

## Lampiran 2

| Nama Material                              | Tipe Barang |
|--------------------------------------------|-------------|
| CABLE PWR ACC;SUSPEN CLAMP 70-300 mm2      | JTM         |
| CABLE PWR ACC;SUSPENSION ASSY 70mm         | JTM         |
| CABLE PWR;N2SEYBY 3X150MM2                 | JTM         |
| CABLE PWR;N2SEYBY 3X240MM2                 | JTM         |
| CABLE PWR ACC; CABLE SHOE AL-CU 2H 150 MM2 | JTM         |
| CABLE PWR ACC;CABLE SHOE AL ID 1H 150MM2   | JTM         |
| CABLE PWR ACC;CABLE SHOE AL ID 1H 70MM2    | JTM         |
| CABLE PWR ACC;CABLE SHOE AL ID 1H 95MM2    | JTM         |
| CABLE PWR ACC;CABLE SHOE AL OD 1H 150MM2   | JTM         |
| CABLE PWR ACC;CABLE SHOE AL OD 2H 150MM2   | JTM         |
| CABLE PWR ACC;CABLE SHOE AL-CU 1H 150MM2   | JTM         |
| CABLE PWR ACC;CABLE SHOE AL-CU 1H 70MM2    | JTM         |
| CABLE PWR ACC;CABLE SHOE AL-CU 1H 95MM2    | JTM         |
| CABLE PWR;NYFGBY;4X185MM2;0.6/1KV;UG       | JTM         |
| CLAMP;G;AL;70-150/70-150mm2;PRS            | JTM         |
| CLAMP;H;AL;150-170/150-70mm2;PRS           | JTM         |
| COND ACC;JOINT SLEEVE AL 150 MM2           | JTM         |
| COND ACC;JOINT SLEEVE AL 70 MM2            | JTM         |
| COND ACC;NON TENSION JOINT AL 150MM2       | JTM         |
| COND ACC;NON TENSION JOINT AL 70MM2        | JTM         |
| CONDUCTOR;AAAC-S;150MM2;44KN               | JTM         |
| CONDUKTOR;AAAC;150 MM2                     | JTM         |
| CONDUKTOR;AAAC;70 MM2                      | JTM         |
| CONN;20kV;LLC;AL;35-240 mm2                | JTM         |
| COUND ACC;COMPRESION TERMINAL LUG 150mm2   | JTM         |
| COUND ACC;COMPRESION TERMINAL LUG 70mm2    | JTM         |
| CT ID 20KV15-30/5 A                        | JTM         |
| CT ID 20KV200-400/5-5 A                    | JTM         |
| CT OD 20 KV 10/5 A                         | JTM         |
| CT OD 20 KV 30/5A                          | JTM         |
| CT OD 20KV 20/5A                           | JTM         |
| CT OD 20KV 40/5A                           | JTM         |
| CTID 20KV 300/5A                           | JTM         |
| CTID 20KV 75/5A                            | JTM         |
| CUBICLE SM6 630A,16KA INCOMING             | JTM         |
| CUBICLE SM6 630A,16KA OUTGOING             | JTM         |
| DS INDOOR 20 630A                          | JTM         |
| ISOLATOR;POCL;PINPOST                      | JTM         |

