DEPARTAMENTO DE ENGENHARIA DE PRODUÇÃO E TRANSPORTES
LABORATÓRIO DE SISTEMAS DE TRANSPORTE

PROJETO PONTO DE PARTIDA

PARTE II

EDIÇÃO UFRGS 2021/1

Daniel Sergio Presta Garcia
Ângelo Cunha Turelly
Caroline da Luz Soares
Gabriel Warken
João Paulo Pinzon do Carmo
Magno Vargas Bertoglio
Rafael Augusto da Silva

DEPARTAMENTO DE ENGENHARIA DE PRODUÇÃO E TRANSPORTES
LABORATÓRIO DE SISTEMA DE TRANSPORTE

PROJETO PONTO DE PARTIDA

EDIÇÃO UFRGS 2021/1

PORTO ALEGRE
UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
2022

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CAPÍTULO I

AC1 ROTAS

Dariane Lemos Amaral
Sabrina de Castro Zorzo

Daniel Sergio Presta Garcia

REPÚBLICA FEDERATIVA DO BRASIL
UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL – UFRGS
ESCOLA DE ENGENHARIA – EE
DEPARTAMENTO DE ENGENHARIA DE PRODUÇÃO E TRANSPORTES – DEPROT
LABORATÓRIO DE SISTEMAS DE TRANSPORTE – PROGRAMA ProINFRA – PROJETO PONTO DE PARTIDA

PROJETO BÁSICO PARA IMPLANTAÇÃO DE TRECHO RODOVIÁRIO ENTRE ITAARA E SILVEIRA MARTINS

Rodovia:	PPP-2021/1
Norma Técnica:	DNER/1999
Classe da rodovia:	CLASSE III
Região:	Região Central do RS
Configuração:	pista simples com acostamentos
Classificação do solo:	1ª Categoria
Faixa de exploração:	2 x 250m
Extensão aproximada:	6,929280 km em diretriz; 8,384757 km em corpo estradal

VOLUME 2 – PROJETO EXECUTIVO

EQUIPE AC1 – AC1 ROTAS
NOVEMBRO/2021

DADOS DE IDENTIFICAÇÃO

Instituição: **Universidade Federal do Rio Grande do Sul – UFRGS**

Unidade: **Escola de Engenharia – EE**

Departamento: **Departamento de Engenharia de Produção e Transportes – DEPROT**

Laboratório: **Laboratório de Sistemas de Transportes – LASTRAN**

Programa: **Programa de Desenvolvimento Tecnológico em Infraestrutura de Transportes – ProINFRA**

Projeto: **Ponto de Partida (Trabalho de Graduação da Disciplina de Rodovias)**

Edição: **PPP UFRGS 2021/1**

Ano: **2021**

Semestre: **1º**

Disciplina: **RODOVIAS**

Turma: **A**

Código da Equipe: **AC1**

Nome: **AC1 ROTAS**

Integrantes do grupo:

Dariane Lemos Amaral

Sabrina de Castro Zorzo

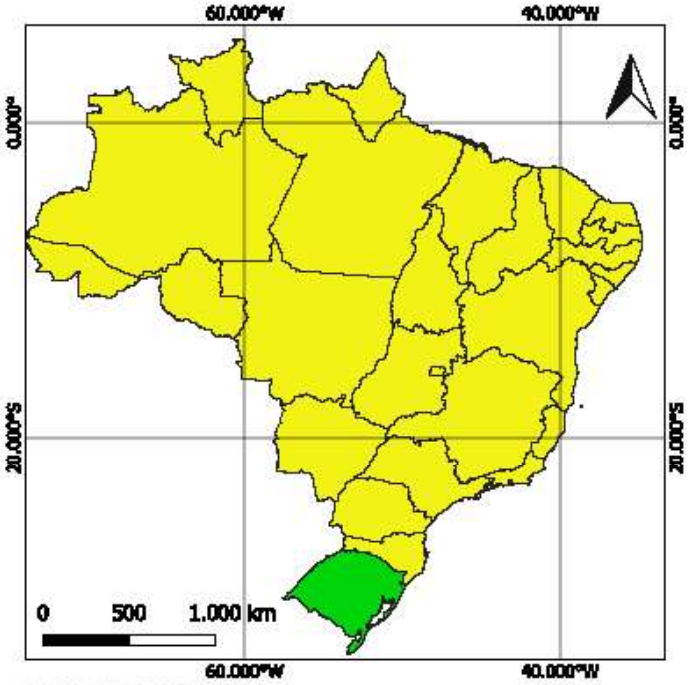
SUMÁRIO

SUMÁRIO

APRESENTAÇÃO

1. APRESENTAÇÃO

1.1. Mapa de Situação e Localização



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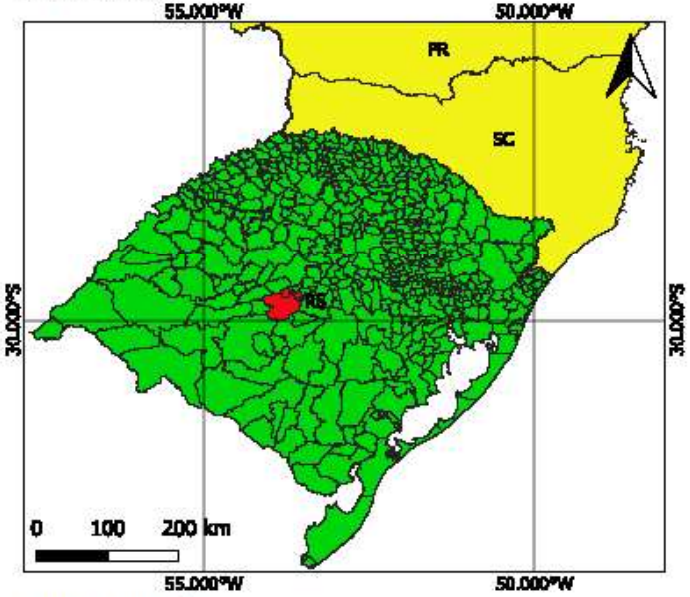
Escala 1:26000000



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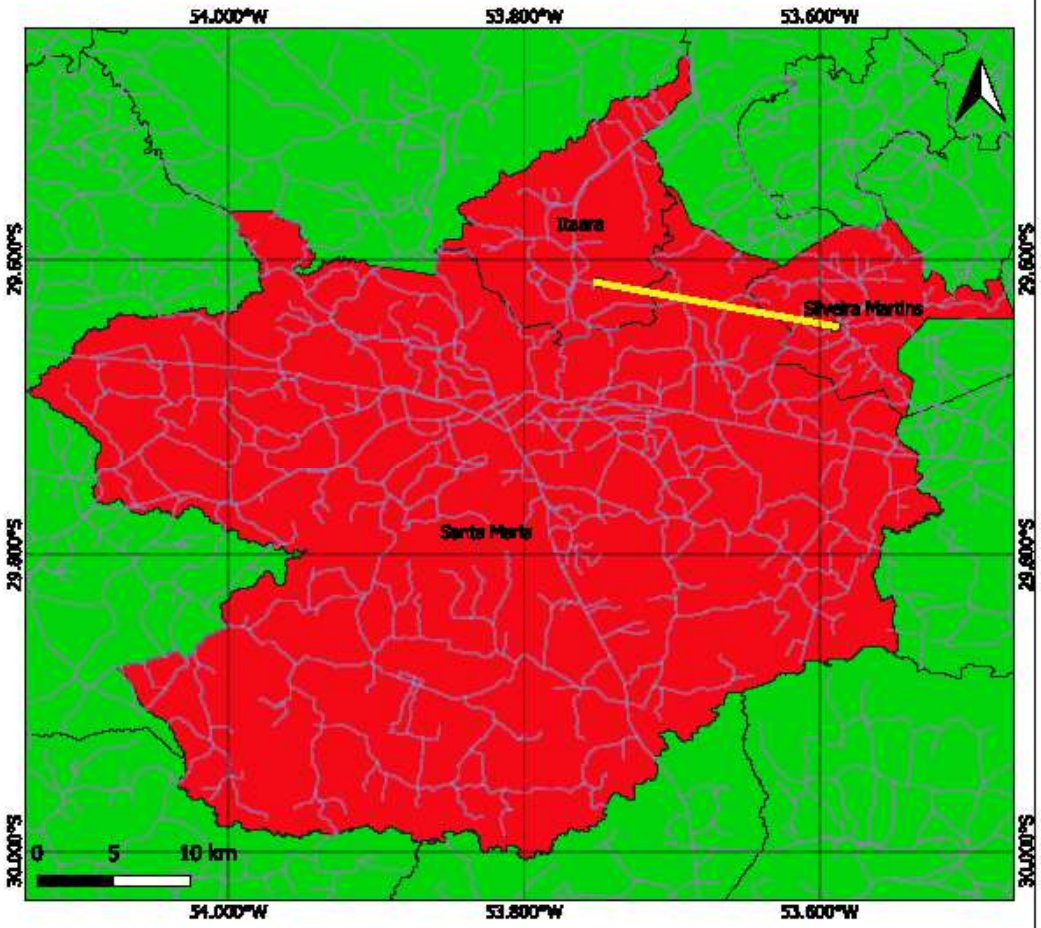


PLANTA DE LOCALIZAÇÃO
Escala 1:250000

DIRETRIZ
COORDENADAS
SISTEMA VIÁRIO EXISTENTE
ITAARA-SANTA MARIA-SILVEIRA MARTINS
MUNICÍPIOS
RIO GRANDE DO SUL
BRASIL

PROJETO TRECHO RODOVIÁRIO
Base de dados: IBGE, FEPAN
Sistema de Coordenadas Geográficas - Datun: SIRGAS 2000
Autores: Dariane, Sabrina, Guilherme
Grupo: AC1 ROTAS
Semestre Letivo: 2021/1

AC1 ROTAS

1.2. Quadro de Características Técnicas

CARACTERÍSTICAS TÉCNICAS

Rodovia: Grupo de Eixos 1
Trecho: traçado
Segmento: km: 0+000,00 ao km: 8+384,76

CARACTERÍSTICAS GERAIS

DE PROJETO		PLANIALTIMETRICAS				SEÇÕES TRANSVERSAIS			
NORMA	DNIT	RAIO MIN. COM TRANS.	50,000	K MIN/DES CÔNCAVA	7 / 7	LARG. PISTA DE ROL.		PLATAFORMA ATERRO	
CLASSE DA RODOVIA	III	RAIO MIN. SIMPLES	300,000	K MIN/DES CONVEXA	5 / 5	LARG. ACOST. INT.		PLATAFORMA CORTE	
REGIÃO	Montanhosa	RAMPA MÁXIMA	8,000	DIST. VIS. PARADA		LARG. ACOST. EXT.		TALUDE ATERRO	
VELOCIDADE DIRETRIZ	40	RAMPA MÍNIMA	0,300	DIST. VIS. ULTRAP.		ABAULAMENTO		TALUDE CORTE 1ª CAT.	
		EXTENSÃO TOTAL	8384,757	FAIXA DOM. (LE/LD+OFF)	25 / 25 + 5	SUPERELEVAÇÃO MÁX.		TALUDE CORTE 3ª CAT.	

PLANIMETRIA

DISTRIBUIÇÃO DE CURVAS

T	RAIOS (m)	FREQ.	Dc (m)	%	Lc1+Lc2 (m)	%
R	R mínimo = 100,000	1	153,250	1,83	80,000	0,95
A	100,000 < R ≤ 100,000					
N	100,000 < R ≤ 200,000	15	913,945	10,90	1280,000	15,27
S	200,000 < R ≤ 300,000	1	37,127	0,44	80,000	0,95
I	300,000 < R ≤ 500,000					
Ç	R > 500,000					
.	TOTAL EM TRANSIÇÃO	17	1104,322	13,17	1440,000	17,17
S	RAIOS (m)	FREQ.	Dc (m)	%		
I	R mínimo = 1000000,000					
M	1000000,000 < R ≤ 500,000					
P	500,000 < R ≤ 700,000					
L	700,000 < R ≤ 1000,000					
E	1000,000 < R ≤ 1500,000					
S	R > 1500,000					
	TOTAL SIMPLES					
TOTAL EM CURVA		17	1104,322	13,17	3648,643	43,52

EXTENSÃO DAS INTERTANGENTES

MÍNIMA		MÁXIMA		TOTAL	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
25,712	0,31	811,017	9,67	5840,436	69,66

PARÂMETROS PLANIMÉTRICOS

TORTUOSIDADE		DISTÂNCIA EM DIRETRIZ	
TOTAL (°/m)	MÉDIA (°/m.km)	EXTENSÃO (m)	ACRÉSCIMO (%)
4,707	0,561	6929,280	21,005

ALTIMETRIA

VARIAÇÃO ALTIMÉTRICA

ACLIVES			NÍVEL		DECLIVES		
INTERVALO	EXTENSÃO (m)	%	EXTENSÃO	%	INTERVALO	EXTENSÃO (m)	%
0 < i ≤ 1					0 < i ≤ 1		
1 < i ≤ 2	568,383	6,78			1 < i ≤ 2		
2 < i ≤ 3					2 < i ≤ 3	1601,853	19,10
3 < i ≤ 4					3 < i ≤ 4		
4 < i ≤ 5					4 < i ≤ 5	686,697	8,19
5 < i ≤ 6					5 < i ≤ 6		
6 < i ≤ 7					6 < i ≤ 7		
7 < i ≤ 8	967,102	11,53			7 < i ≤ 8	3335,874	39,78
8 < i ≤ 9					8 < i ≤ 9		
9 < i ≤ 10					9 < i ≤ 10		
i > 10					i > 10		
TOTAL	1535,485	18,31			TOTAL	5624,424	67,08

EXTENSÃO DOS ELEMENTOS VERTICAIS

RAMPA		CURVA CÔNCAVA		CURVA CONVEXA		CURVA TOTAL	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
7159,909	85,39	864,839	10,31	360,010	4,29	1224,848	14,61

