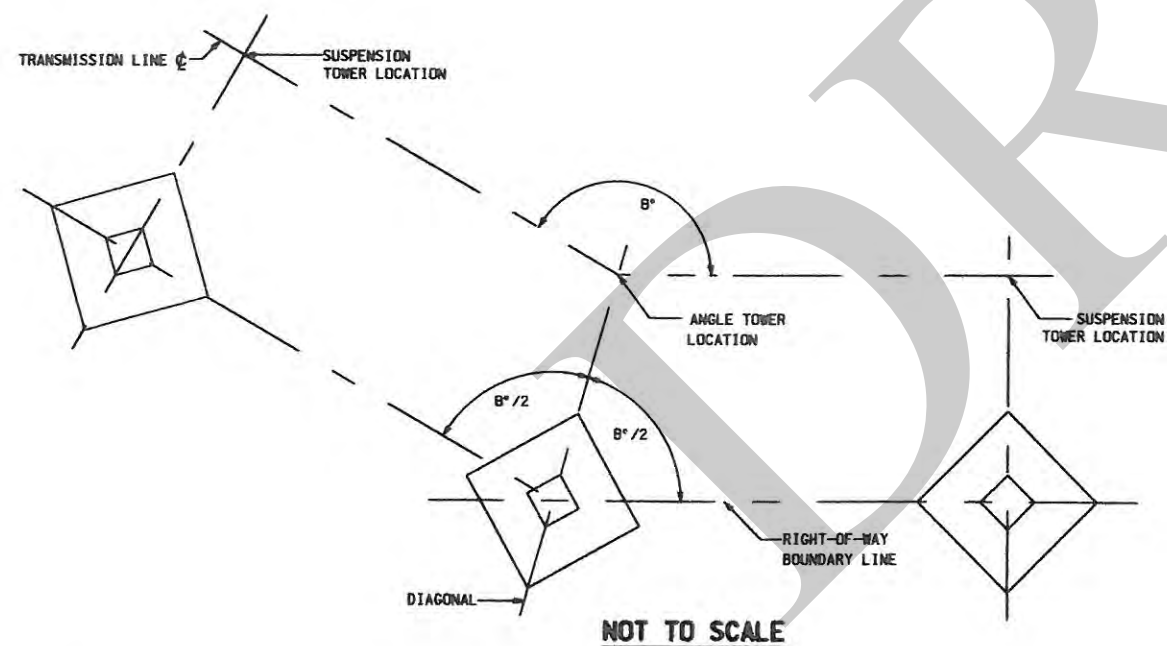
NOTES

- Subsurface investigations are required primarily for classification of soil and selection of foundation type, tests shall also be performed in the layer of soil below the bottom of foundation.
- Consider water table up to ground level for stability against uplift load and water table below bottom of foundation for stability against compression loads.
- EGAT reserves the right to select the type of foundation in any particular class of soil to be constructed for any other class of soil if it is in the economical and engineering safety provision.
- Skin friction resistance tabulated above are for information only. Actual values shall be based on subsurface investigations.
- Any foundation type suffixed by "X1" "X2",and "X3" shall be designed against sulphate attack caused by sea water or sulphate in soil as per Specification C-2, Article BB-26 case 1, case 2 and case 3 with 7.5 cm covering for protection of steel reinforcement respectively.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | |
|--------------|-------------|----------------|---|
| DESIGNED | DRN | SUBMITTED | CRITERIA AND BASIC DATA |
| DESIGNED | SPD | RECOMMENDED | FOR CALCULATION AND SELECTION OF FOUNDATION |
| DRAWN Chalee | RECOMMENDED | CONCURRED | |
| CHECKED | | | |
| APPROVED | | | |
| | | DATE NOV 9, 90 | JOB NO. |
| | | | REPLACING DWG. NO. |
| | | | DWG. NO. 129 |
| | | | TP-152 |
| | | | REV. 1 |

| NO. | JOB ASSIG. | JOB DESCRIPTION & REVISION | DRAWN | DESIGNED | CHECKED | SUBMITTED | RECOMMENDED | CONCURRED | APPROVED | DATE |
|-----|------------|----------------------------|-------|----------|---------|-----------|-------------|-----------|----------|------|
| 1 | | RETRACED | | | | | | | | |