| Nama Material                               | Tipe Barang |
|---------------------------------------------|-------------|
| ISOLATOR;ROD;PORCL;STRAIN                   | JTM         |
| JOINT SLEEVE AL/CU 150 MM2                  | JTM         |
| JOINT SLEEVE AL/CU 70 MM2                   | JTM         |
| JOINT SLEEVE CU 150 MM2                     | JTM         |
| JOINT SLEEVE CU 70 MM2                      | JTM         |
| LIGHTING ARRESTER 20KV 10kA                 | JTM         |
| LIGHTING ARRESTER 20KV 10kA                 | JTM         |
| LINE LINE CON 150 - 240 MM                  | JTM         |
| LINE LINE CON 70 - 150 MM                   | JTM         |
| LINE TAP CON 150 - 240MM                    | JTM         |
| LINE TAP CON 70 - 150MM                     | JTM         |
| LINE TAP CONNECTOR 70/150 MM2 AL            | JTM         |
| POLE ACC;PREFORMED GRIP T70MM2              | JTM         |
| POLE ACC;SPANSCHROEVEN 3/4"                 | JTM         |
| POLE TOP SWITCH;20KV;630A;12.5KA;REC        | JTM         |
| POLE TOP SWITH;LBS MOUNTED GAS+MOTORIZED    | JTM         |
| POLE TOP SWITH;LOAD BREAK SWITCH 630 A      | JTM         |
| STRINGSET ACC; S CLAMP 150-240 MM + 2U-BOLT | JTM         |
| STRINGSET ACC;STRAIN CLAMP 70-150 MM2       | JTM         |
| STRINGSET ACC;STRAIN CLAMP H.240MM          | JTM         |
| UNIV ACC;GROUND ROD BC DIAS/8INX1.5m        | JTM         |
| UNIV ACC;GROUND ROD BC DIAS/8INX2.5m        | JTM         |
| CABLE PWR;NYA; 70 mm2                       | GTT         |
| CABLE PWR;NYA;1X120 mm2                     | GTT         |
| CABLE PWR;NYA;1X95 mm2                      | GTT         |
| CABLE PWR;NYAF; 1X35 mm2                    | GTT         |
| CABLE PWR ACC;CABLE SHOE CU ID 1H 150MM2    | GTT         |
| CABLE PWR ACC;CABLE SHOE CU ID 1H 25MM2     | GTT         |
| CABLE PWR ACC;CABLE SHOE CU ID 1H 35MM2     | GTT         |
| CABLE PWR ACC;CABLE SHOE CU ID 1H 50MM2     | GTT         |
| CABLE PWR ACC;CABLE SHOE CU ID 1H 70MM2     | GTT         |
| CABLE PWR ACC;CABLE SHOE CU ID 1H 95MM2     | GTT         |
| CABLE PWR;NYA;1X35MM2;0.6/1KV;OH            | GTT         |
| CABLE PWR;NYA;1X50MM2;0.6/1KV;OH            | GTT         |
| CABLE PWR;NYY;1X150MM2;0.6/1KV;OH           | GTT         |
| CABLE PWR;NYY;1X70MM2;0.6/1KV;OH            | GTT         |
| CABLE PWR;NYY;4X150MM2;0.6/1KV;OH           | GTT         |
| CABLE PWR;NYY;4X70MM2;0.6/1KV;OH            | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 100A             | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 10A              | GTT         |

| Nama Material                                     | Tipe Barang |
|---------------------------------------------------|-------------|
| CUT OUT ACC;FUSE LINK 20KV 12A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 15A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 20A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 25A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 2A                     | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 30A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 32A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 3A                     | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 40A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 50A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 5A                     | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 6A                     | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 80A                    | GTT         |
| CUT OUT ACC;FUSE LINK 20KV 8A                     | GTT         |
| CUT OUT ACC;FUSE LINK 60A                         | GTT         |
| CUT OUT;20KV;6-100A;10KA;125KV                    | GTT         |
| CUT OUT;27KV;6-100A;POLIMER;125KV                 | GTT         |
| FUSE;380/220V;100A;SQUARE;1                       | GTT         |
| FUSE;380/220V;125A;SQUARE;1                       | GTT         |
| FUSE;380/220V;160A;SQUARE;1                       | GTT         |
| FUSE;380/220V;200A;SQUARE;1                       | GTT         |
| FUSE;380/220V;225A;SQUARE;1                       | GTT         |
| FUSE;380/220V;250A;SQUARE;1                       | GTT         |
| FUSE;380/220V;300A;SQUARE;2                       | GTT         |
| FUSE;380/220V;400A;SQUARE;2                       | GTT         |
| FUSE;380/220V;63A;SQUARE;1                        | GTT         |
| FUSE;380/220V;80A;SQUARE;1                        | GTT         |
| INSUL MEDIA;OIL;DIALA B                           | GTT         |
| INSUL MEDIA;OIL;TOTAL,NYNAS                       | GTT         |
| LIGHTING ARRESTER 20KV 5ka                        | GTT         |
| LVSB;DIST;3P;380V;250A;2LINE FIBER;OD (LV PANEL)  | GTT         |
| LVSB;DIST;3P;380V;250A;2LINE;OD (LV PANEL FIBER)  | GTT         |
| LVSB;DIST;3P;380V;400A;2LINE FIBER;OD (LV PANEL)  | GTT         |
| LVSB;DIST;3P;380V;400A;2LINE;OD                   | GTT         |
| LVSB;DIST;3P;380V;400A;4LINE FIBER;OD ( LV PANEL) | GTT         |
| LVSB;DIST;3P;380V;400A;4LINE FIBER;OD (LV PANEL)  | GTT         |
| LVSB;DIST;3P;380V;400A;4LINE;OD                   | GTT         |
| LVSB;DIST;3P;380V;630A;4LINE FIBER;OD ( LV PANEL) | GTT         |
| TRF.DIST 3 PHS,200Kva,OD                          | GTT         |
| TRF.DIST 3 PHS,250Kva,OD                          | GTT         |