PARÂMETROS K MÍNIMOS ADOTADOS

EM CURVA CÔNCAVA	30,540	EM CURVA CONVEXA	37,605

PARÂMETROS ALTIMÉTRICOS

COMPRIMENTO VIRTUAL IDA		COMPRIMENTO VIRTUAL VOLTA		COMPRIMENTO VIRTUAL MÉDIO	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
13335,635	159,05	25185,637	300,37	19260,636	229,71

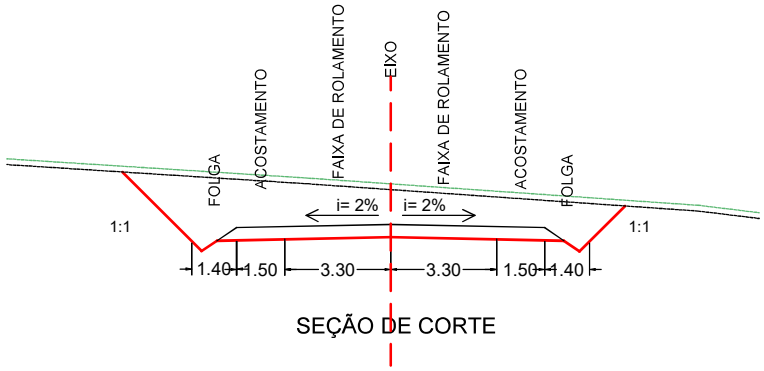
CARACTERÍSTICAS OPERACIONAIS

ANO DE ABERTURA		VDM ABERTURA		PARÂMETRO					
ANO FINAL DA VIDA ÚTIL		VDM FINAL							

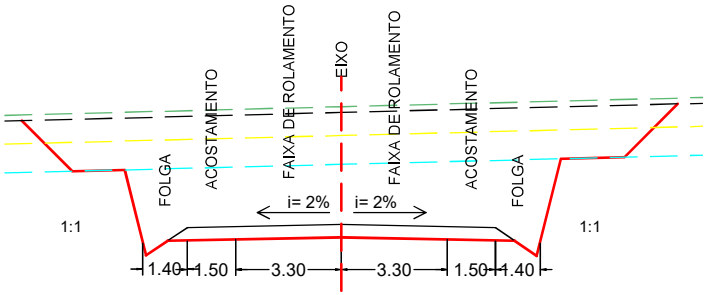
PROJETO GEOMÉTRICO

2. PROJETO GEOMÉTRICO

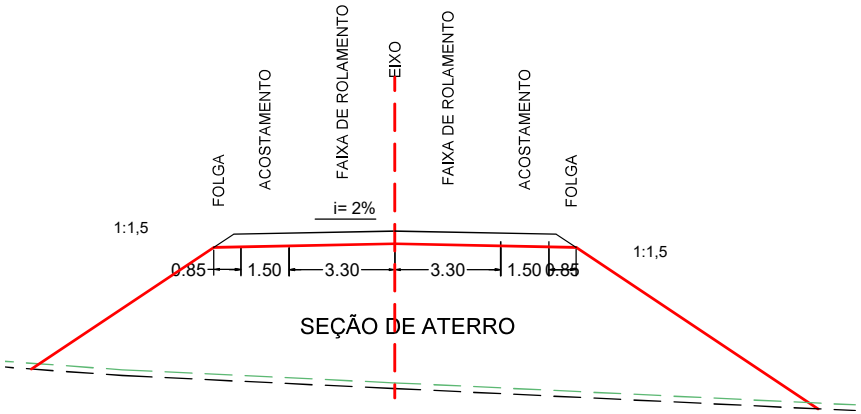
2.1. Seções Transversais Tipo



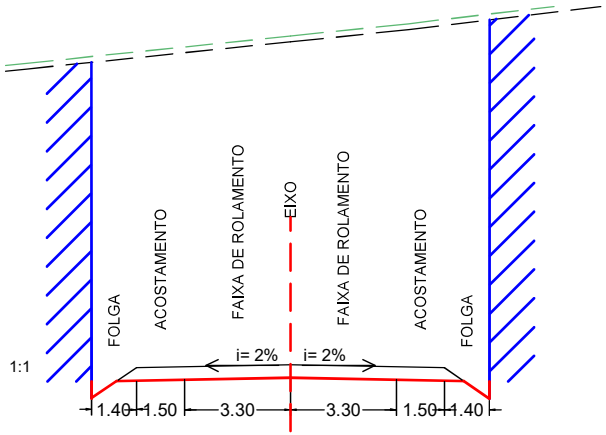
SEÇÃO DE CORTE



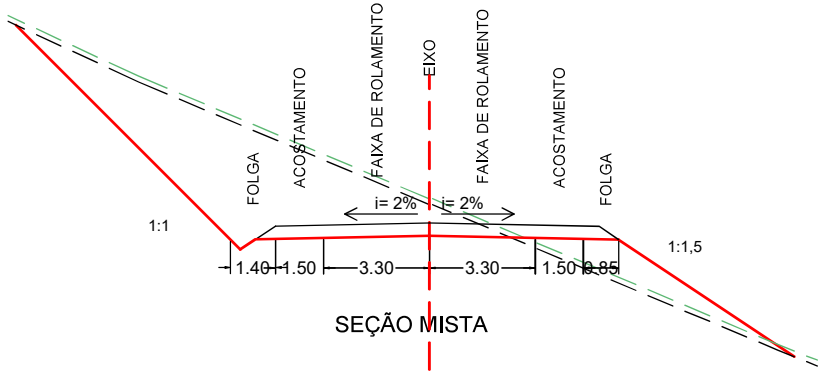
SEÇÃO COM
CORTE EM ROCHA



SEÇÃO DE ATERRO



SEÇÃO DE CORTE COM
MURO DE ARRIMO LD E LE



SEÇÃO MISTA

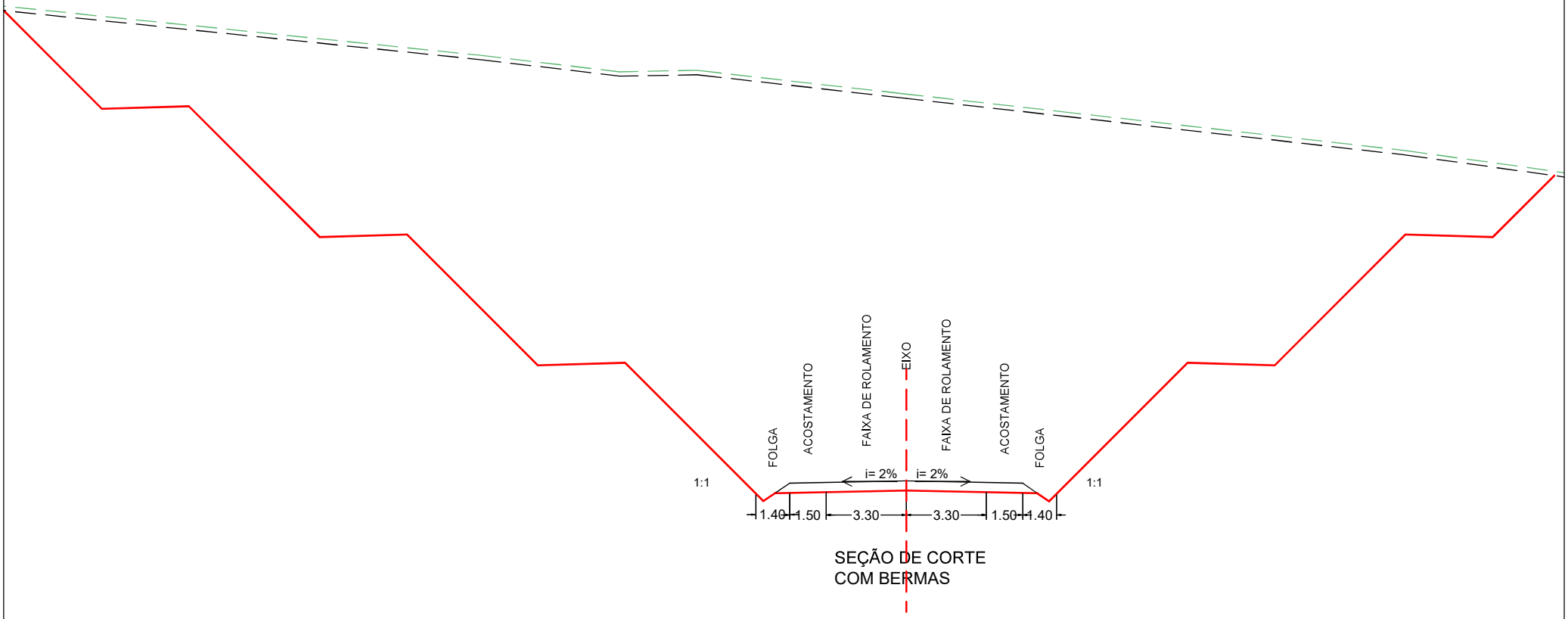
AC1 ROTAS

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
Departamento de Engenharia de Produção e Transportes
Laboratório de Sistemas de Transportes - LASTRAN

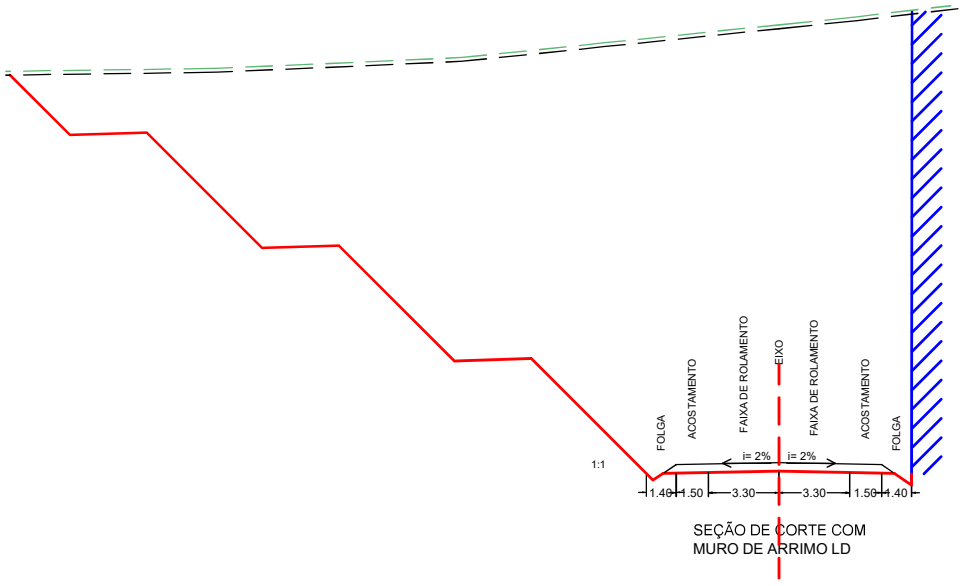
Rodovia: PPP - UFRGS - 2021/1
Trecho: ITAARA-SILVEIRA MARTINS - LOTE 1
Data: 10/11/2021

SEÇÕES TIPO

Código: S/01



SEÇÃO DE CORTE
COM BERMAS



SEÇÃO DE CORTE COM
MURO DE ARRIMO LD

AC1 ROTAS

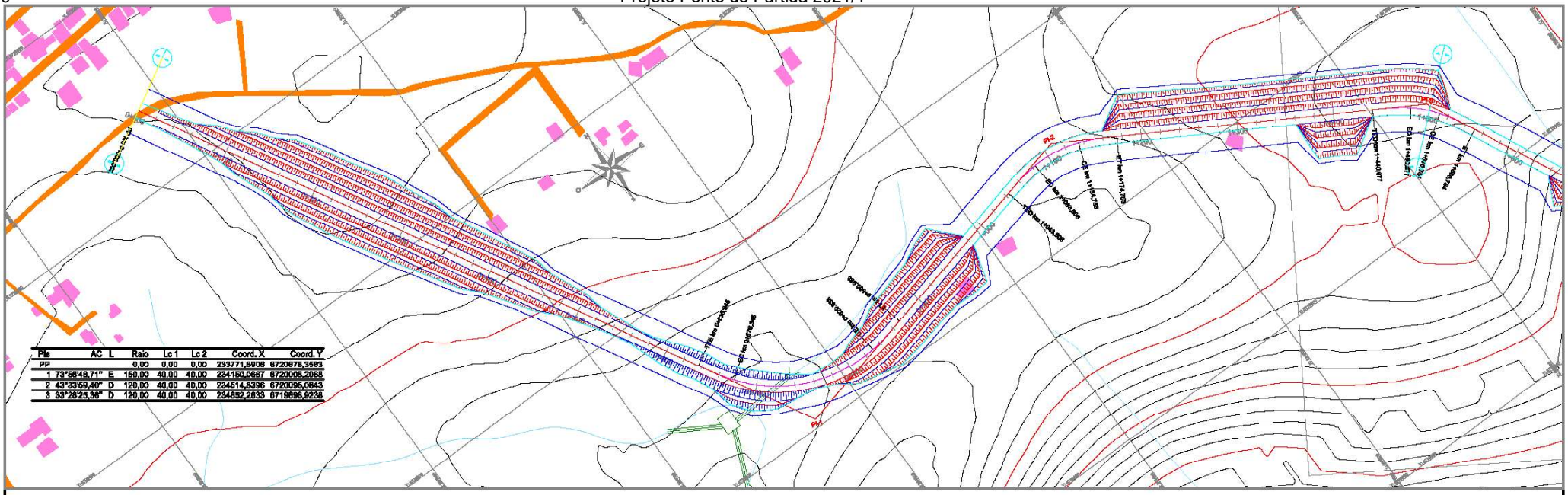
UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
Departamento de Engenharia de Produção e Transportes
Laboratório de Sistemas de Transportes - LASTRAN

Rodovia: PPP - UFRGS - 2021/1
Trecho: ITAARA-SILVEIRA MARTINS - LOTE 1
Data: 10/11/2021