NOTES

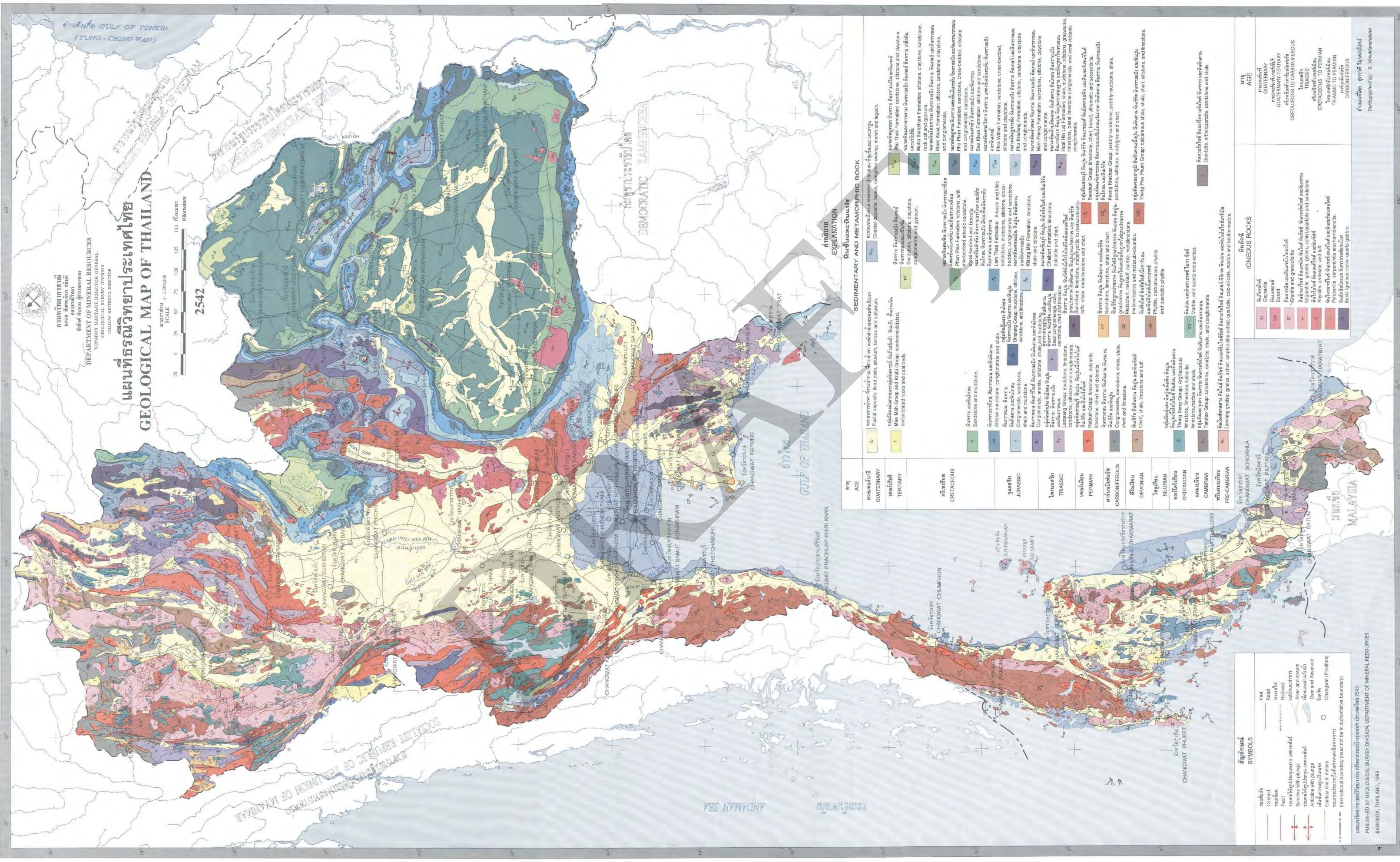
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. PRECAST REINFORCED CONCRETE IS TO BE USED.
3. BOUNDARY POSTS SHALL BE PLACED AT EACH TOWER LOCATION ALONG RIGHT-OF-WAY BOUNDARY LINE OF THE TRANSMISSION LINE. THE ARRANGEMENT OF THOSE POSTS ARE AS SHOWN.
4. BOUNDARY POST SHALL BE PLACED ON ROCK OR ON WELL COMPACTED SOIL IN SUCH A MANNER THAT THE DISTANCE FROM ITS TIP TO THE GROUND SURFACE IS 500 MILLIMETERS THE BACKFILL SOIL IS TO BE WELL COMPACTED.
5. ENGRAVING SHALL BE 1 CM. DEEP ON ALL FOUR SIDES LETTERS SHALL BE 5 CM. WIDE AND 8 CM. HIGH.
6. PAINTS SHALL BE APPLIED AS THE FOLLOWING.
 - I. TOP : ORANGE OR RED WITH ENAMEL PAINT.
 - II. COLUMN ABOVE GROUND LEVEL : WHITE WITH PLASTIC PAINT.
 - III. ENGRAVING : BLACK WITH ENAMEL PAINT.