| Nama Material                                    | Tipe Barang |
|--------------------------------------------------|-------------|
| TRF.DIST,3 PHS 100Kva,OD                         | GTT         |
| TRF.DIST,3 PHS 160Kva,OD                         | GTT         |
| TRF.DIST,3 PHS 50Kva,OD                          | GTT         |
| UNIV ACC;PIPE GALV 1.5"                          | GTT         |
| VEER CONTACT 250A                                | GTT         |
| VEER CONTACT 300A                                | GTT         |
| VEER CONTACT 400A                                | GTT         |
| VEER CONTACT 630A                                | GTT         |
| CABLE PWR ACC;LA ASSY 70mm                       | JTR         |
| CABLE PWR ACC;CABLE SHOE AL ID 1H 25MM2          | JTR         |
| CABLE PWR ACC;CABLE SHOE AL ID 1H 50MM2          | JTR         |
| CABLE PWR ACC;CABLE SHOE AL-CU 1H 35MM2          | JTR         |
| CABLE PWR ACC;CABLE SHOE AL-CU 1H 50MM2          | JTR         |
| CABLE PWR ACC;LINK 25 X 25mm2                    | JTR         |
| CABLE PWR ACC;STOPPING BUCKLE SSS 20X0           | JTR         |
| CABLE PWR;NFA2X-T;3X50+1X35;0.6/1KV;OH           | JTR         |
| CABLE PWR;NFA2X-T;3X70+1X50;0.6/1KV;OH           | JTR         |
| CLAMP;G;AL;50-70/50-70mm2;PRS                    | JTR         |
| COND ACC;ALL BINDING WIRE                        | JTR         |
| COND ACC;ALL TAPE 0,4X10 MM2                     | JTR         |
| COND ACC;COMPRESION TERMINAL LUG 50mm2           | JTR         |
| CT TR 200/5 A                                    | JTR         |
| CT TR 100/5 A                                    | JTR         |
| CT TR 150/5 A                                    | JTR         |
| CT TR 250/5 A                                    | JTR         |
| CT TR 300/5 A                                    | JTR         |
| CT TR 75/5 A                                     | JTR         |
| JOINT SLEEVE AL 50 MM2                           | JTR         |
| JOINT SLEEVE AL/CU 50 MM2                        | JTR         |
| LINE TAP CONNECTOR 50/50 MM2 AL                  | JTR         |
| LINE TAP CONNECTOR 50/70 MM2 AL                  | JTR         |
| LINE TAP CONNECTOR 70/70 MM2 AL                  | JTR         |
| POLE ACC FORMET 22 MM                            | JTR         |
| STRINGSET ACC;BALL CLEVIS                        | JTR         |
| STRINGSET ACC;SOCKET. EYE                        | JTR         |
| SR APP VI : NFB (SR APP KHUSUS) 200,100/5        | SR APP      |
| SR APP VI : NFB (SR APP KHUSUSLENGKAP) 200,100/5 | SR APP      |
| MTR ACC;KAWAT SEGEL                              | SR APP      |
| MTR ACC;MODEM GSM 12V DC DIGITAL                 | SR APP      |
| MTR ACC;SEGEL ACUAN CEKUNG                       | SR APP      |