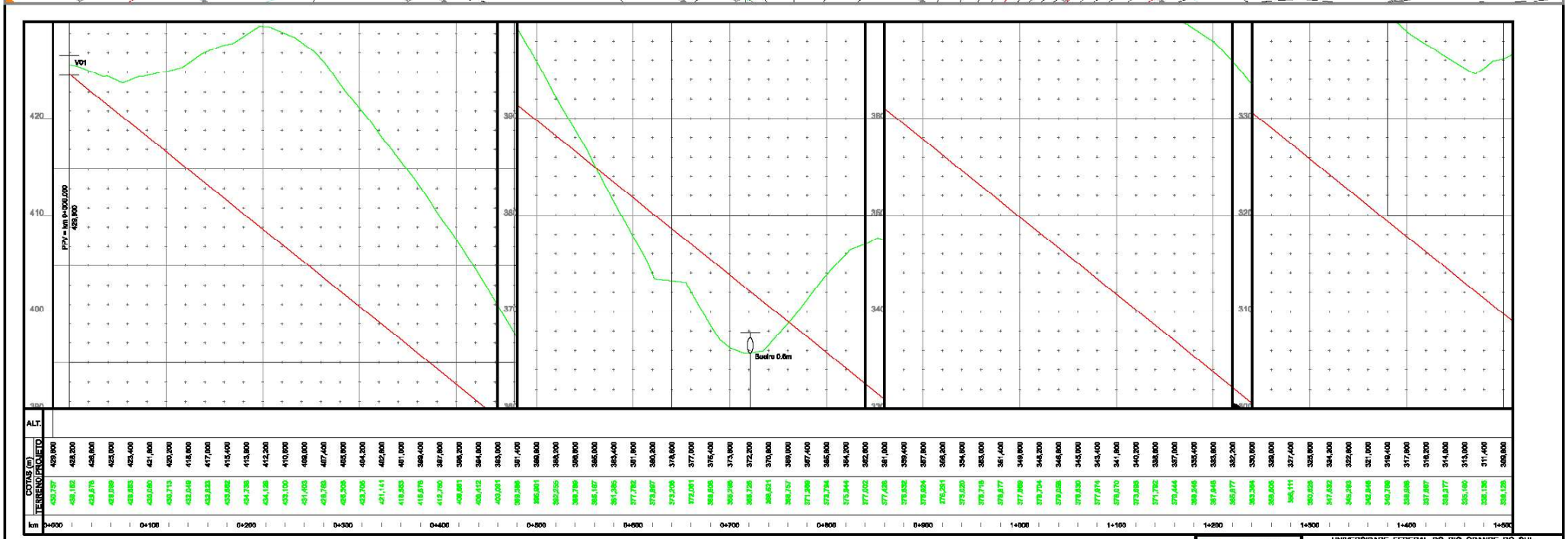
SEÇÕES TIPO

Código: S/02

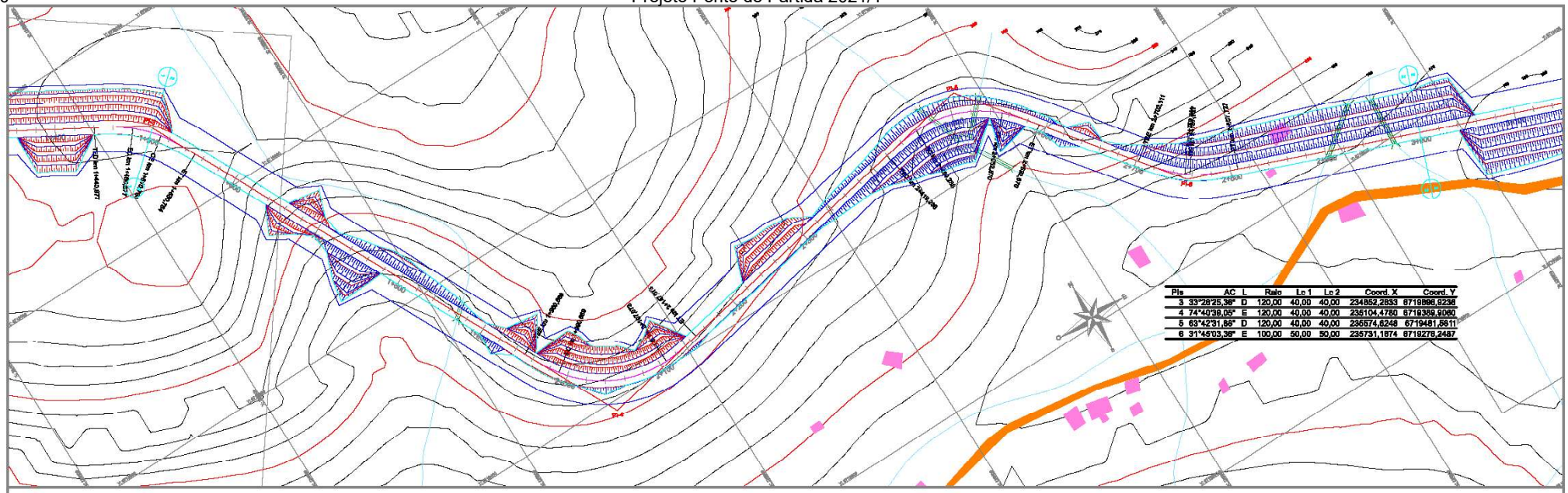
2.2. Linha Geral



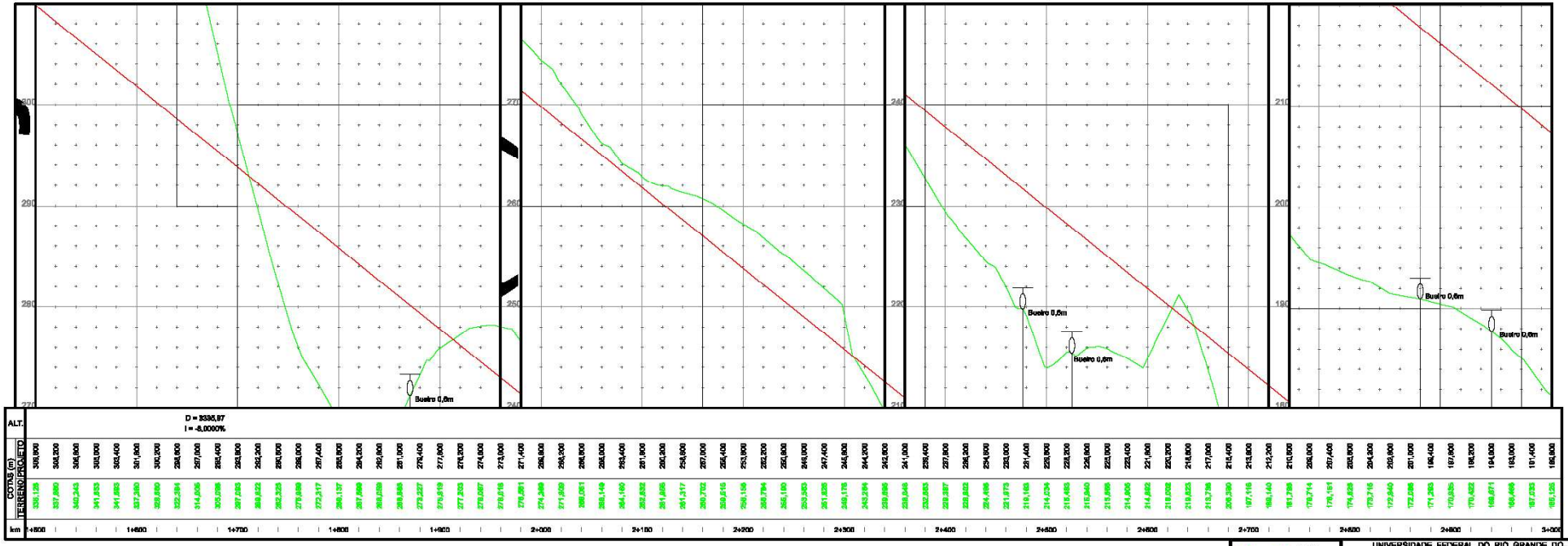
Pts	AC	L	Raio	Lc 1	Lc 2	Coord. X	Coord. Y
PP			0,00	0,00	0,00	233771,8908	6720678,3583
1	73°56'48,71"	E	150,00	40,00	40,00	234150,0667	6720008,2068
2	43°33'59,40"	D	120,00	40,00	40,00	234514,8396	6720095,0843
3	33°26'25,36"	D	120,00	40,00	40,00	234852,2633	6719698,9238



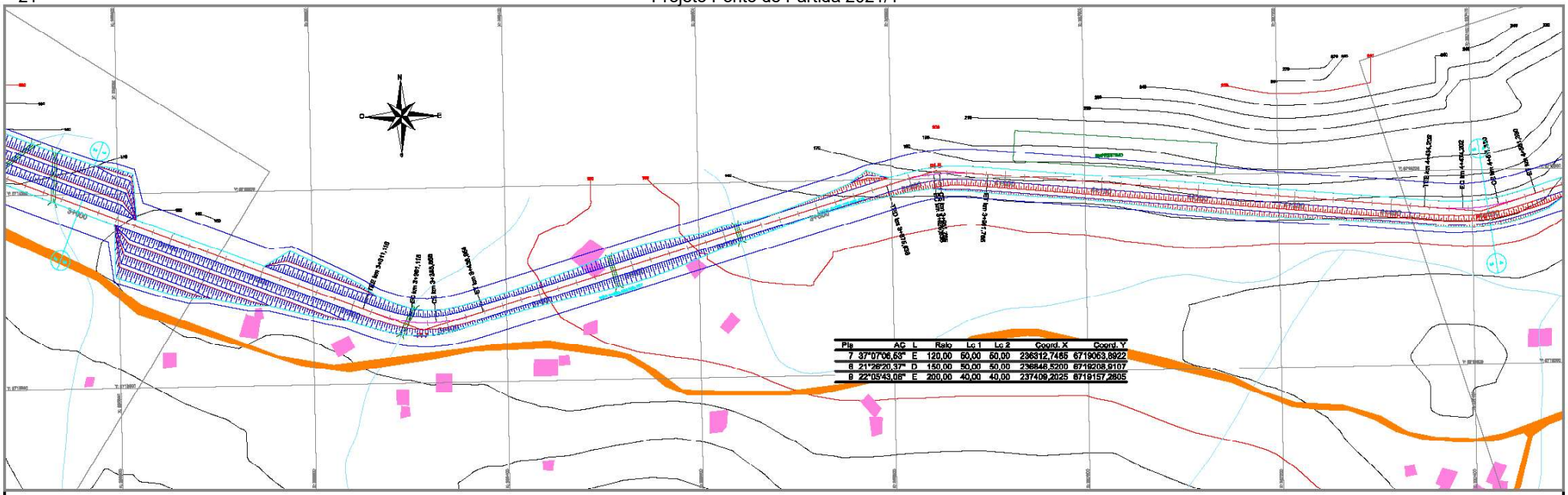
AC1 ROTAS	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
	Rodovia: PPP - UFRGS - 2021/1 Trecho: ITAARA-SILVEIRA MARTINS - LOTE 1 Data: 10/11/2021	
Escala: 1:2000	PROJETO GEOMÉTRICO	Código: PG/01

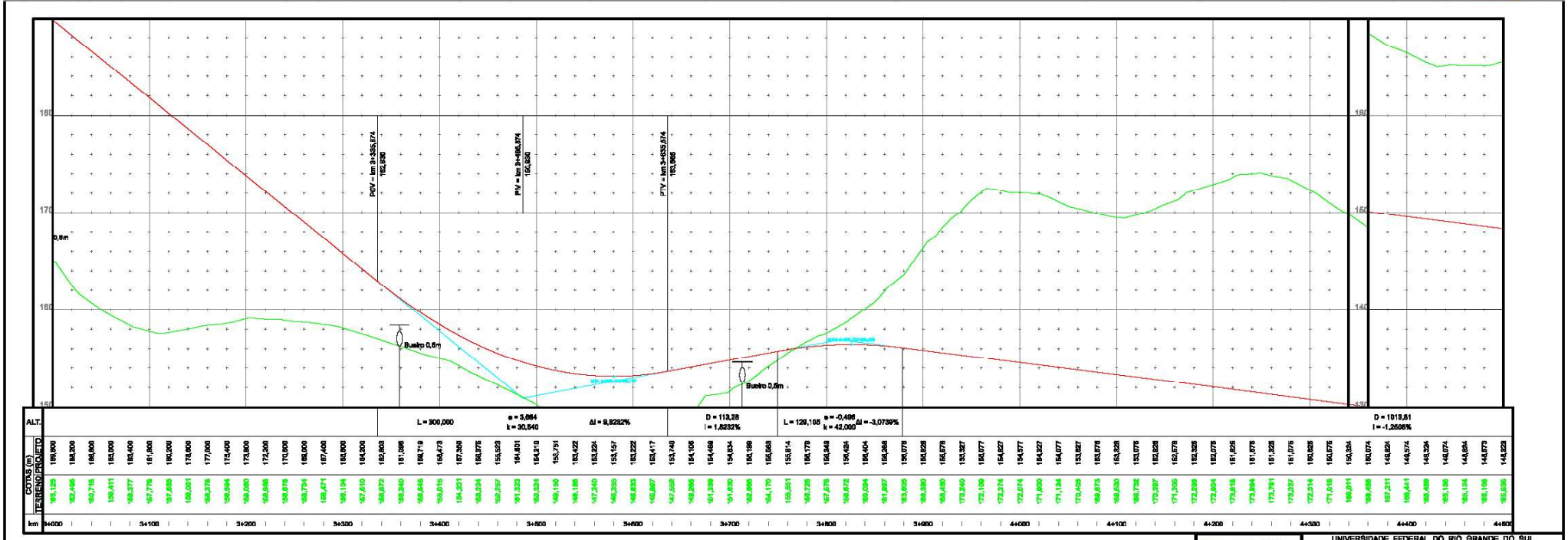


PIs	AC	L	Raio	Lc 1	Lc 2	Coord. X	Coord. Y
3	33°26'25,36"	D	120,00	40,00	40,00	234852,2833	6719866,6236
4	74°40'39,05"	E	120,00	40,00	40,00	235104,4780	6719389,9060
5	63°42'31,88"	D	120,00	40,00	40,00	235574,6248	6719481,5811
6	31°45'03,39"	E	100,00	50,00	50,00	235731,1874	6719276,2487