ELECTRICITY GENERATING AUTHORITY OF THAILAND

| | | | |
|----------|-----------|----------------|-------------|
| DRAWN | CHALFE | VAL DATED | 20/11/08 |
| DESIGNED | TITI PONG | RECOMMENDED BY | [Signature] |
| VERIFIED | SUPAKORN | CHECKED BY | [Signature] |
| APPROVED | J. L. | DATE | 20/11/08 |

BOUNDARY POST

| JOB NO. | REPLACING DUG NO. | DUG NO. |
|---------|-------------------|---------|
| | TP-602A | TP-602B |



กรมทรัพยากรธรณี
กรมธรณีวิทยา
DEPARTMENT OF MINERAL RESOURCES
NOTADON MANTADIT, DIRECTOR, GENERAL
CHAIVAN JINTONG, DIRECTOR

แผนที่ธรณีวิทยาประเทศไทย GEOLOGICAL MAP OF THAILAND

มาตราส่วน
SCALE 1:250,000
0 25 50 75 100 125 150 กิโลเมตร
Kilometers

2542

| สัญลักษณ์ SYMBOLS | |
|--------------------------------------|------------------------------------|
| ถนน Road | ทางรถไฟ Railroad |
| แม่น้ำ River | เขื่อน Dam |
| รอยแตก Fault | เขื่อนกั้นน้ำ Dam and Reservoir |
| รอยพับ Syncline | เขื่อนกั้นน้ำ Dam and Reservoir |
| รอยโค้ง Anticline | เขื่อนกั้นน้ำ Dam and Reservoir |
| เส้นระดับ Contour line | เขื่อนกั้นน้ำ Dam and Reservoir |
| เส้นเขตแดน International boundary | เขื่อนกั้นน้ำ Dam and Reservoir |

แผนที่ธรณีวิทยา ประเทศไทย กรมทรัพยากรธรณี
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| อายุ AGE | หินอัคนี IGNEOUS ROCKS | หินตะกอน SEDIMENTARY AND METAMORPHIC ROCK |
|---------------------------------|--|--|
| ควอเตอร์นารี QUATERNARY | ดินเหนียว Clay ทราย Sand | ตะกอนน้ำท่วม Fluvial deposits |
| เทเชีย TERTIARY | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| ครีเทเชียส CRETACEOUS | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| จูราซิก JURASSIC | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| ไทรแอสสิก TRIASSIC | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| เพอร์เมียน PERMIAN | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| คาร์บอนิเฟอรัส CARBONIFEROUS | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| ดีโวเนียน DEVONIAN | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| ซิลูเรียน SILURIAN | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| ออโดวician ORDOVICIAN | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| แคมเบรียน CAMBRIAN | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |
| พรีแคมเบรียน PRE-CAMBRIAN | หินแกรนิต Granite หินบะซอลต์ Basalt | หินทราย Sandstone หินดินดาน Siltstone หินโคลน Claystone หินปูน Limestone หินยิปซัม Gypsum |