| Nama Material                            | Tipe Barang |
|------------------------------------------|-------------|
| MTR ACC;SEGEL ACUAN CEMBUNG              | SR APP      |
| MTR ACC;SEGEL PUTAR PLASTIC              | SR APP      |
| MTR ACC;TIMAH SEGEL                      | SR APP      |
| MTR;kVARH M;;3P;220/380V;20-60A;3;ST;4W  | SR APP      |
| MTR;kVARH M;;3P;220/380V;5-20A;3;ST;4W   | SR APP      |
| MTR;kWH E;;1P;160/240V;5-20A;1;;2W       | SR APP      |
| MTR;kWH E;;1P;230V;5-40A;1;;2W           | SR APP      |
| MTR;kWH E;;3P;220/380V;5-100A;1;;4W      | SR APP      |
| MTR;kWH E;;3P;220/380V;5-60A;1;;4W       | SR APP      |
| MTR;KWH E;;3P;220/380V;5A;1;;4W          | SR APP      |
| MTR;KWH E;;3P;57,7/100V;0,5;;4W          | SR APP      |
| MTR;kWH E;;3P;57.7/240V;5-10A;0,5;;4W    | SR APP      |
| MTR;kWH E;;3P;57.7/240V;5-20A;0,5;;4W    | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-20A MINMCB;1;;   | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-30A-10A;1;ST;2W  | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-30A-16A;1;ST;2W  | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-30A-20A;1;ST;2W  | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-30A-2A;1;ST;2W   | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-30A-4A;1;ST;2W   | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-30A-6A;1;ST;2W   | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-40A MINMCB;1;;   | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-40A-10A;1;;2W    | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-40A-16A;1;;2W    | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-40A-20A;1;;2W    | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-40A-2A;1;;2W     | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-40A-4A;1;ST;2W   | SR APP      |
| MTR;kWH ECOM;;1P;230V;5-40A-6A;1;;2W     | SR APP      |
| MTR;kWH EM;;3P;220/380V;5-20A;1;DT;4W    | SR APP      |
| MTR;kWH EM;;3P;220/380V;5-20A;1;ST;4W    | SR APP      |
| MTR;kWH E-PR;;1P;230V;5-60A;1;;2W        | SR APP      |
| MTR;kWH E-PR;;3P;230V;10-100A;1;;4W      | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-10A;1;;2W | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-16A;1;;2W | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-20A;1;;2W | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-25A;1;;2W | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-2A;1;;2W  | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-35A;1;;2W | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-4A;1;;2W  | SR APP      |
| MTR;KWH E-PR-COM;1P;230V;5-60A-6A;1;;2W  | SR APP      |
| MTR;kWH M;;1P;220V;5-20A;2;ST;2W         | SR APP      |

| Nama Material                           | Tipe Barang |
|-----------------------------------------|-------------|
| MTR;kWH M;;1P;230V;20-60A;2;;2W         | SR APP      |
| MTR;kWH M;;1P;230V;5-20A;2;;2W          | SR APP      |
| MTR;kWH M;;3P;100V;5A;2;ST;3W           | SR APP      |
| MTR;kWH M;;3P;220/380V;20-60A;2;DT;4W   | SR APP      |
| MTR;kWH M;;3P;220/380V;5-20A;2;DT;4W    | SR APP      |
| MTR;kWH M;;3P;57.7/100V;5A;2;ST;4W      | SR APP      |
| MTR;kWH MCOM;;1P;230V;5-20A-10A;2;ST;2W | SR APP      |
| PANEL ACC;TERMINAL BLOCK 7H 63 A        | SR APP      |
| TERMINAL PRES OAK TYPE I                | SR APP      |
| TERMINAL PRES OAK TYPE III              | SR APP      |
| TOOL E;INFRA RED THERMO VISION          | SR APP      |
| CABLE PWR ACC; POLE BRACKET 6"          | SR APP      |
| CABLE PWR ACC;PROTEC CUP WITH PLASTIC   | SR APP      |
| CABLE PWR ACC;STRAIN HOOK CLAMP 1 1/2"  | SR APP      |
| CABLE PWR ACC;STROP MANCHET TIMAH 1,5"  | SR APP      |
| CABLE PWR ACC;STROP MANCHET TIMAH 2"    | SR APP      |
| CABLE PWR;NFA2X; 4X10MM2                | SR APP      |
| CABLE PWR;NFA2X;2X10MM2;0.6/1KV;OH      | SR APP      |
| CABLE PWR;NFA2X;2X16MM2;0.6/1KV;OH      | SR APP      |
| CABLE PWR;NFA2X;4X16MM2;0.6/1KV;OH      | SR APP      |
| CABLE PWR;NFA2X;4X25MM2;0.6/1KV;OH      | SR APP      |
| CONECTOR PRESS 16 - 16 MM               | SR APP      |
| CONECTOR PRESS 16 - 35 MM               | SR APP      |
| CONECTOR PRESS 35 - 70 MM               | SR APP      |
| CONN;1kV;PIER;AL;70-70                  | SR APP      |
| LINE TAP CONNECTOR 10-10 MM2 TYGPE G    | SR APP      |
| LINE TAP CONNECTOR 10-16 MM2 TYGPE G    | SR APP      |
| LINE TAP CONNECTOR 16-70 MM2 TYGPE G    | SR APP      |
| LLC AL                                  | SR APP      |
| LOUD MANCHET 1,5 "                      | SR APP      |
| SERVICE WEDGE CLAMP                     | SR APP      |