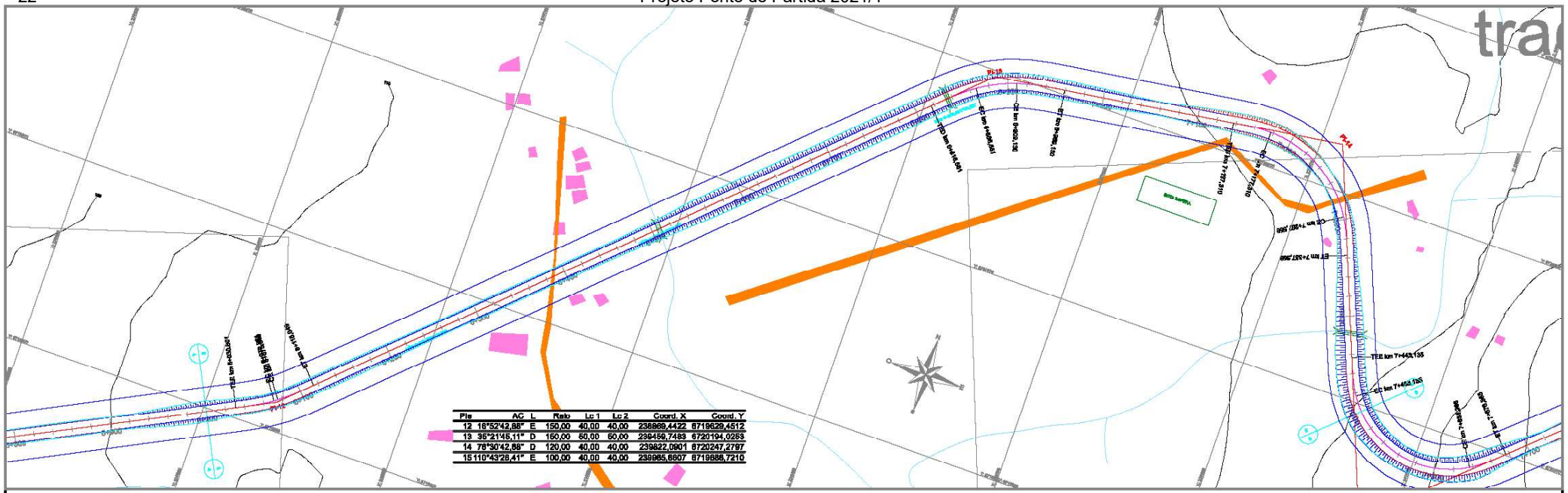
AC1 ROTAS	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN	
	Rodovia: PPP - UFRGS - 2021/1 Trecho: ITAARA-SILVEIRA MARTINS - LOTE 1 Data: 11/2021	
Escala: 1:2000	PROJETO GEOMÉTRICO	Código: PG/02



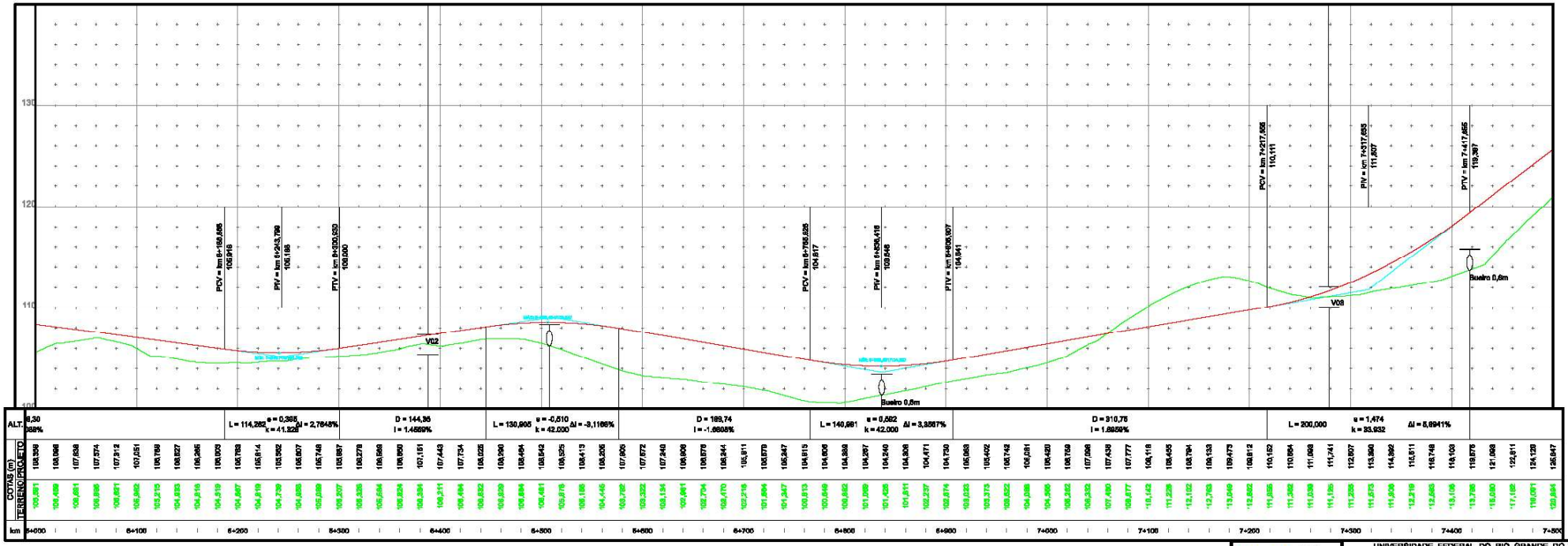


AC1 ROTAS	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN
Escala: 1:2000	Rodovia: PPP - UFRGS - 2021/1 Trecho: ITAARA-SILVEIRA MARTINS - LOTE 1 Data: 10/11/2021
PROJETO GEOMÉTRICO	Código: PG/03

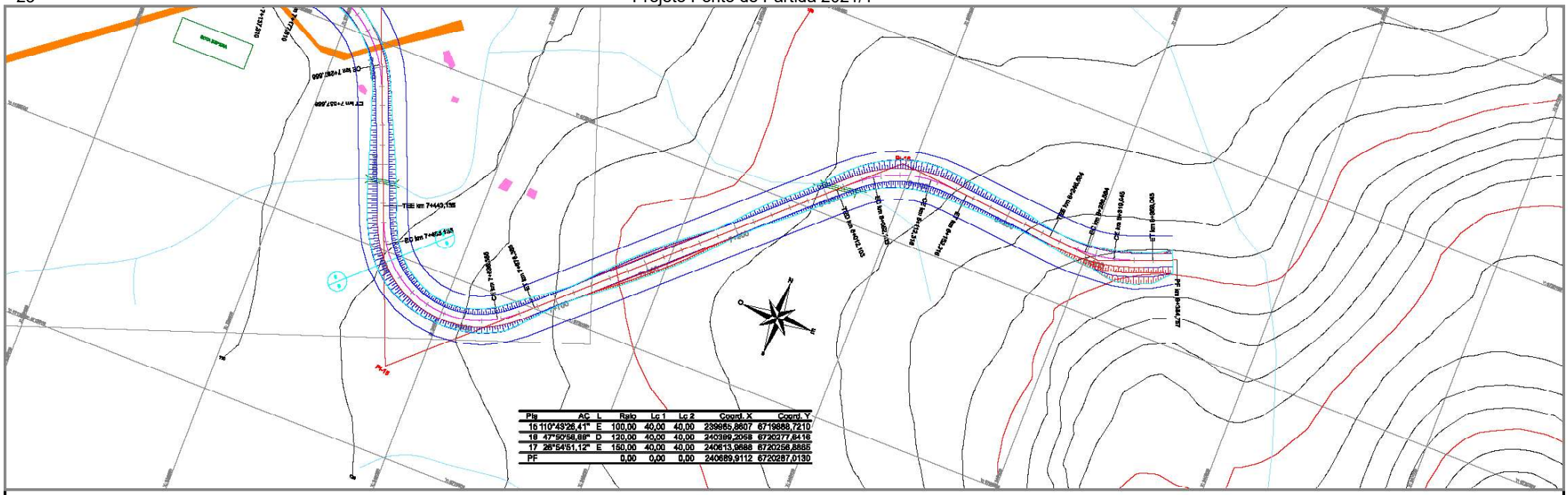
traçado-PG 03



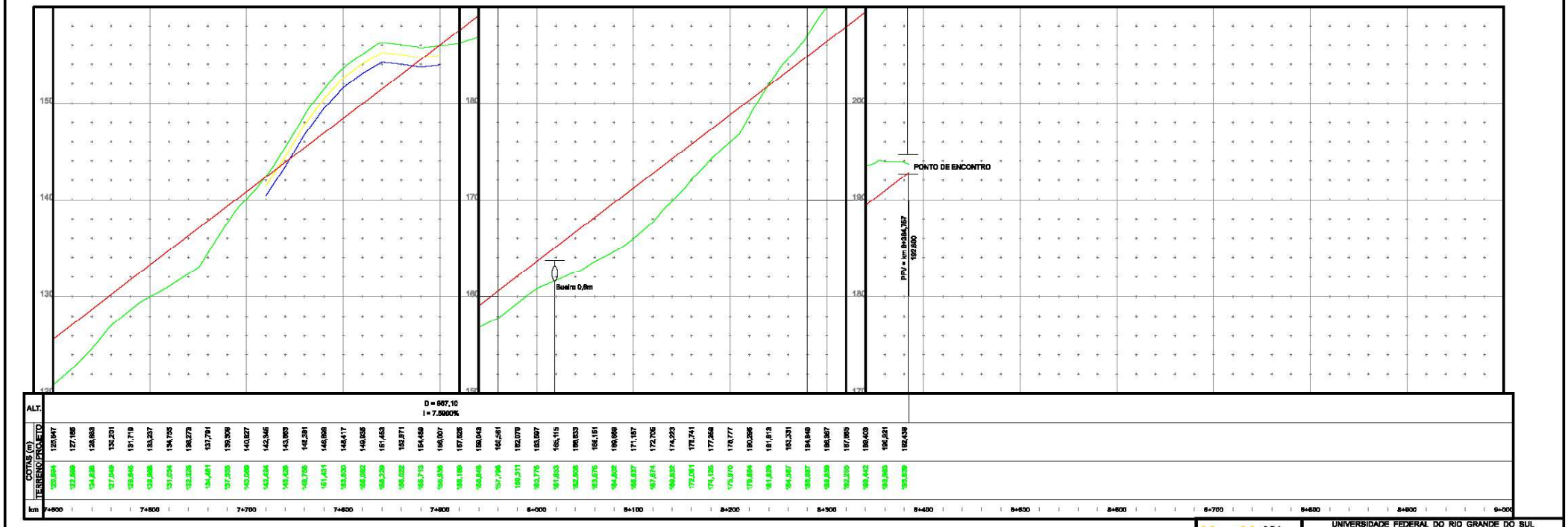
Pis	AC	L	Raio	Lc 1	Lc 2	Coord. X	Coord. Y
12	16°52'42,88"	E	150,00	40,00	40,00	238869,4422	6719629,4512
13	35°21'45,11"	D	150,00	50,00	50,00	239456,7483	6720194,0283
14	76°30'42,88"	D	120,00	40,00	40,00	239822,0901	6720247,2797
15	110°43'28,41"	E	100,00	40,00	40,00	239985,6607	6719888,7210



AC1 ROTAS	UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL Departamento de Engenharia de Produção e Transportes Laboratório de Sistemas de Transportes - LASTRAN
	Rodovia: PPP - UFRGS - 2021/1 Trecho: ITAARA-SILVEIRA MARTINS - LOTE 1 Data:10/11/2021
Escala: 1:2000	PROJETO GEOMÉTRICO — Código: PG/05



PIs	AC	L	Raio	Lc 1	Lc 2	Coord. X	Coord. Y
16	110°43'26,41"	E	100,00	40,00	40,00	239985,8607	6719868,7210
18	47°50'56,88"	D	120,00	40,00	40,00	240389,2058	6720277,8416
17	26°54'51,12"	E	150,00	40,00	40,00	240613,9688	6720258,8865
PF			0,00	0,00	0,00	240669,9112	6720287,0130



UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL
Departamento de Engenharia de Produção e Transportes
Laboratório de Sistemas de Transportes - LASTRAN

AC1 ROTAS

Rodovia: PPP - UFRGS - 2021/1
Trecho: ITAARA-SILVEIRA MARTINS - LOTE 1
Data: 10/11/2021

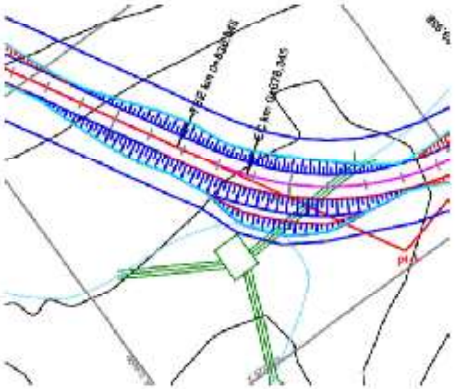
Escala: 1:2000

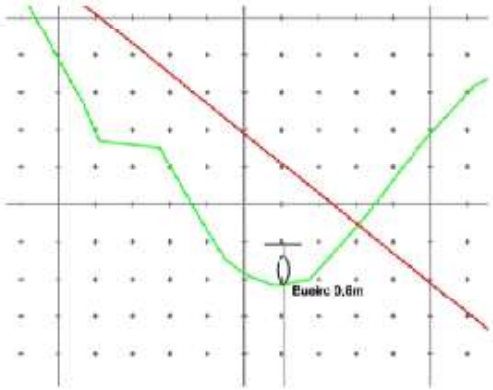
PROJETO GEOMÉTRICO

Código: PG/05

traçado-PG 06

2.3. Detalhamento do Projeto Planialtimétrico



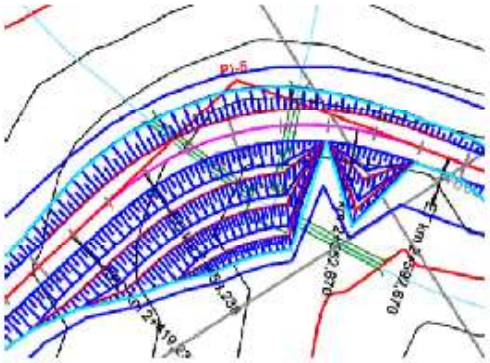


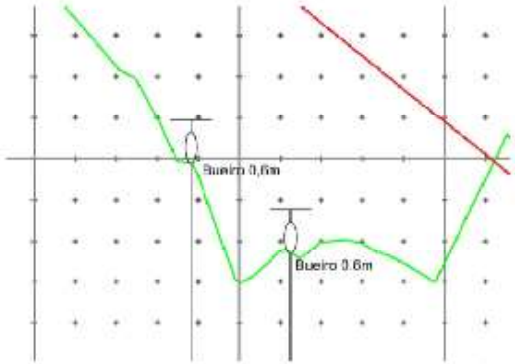
BUEIRO 1

Bueiro com solução de projeto para córregos

Estaca: 0+721,399m
Cota terreno: 365,692m
Cota projeto: 372,088m

Obs.: para o orçamento da solução, foram somados os comprimentos das 3 ramificações e adotadas 6 bocas





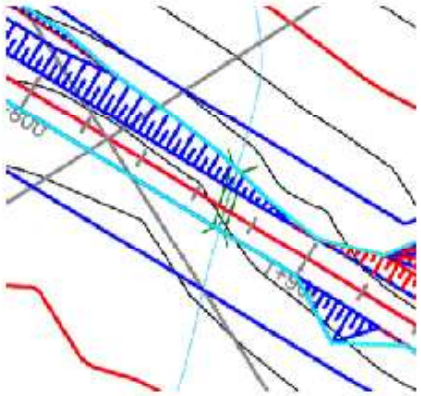
BUEIROS 3 e 4

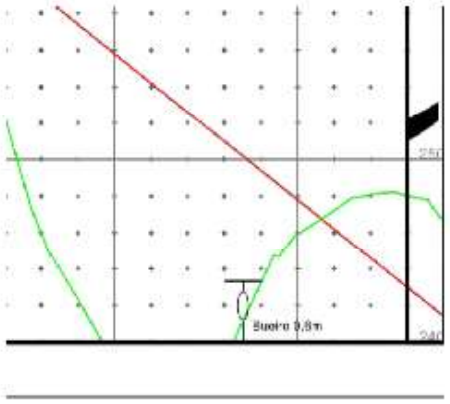
Bueiros com solução de projeto para córregos

Estaca: 2+476,536m
Cota terreno: 219,907m
Cota projeto: 231,677m

Estaca: 2+524,813m
Cota terreno: 215,541m
Cota projeto: 227,815m

Obs.: para o orçamento da solução, foram somados os comprimentos das 3 ramificações e adotadas 6 bocas





BUEIRO 2

Bueiro simples para córrego

Estaca: 1+870,106m
Cota terreno: 270,993m
Cota projeto: 280,192m

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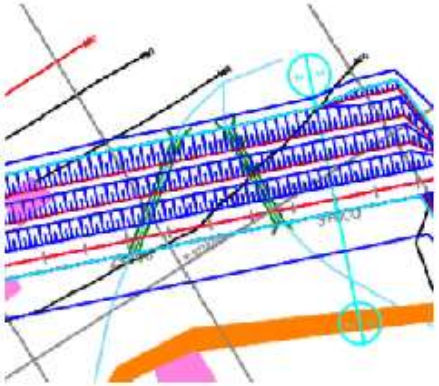
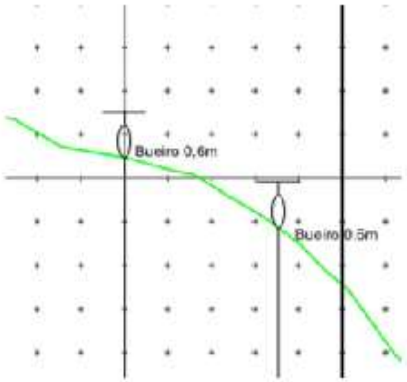
AC1 ROTAS

PROJETO GEOMÉTRICO

Detalhamento de interferências com córregos



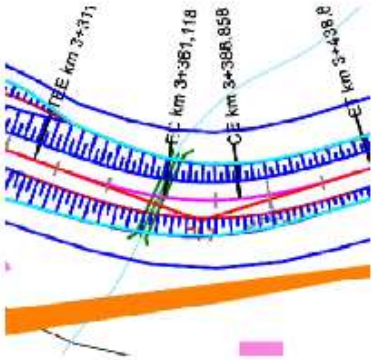


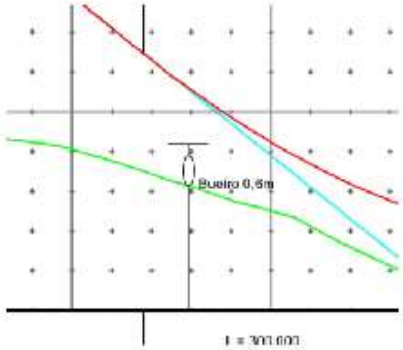
BUEIROS 5 e 6

Bueiros simples para córregos

Estaca: 2+902,838m
Cota terreno: 170,761m
Cota projeto: 197,573m

Estaca: 2+970,349m
Cota terreno: 167,811m
Cota projeto: 192,172m

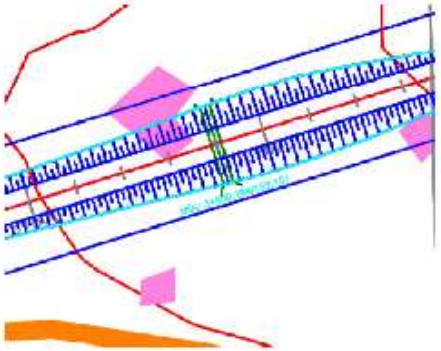


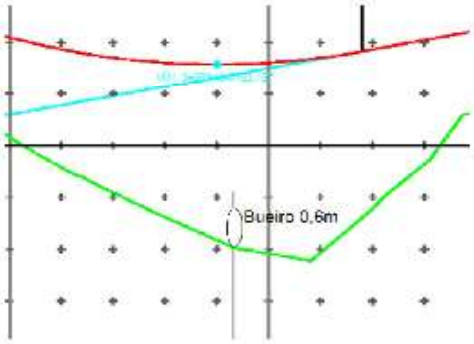


BUEIRO 7

Bueiro simples para córrego

Estaca: 3+359,100m
Cota terreno: 156,311m
Cota projeto: 161,160m





BUEIRO 8

Bueiro simples para
ponto de cota mínima

Estaca: 3+580,194m
Cota terreno: 146,276m
Cota projeto: 153,157m

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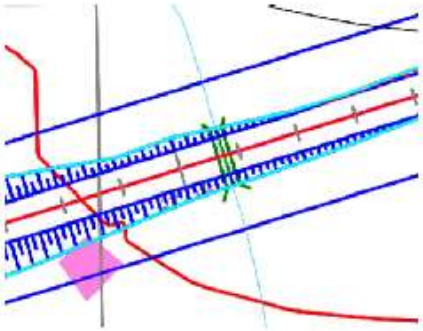
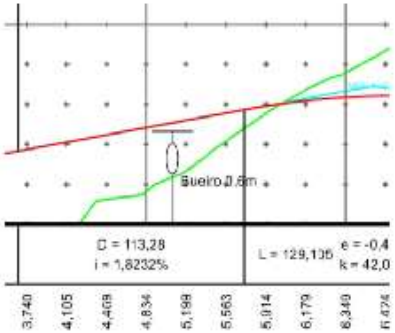
AC1 ROTAS

PROJETO GEOMÉTRICO

Detalhamento de interferências com córregos

PRODUZIDO POR UMA VERSAO DO AUTODESK PARA ESTUDANTES

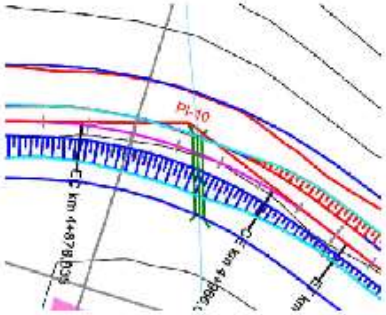


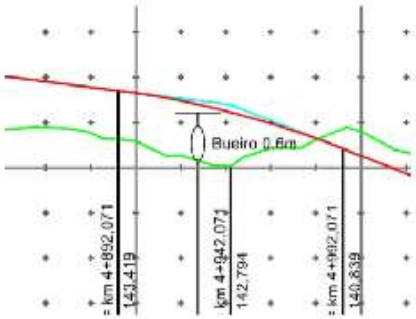


BUEIRO 9

Bueiro simples para córrego

Estaca: 3+713,449m
Cota terreno: 152,305m
Cota projeto: 155,079m

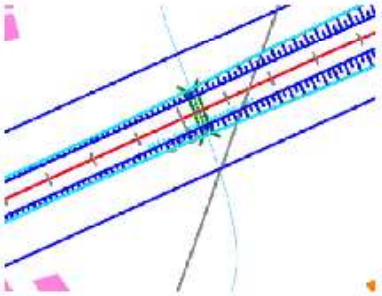


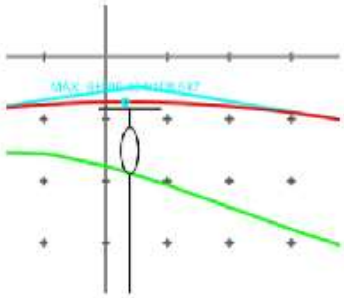


BUEIRO 10

Bueiro simples para córrego

Estaca: 4+927,257m
Cota terreno: 140,410m
Cota projeto: 142,815m





BUEIRO 11

Bueiro simples para córrego

Estaca: 6+506,434m
Cota terreno:106,157m
Cota projeto: 108,546m

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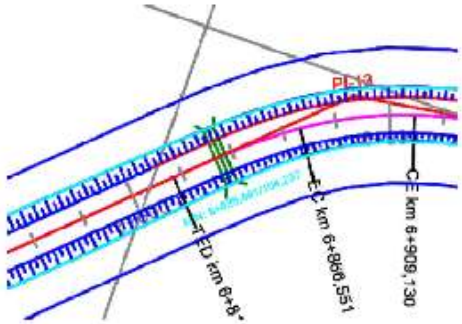
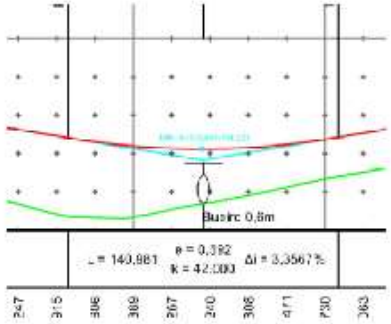
AC1 ROTAS

PROJETO GEOMÉTRICO

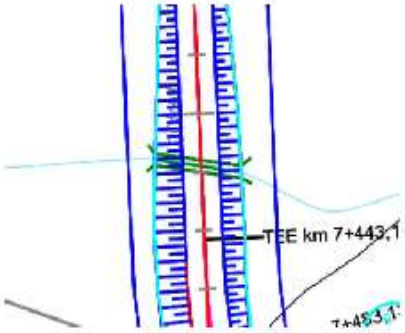
Detalhamento de interferências com córregos

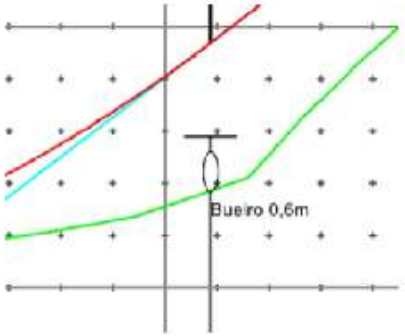




BUEIRO 12

Bueiro simples para ponto de cota mínima
Estaca: 6+336,180m
Cota terreno: 101,351m
Cota projeto: 104,237m

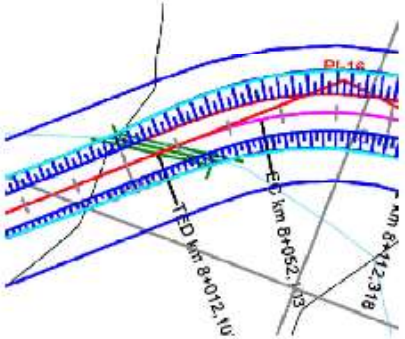


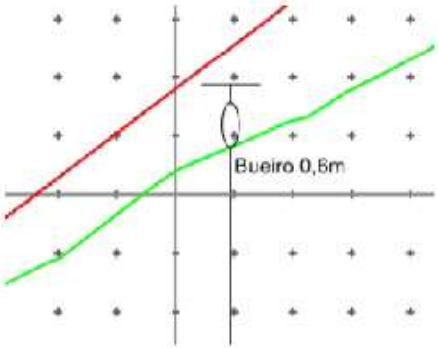


BUEIRO 13

Bueiro simples para córrego

Estaca: 7+417,927m
Cota terreno: 113,699m
Cota projeto: 119,418m





BUEIRO 14

Bueiro simples para córrego

Estaca: 8+019,989m
Cota terreno:161,602m
Cota projeto: 165,114m

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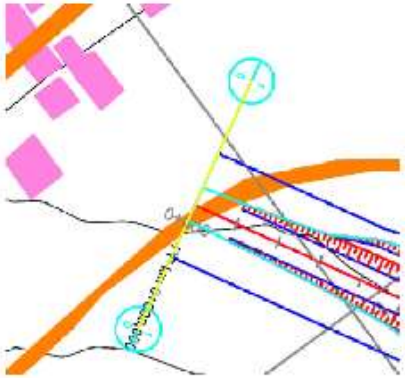
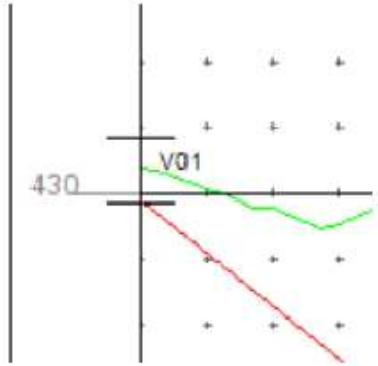
AC1 ROTAS