Sumber : Data Internal PT.PLN





Gambar Produk JTM (Jaringan Tegangan Menengah)



Gambar Produk JTR (Jaringan Tegangan Rendah)



Gambar Produk GTT (Gardu Tegangan Tinggi)



Gambar Produk SR APP (Sambungan Rumah dan Alat Pembatas dan Pengukur)



### Lampiran 3

#### Formulasi produk JTM

$$\begin{aligned} \text{Min } z : & 40800X_{21} + 3000Y_{21} + 40800X_{22} + 10500Y_{22} + 40800X_{23} + 9750Y_{23} + \\ & 40800X_{24} + 6300Y_{24} + 40800X_{25} + 19500Y_{25} + 40800X_{26} + 30000Y_{26} + \\ & 40800X_{27} + 33000Y_{27} + 40800X_{28} + 28500Y_{28} + 40800X_{29} + 24000Y_{29} + \\ & 40800X_{210} + 33000Y_{210} + 40800X_{211} + 15600Y_{211} + 40800X_{212} + 63000Y_{212} \\ & + 40800X_{213} + 51000Y_{213} + 40800X_{214} + 52500Y_{214} + 40800X_{31} + 16500Y_{31} \\ & + 40800X_{32} + 15000Y_{32} + 40800X_{33} + 16500Y_{33} + 40800X_{34} + 25500Y_{34} + \\ & 40800X_{35} + 0Y_{35} + 40800X_{36} + 12000Y_{36} + 40800X_{37} + 34500Y_{37} + \\ & 40800X_{38} + 48000Y_{38} + 40800X_{39} + 39000Y_{39} + 40800X_{310} + 52500Y_{310} + \\ & 40800X_{311} + 33000Y_{311} + 40800X_{312} + 64500Y_{312} + 40800X_{313} + 67500Y_{313} \\ & + 40800X_{314} + 72000Y_{314} + 40800X_{41} + 18600Y_{41} + 40800X_{42} + 24000Y_{42} \\ & + 40800X_{43} + 25500Y_{43} + 40800X_{44} + 9000Y_{44} + 40800X_{45} + 33000Y_{45} + \\ & 40800X_{46} + 43500Y_{46} + 40800X_{47} + 46500Y_{47} + 40800X_{48} + 19500Y_{48} + \\ & 40800X_{49} + 27000Y_{49} + 40800X_{410} + 18000Y_{410} + 40800X_{411} + 0Y_{411} + \\ & 40800X_{412} + 76500Y_{412} + 40800X_{413} + 40500Y_{413} + 40800X_{414} + 37500Y_{414} \end{aligned}$$