PROJETO GEOMÉTRICO

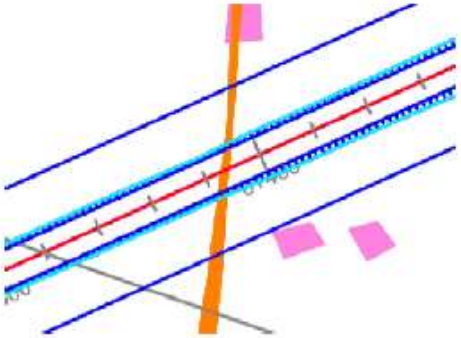
Detalhamento de interferências com córregos

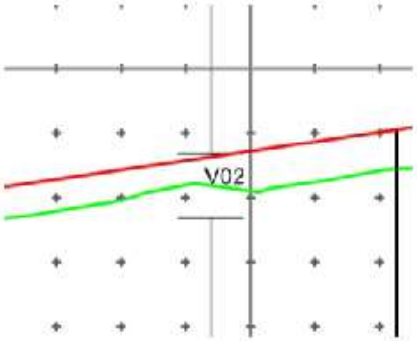




VIA EXISTENTE - V01

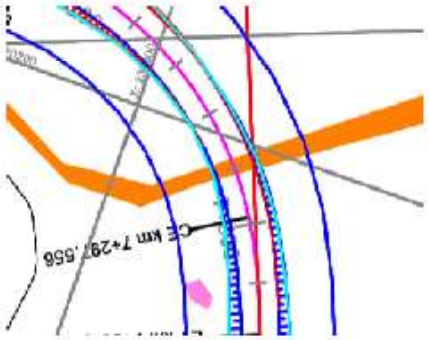
Estaca: 0+000,000m
Cota terreno: 430,757m
Cota projeto: 429,800m

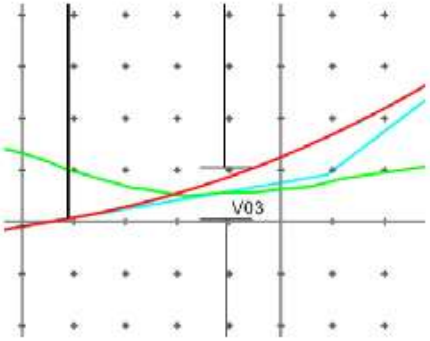




VIA EXISTENTE - V02

Estaca: 6+388,133m
Cota terreno: 106,320m
Cota projeto: 107,270m





VIA EXISTENTE - V03

Estaca: 7+ 279,172m
Cota terreno: 111,136m
Cota projeto: 111,712m

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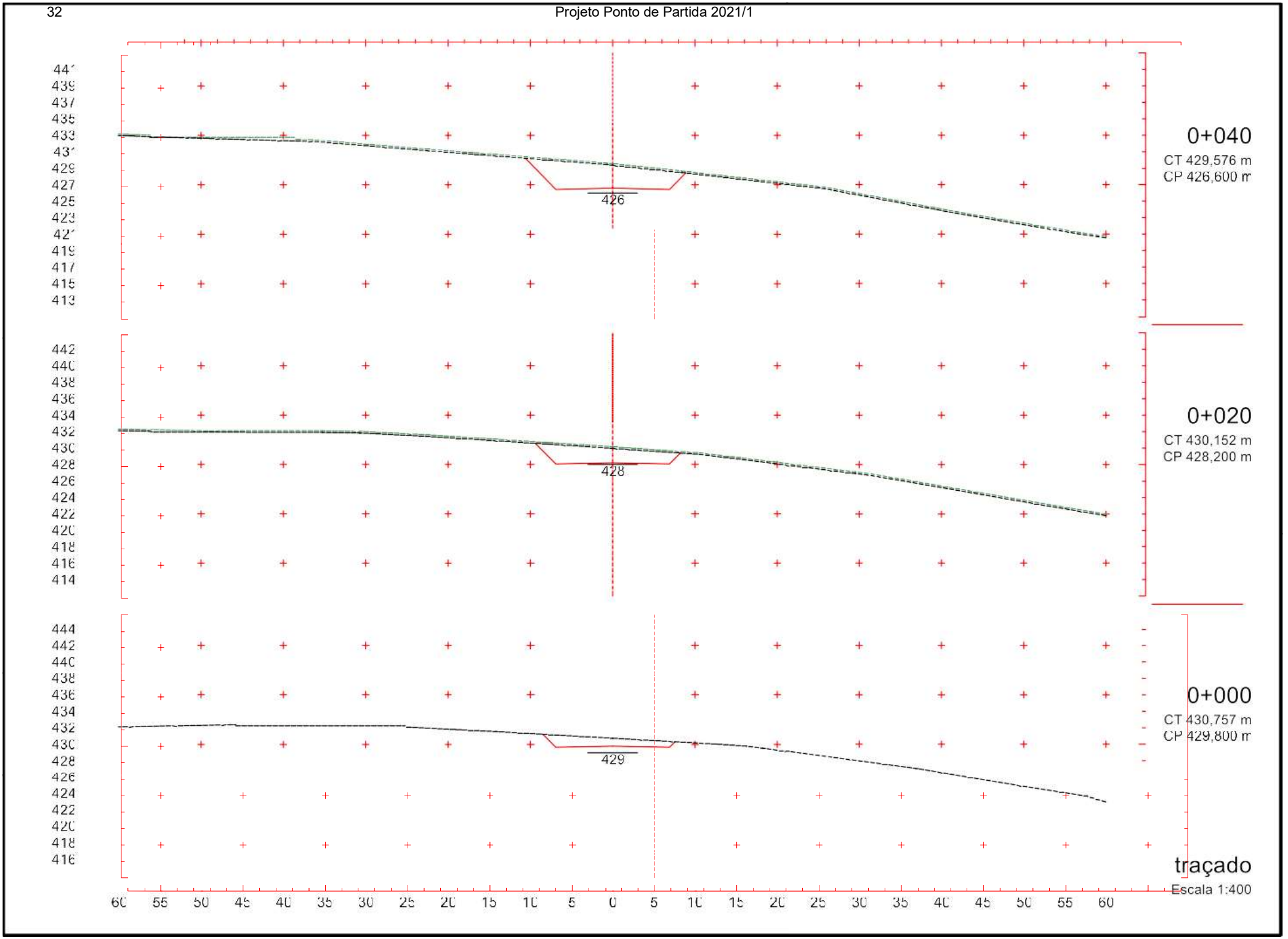
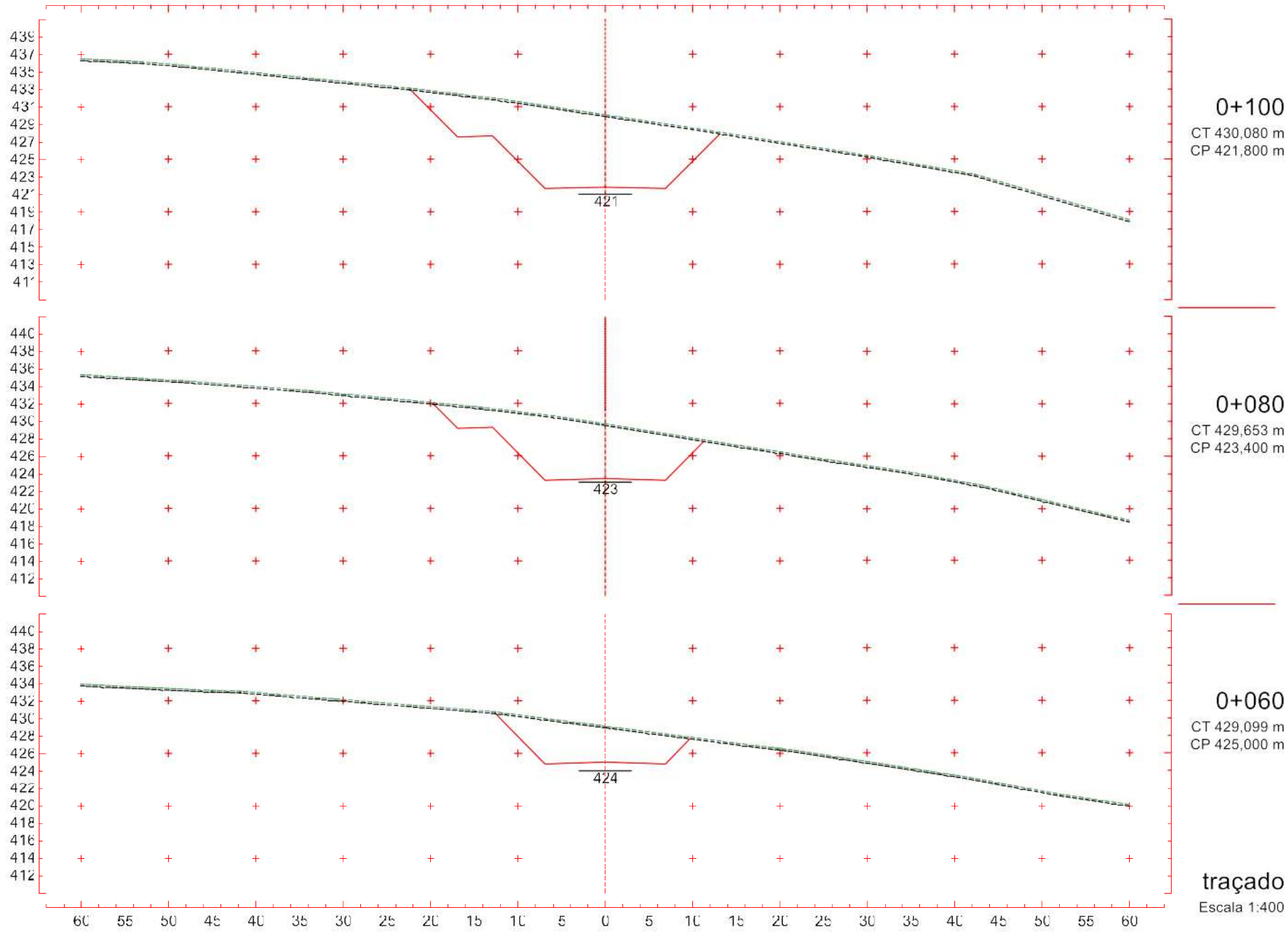
AC1 ROTAS

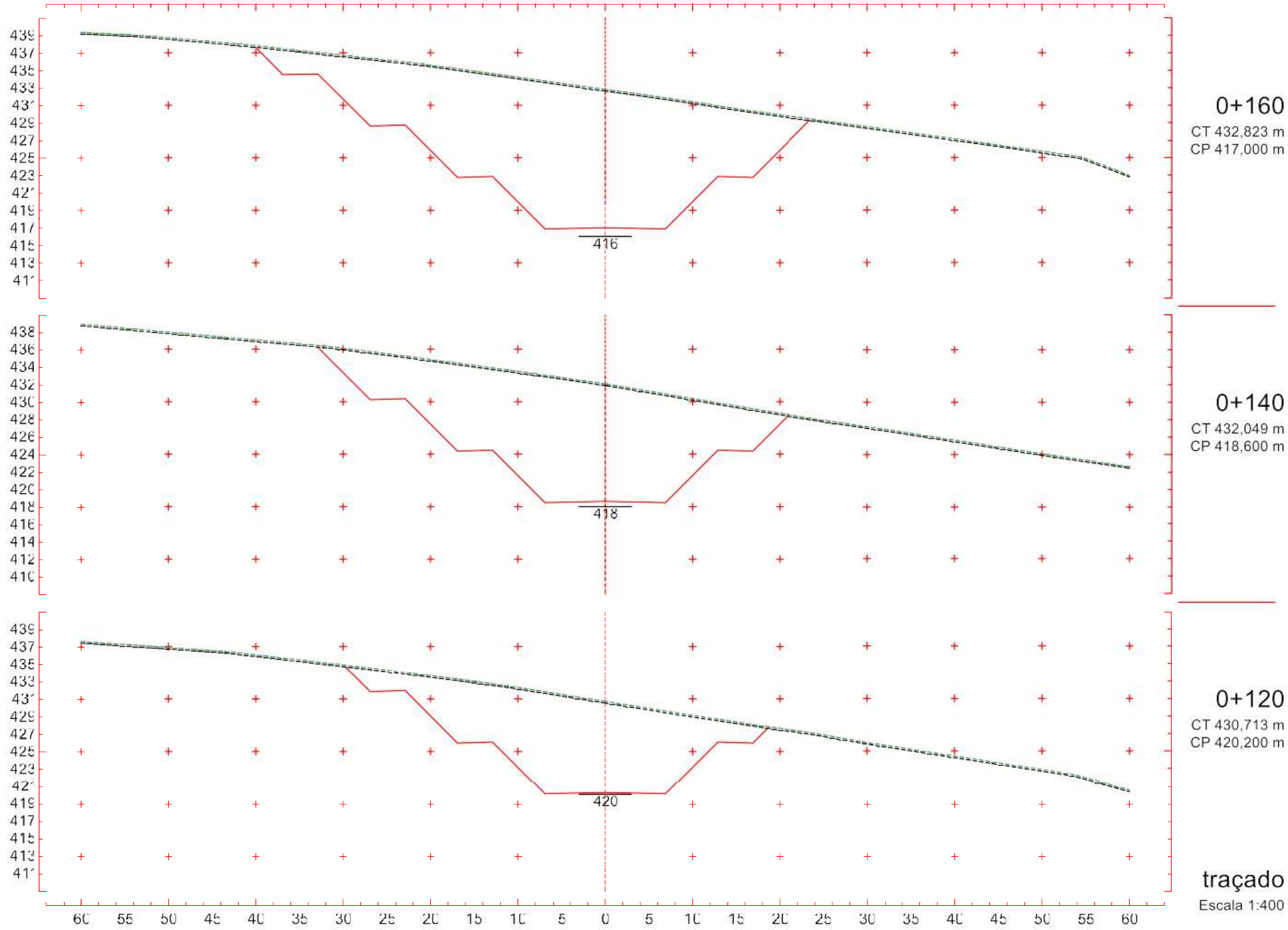
PROJETO GEOMÉTRICO

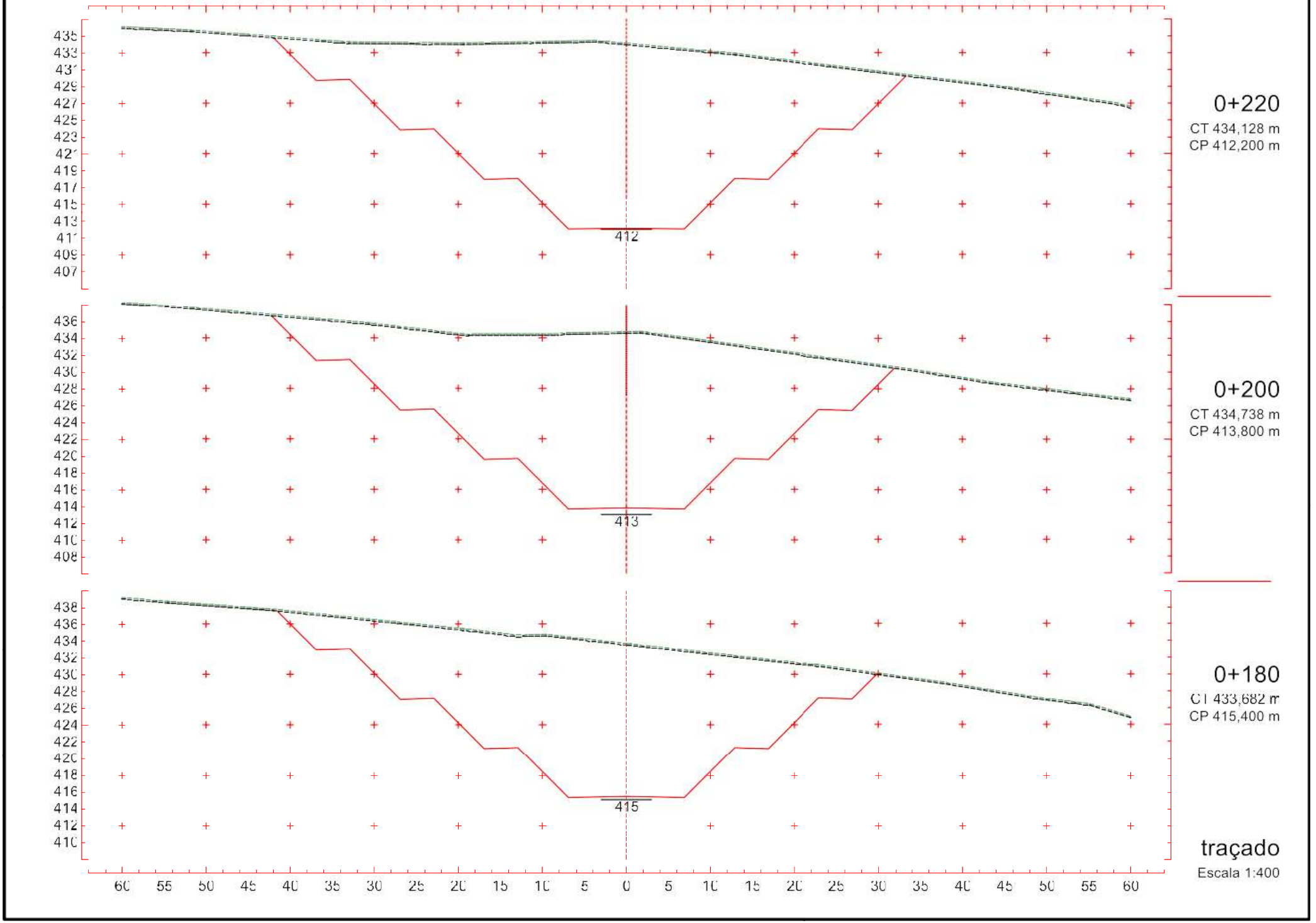
Detalhamento de interferências com vias existentes

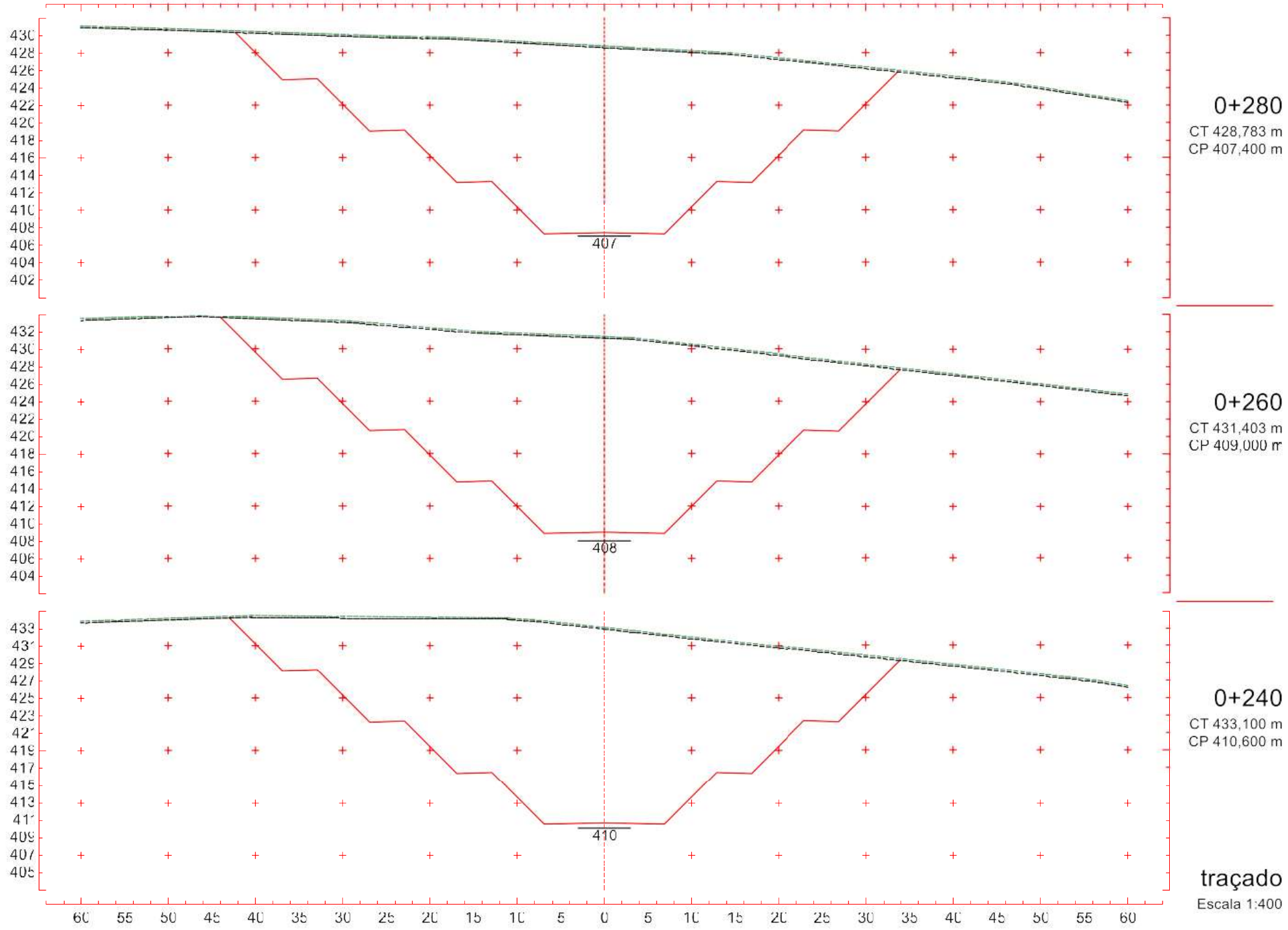
2.4. Seções Transversais

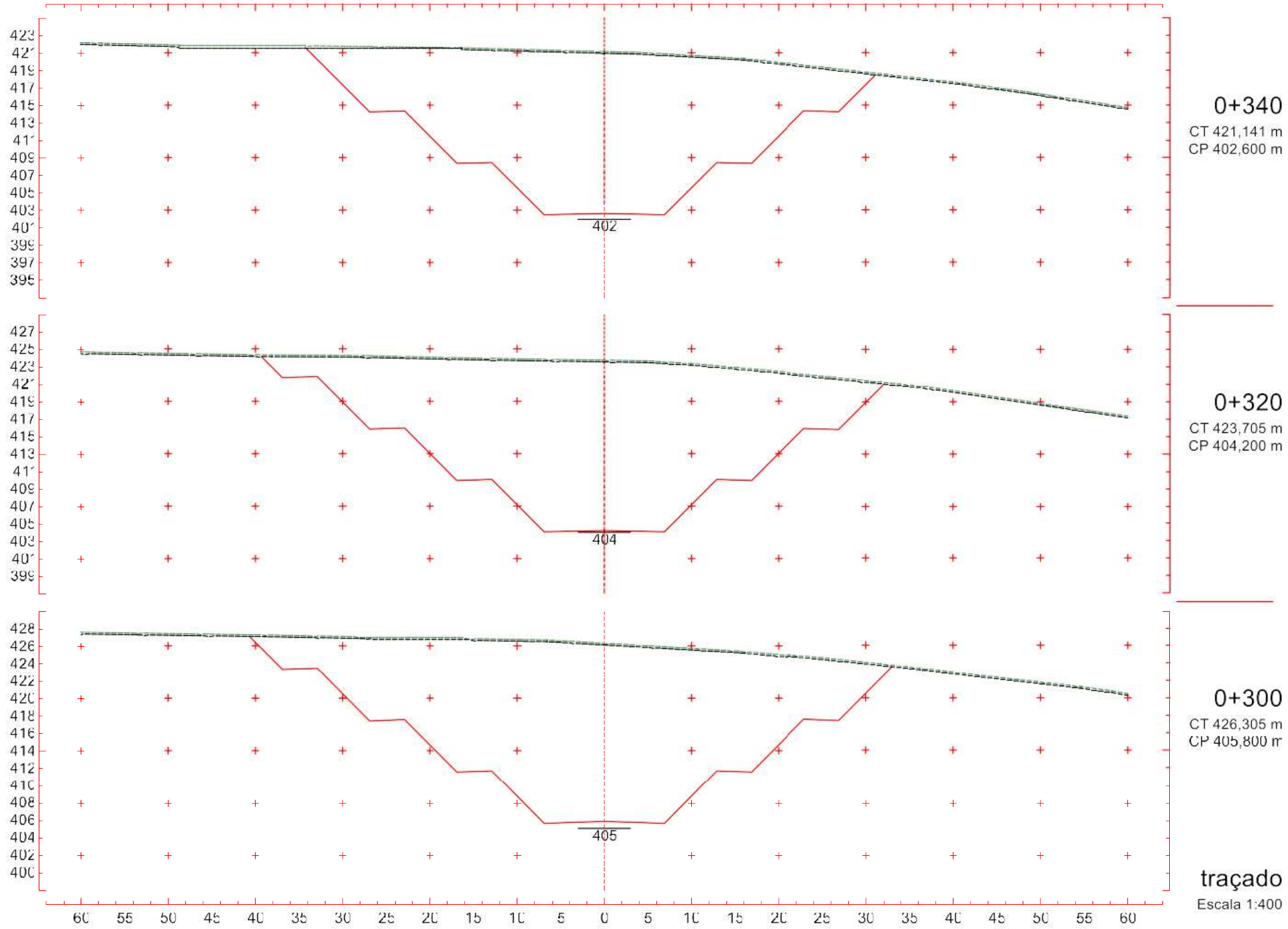

0+040
CT 429,576 m
CP 426,600 m
426
0+020
CT 430,152 m
CP 428,200 m
428
0+000
CT 430,757 m
CP 429,800 m
429
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

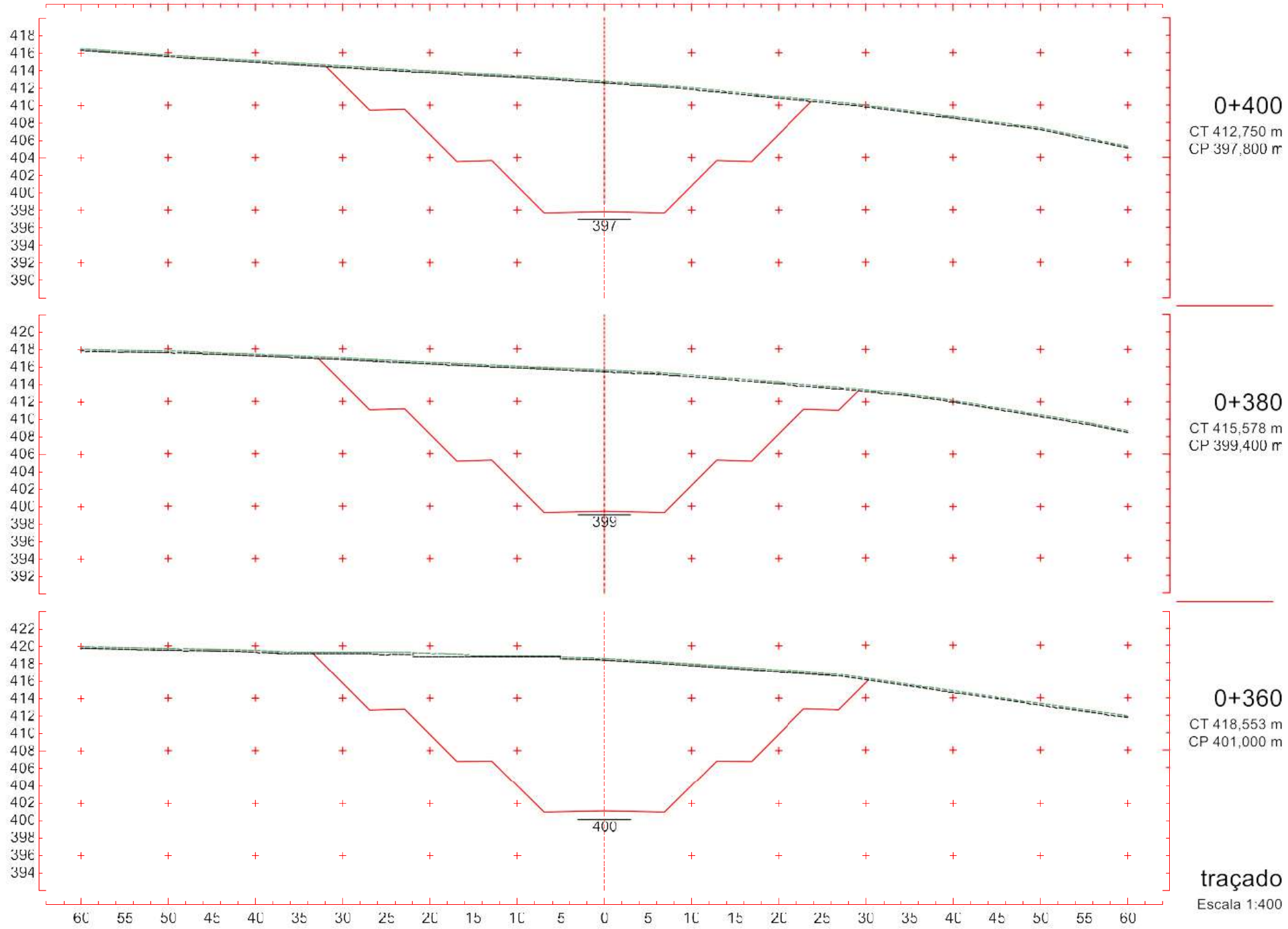

0+100
CT 430,080 m
CP 421,800 m
421
0+080
CT 429,653 m
CP 423,400 m
423
0+060
CT 429,099 m
CP 425,000 m
424
traçado
Escala 1:400