$$\text{Fungsi Kendala : } 13X = d_1 \qquad 72X \leq s_4$$

$$18X = d_2 \qquad 3X \leq k_p$$

$$17X = d_3$$

$$32X = d_4$$

$$18X = d_5$$

$$12X = d_6$$

$$15X = d_7$$

$$19X = d_8$$

$$14X = d_9$$

$$11X = d_{10}$$

$$12X = d_{11}$$

$$11X = d_{12}$$

$$17X = d_{13}$$

$$13X = d_{14}$$

$$132X \leq s_2$$

$$107X \leq s_3$$

#### Lampiran 4

Formulasi produk GTT

$$\begin{aligned} \text{Min } z : & 70800X_{21} + 3000Y_{21} + 70800X_{22} + 10500Y_{22} + 70800X_{23} + 9750Y_{23} + \\ & 70800X_{24} + 6300Y_{24} + 70800X_{25} + 19500Y_{25} + 70800X_{26} + 30000Y_{26} + \\ & 70800X_{27} + 33000Y_{27} + 70800X_{28} + 28500Y_{28} + 70800X_{29} + 24000Y_{29} + \\ & 70800X_{210} + 33000Y_{210} + 70800X_{211} + 15600Y_{211} + 70800X_{212} + 63000Y_{212} + \\ & 70800X_{213} + 51000Y_{213} + 70800X_{214} + 52500Y_{214} + 70800X_{41} + 18600Y_{41} + \\ & 70800X_{42} + 24000Y_{42} + 70800X_{43} + 25500Y_{43} + 70800X_{44} + 9000Y_{44} + \\ & 70800X_{45} + 33000Y_{45} + 70800X_{46} + 43500Y_{46} + 70800X_{47} + 46500Y_{47} + \\ & 70800X_{48} + 19500Y_{48} + 70800X_{49} + 27000Y_{49} + 70800X_{410} + 18000Y_{410} + \\ & 70800X_{411} + 0Y_{411} + 70800X_{412} + 76500Y_{412} + 70800X_{413} + 40500Y_{413} + \\ & 70800X_{414} + 37500Y_{414} \end{aligned}$$

Fungsi Kendala :  $3X = d_1$

$$4X = d_2$$

$$3X = d_3$$

$$3X = d_4$$

$$2X = d_5$$

$$2X = d_6$$

$$3X = d_7$$

$$2X = d_8$$

$$2X = d_9$$

$$3X = d_{10}$$

$$1X = d_{11}$$

$$1X = d_{12}$$

$$1X = d_{13}$$

$$2X = d_{14}$$

$$27X \leq s_2$$

$$23X \leq s_4$$

$$2X \leq kp$$



### Lampiran 5

#### Formulasi produk JTR

$$\begin{aligned} \text{Min } z : & 31500X_{21} + 3000Y_{21} + 31500X_{22} + 10500Y_{22} + 31500X_{23} + 9750Y_{23} + \\ & 31500X_{24} + 6300Y_{24} + 31500X_{25} + 19500Y_{25} + 31500X_{26} + 30000Y_{26} + \\ & 31500X_{27} + 33000Y_{27} + 31500X_{28} + 28500Y_{28} + 31500X_{29} + 24000Y_{29} + \\ & 31500X_{210} + 33000Y_{210} + 31500X_{211} + 15600Y_{211} + 31500X_{212} + 63000Y_{212} \\ & + 31500X_{213} + 51000Y_{213} + 31500X_{214} + 52500Y_{214} + 31500X_{31} + 16500Y_{31} \\ & + 31500X_{32} + 15000Y_{32} + 31500X_{33} + 16500Y_{33} + 31500X_{34} + 25500Y_{34} + \\ & 31500X_{35} + 0Y_{35} + 31500X_{36} + 12000Y_{36} + 31500X_{37} + 34500Y_{37} + \\ & 31500X_{38} + 48000Y_{38} + 31500X_{39} + 39000Y_{39} + 31500X_{310} + 52500Y_{310} + \\ & 31500X_{311} + 33000Y_{311} + 31500X_{312} + 64500Y_{312} + 31500X_{313} + 67500Y_{313} \\ & + 31500X_{314} + 72000Y_{314} + 31500X_{41} + 18600Y_{41} + 31500X_{42} + 24000Y_{42} \\ & + 31500X_{43} + 25500Y_{43} + 31500X_{44} + 9000Y_{44} + 31500X_{45} + 33000Y_{45} + \\ & 31500X_{46} + 43500Y_{46} + 31500X_{47} + 46500Y_{47} + 31500X_{48} + 19500Y_{48} + \\ & 31500X_{49} + 27000Y_{49} + 31500X_{410} + 18000Y_{410} + 31500X_{411} + 0Y_{411} + \\ & 31500X_{412} + 76500Y_{412} + 31500X_{413} + 40500Y_{413} + 31500X_{414} + 37500Y_{414} \end{aligned}$$

$$\text{Fungsi Kendala : } 2X = d_1 \qquad 31X \leq s_4$$

$$3X = d_2 \qquad 3X \leq k_p$$

$$4X = d_3$$

$$22X = d_4$$

$$7X = d_5$$

$$16X = d_6$$

$$5X = d_7$$

$$22X = d_8$$

$$5X = d_9$$

$$8X = d_{10}$$

$$5X = d_{11}$$

$$4X = d_{12}$$

$$4X = d_{13}$$

$$7X = d_{14}$$

$$82X \leq s_2$$

$$15X \leq s_3$$



### Lampiran 6

Formulasi produk SR APP

$$\begin{aligned} \text{Min } z : & 450X_{11} + 0Y_{11} + 450X_{12} + 9030Y_{12} + 450X_{13} + 5805Y_{13} + 450X_{14} + \\ & 7998Y_{14} + 450X_{15} + 14190Y_{15} + 450X_{16} + 23220Y_{16} + 450X_{17} + 25800Y_{17} \\ & + 450X_{18} + 27090Y_{18} + 450X_{19} + 23220Y_{19} + 450X_{110} + 30960Y_{110} + \\ & 450X_{111} + 15996Y_{111} + 450X_{112} + 51600Y_{112} + 450X_{113} + 46440Y_{113} + \\ & 450X_{114} + 47730Y_{114} + 450X_{21} + 2580Y_{21} + 450X_{22} + 9030Y_{22} + 450X_{23} + \\ & 8385Y_{23} + 450X_{24} + 5418Y_{24} + 450X_{25} + 16770Y_{25} + 450X_{26} + 25800Y_{26} + \\ & 450X_{27} + 28380Y_{27} + 450X_{28} + 24510Y_{28} + 450X_{29} + 20640Y_{29} + 450X_{210} + \\ & 28380Y_{210} + 450X_{211} + 13450Y_{211} + 450X_{212} + 54180Y_{212} + 450X_{213} + \\ & 43860Y_{213} + 450X_{214} + 45150Y_{214} + 450X_{31} + 14190Y_{31} + 450X_{32} + \\ & 12900Y_{32} + 450X_{33} + 14190Y_{33} + 450X_{34} + 21930Y_{34} + 450X_{35} + 0Y_{35} + \\ & 450X_{36} + 10320Y_{36} + 450X_{37} + 29670Y_{37} + 450X_{38} + 41280Y_{38} + 450X_{39} \\ & + 33540Y_{39} + 450X_{310} + 45150Y_{310} + 450X_{311} + 28380Y_{311} + 450X_{312} + \\ & 55470Y_{312} + 450X_{313} + 58050Y_{313} + 450X_{314} + 61920Y_{314} + 450X_{41} + \\ & 15996Y_{41} + 450X_{42} + 20640Y_{42} + 450X_{43} + 21930Y_{43} + 450X_{44} + 7740Y_{44} \\ & + 450X_{45} + 28380Y_{45} + 450X_{46} + 37410Y_{46} + 450X_{47} + 39990Y_{47} + 450X_{48} \\ & + 16770Y_{48} + 450X_{49} + 23220Y_{49} + 450X_{410} + 15480Y_{410} + 450X_{411} + 0Y_{411} \\ & + 450X_{412} + 65790Y_{412} + 450X_{413} + 34830Y_{413} + 450X_{414} + 32250Y_{414} \end{aligned}$$

Fungsi Kendala :  $67X = d_1$

$234X = d_{14}$

$138X = d_2$

$3450X \leq s_1$

$91X = d_3$

$1050X \leq s_2$

$665X = d_4$

$700X \leq s_3$

$259X = d_5$

$250X \leq s_4$

$429X = d_6$

$120X \leq k_p$

$124X = d_7$

$715X = d_8$

$155X = d_9$

$469X = d_{10}$

$236X = d_{11}$

$105X = d_{12}$

$134X = d_{13}$