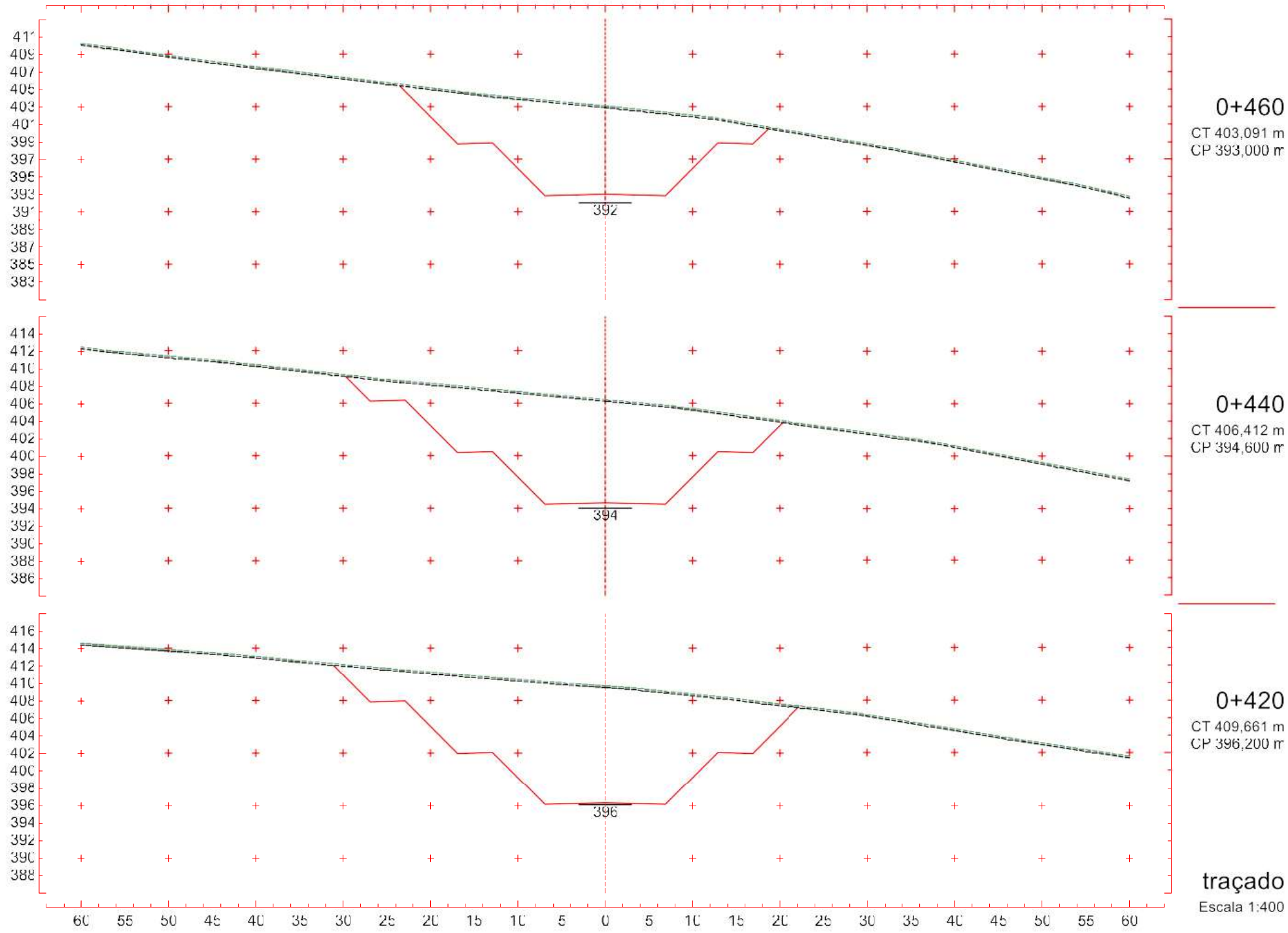

0+160
CT 432,823 m
CP 417,000 m
416
0+140
CT 432,049 m
CP 418,600 m
418
0+120
CT 430,713 m
CP 420,200 m
420
traçado
Escala 1:400

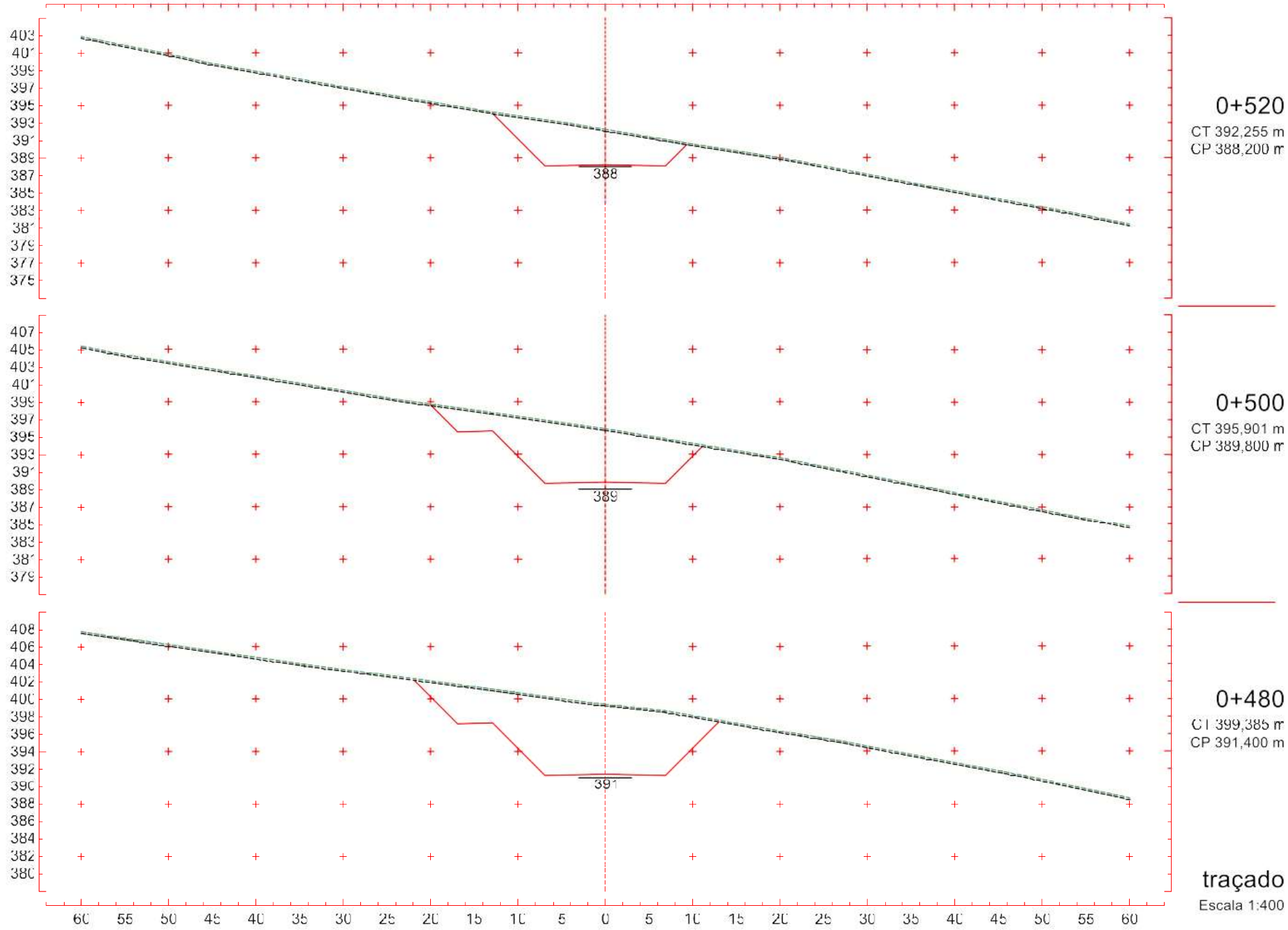

435
433
431
429
427
425
423
421
419
417
415
413
411
409
407
412
0+220
CT 434,128 m
CP 412,200 m
436
434
432
430
428
426
424
422
420
418
416
414
412
410
408
413
0+200
CT 434,738 m
CP 413,800 m
438
436
434
432
430
428
426
424
422
420
418
416
414
412
410
415
0+180
CT 433,682 m
CP 415,400 m
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60
traçado
Escala 1:400

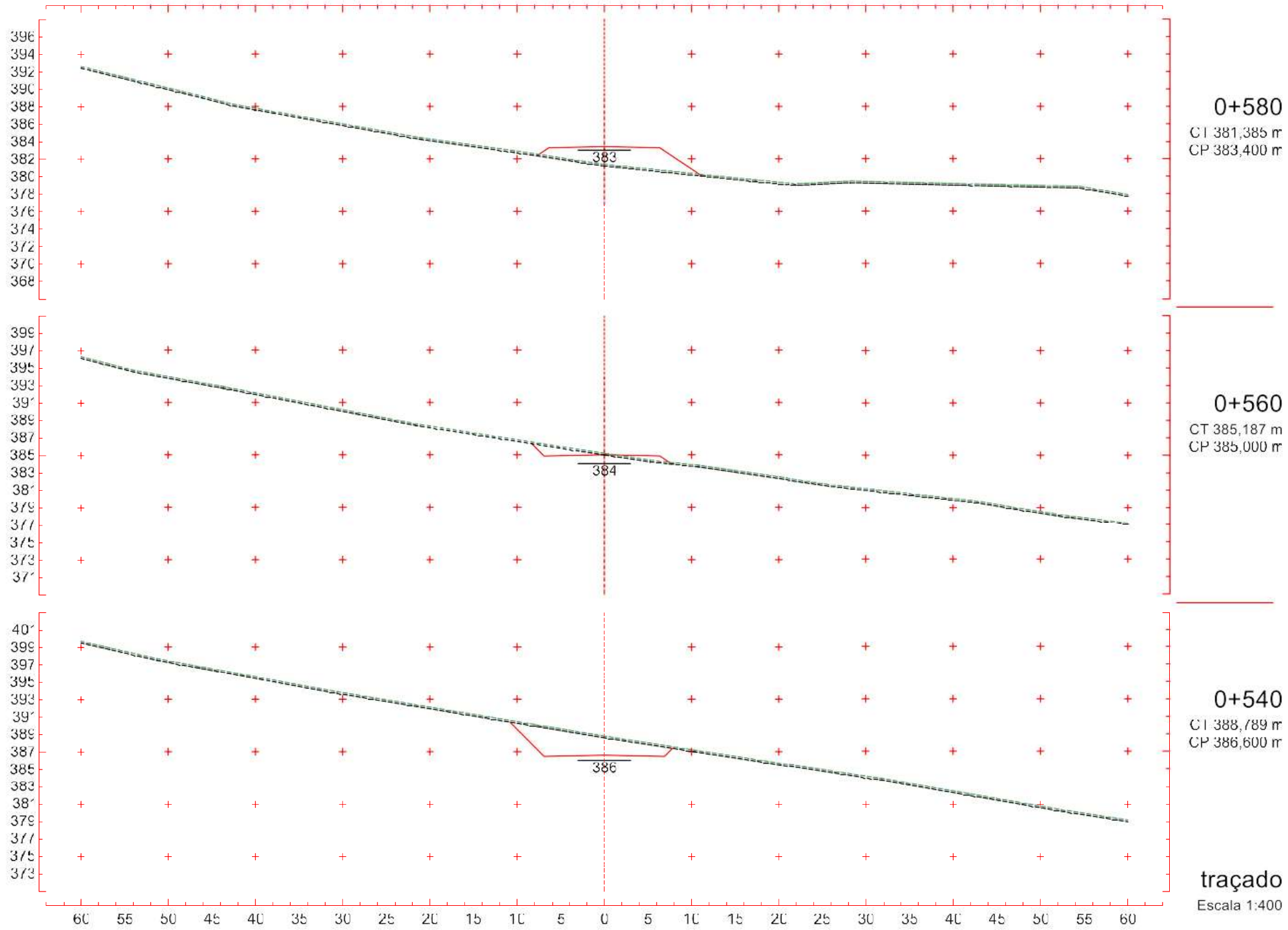

0+280
CT 428,783 m
CP 407,400 m
407
0+260
CT 431,403 m
CP 409,000 m
408
0+240
CT 433,100 m
CP 410,600 m
410
traçado
Escala 1:400

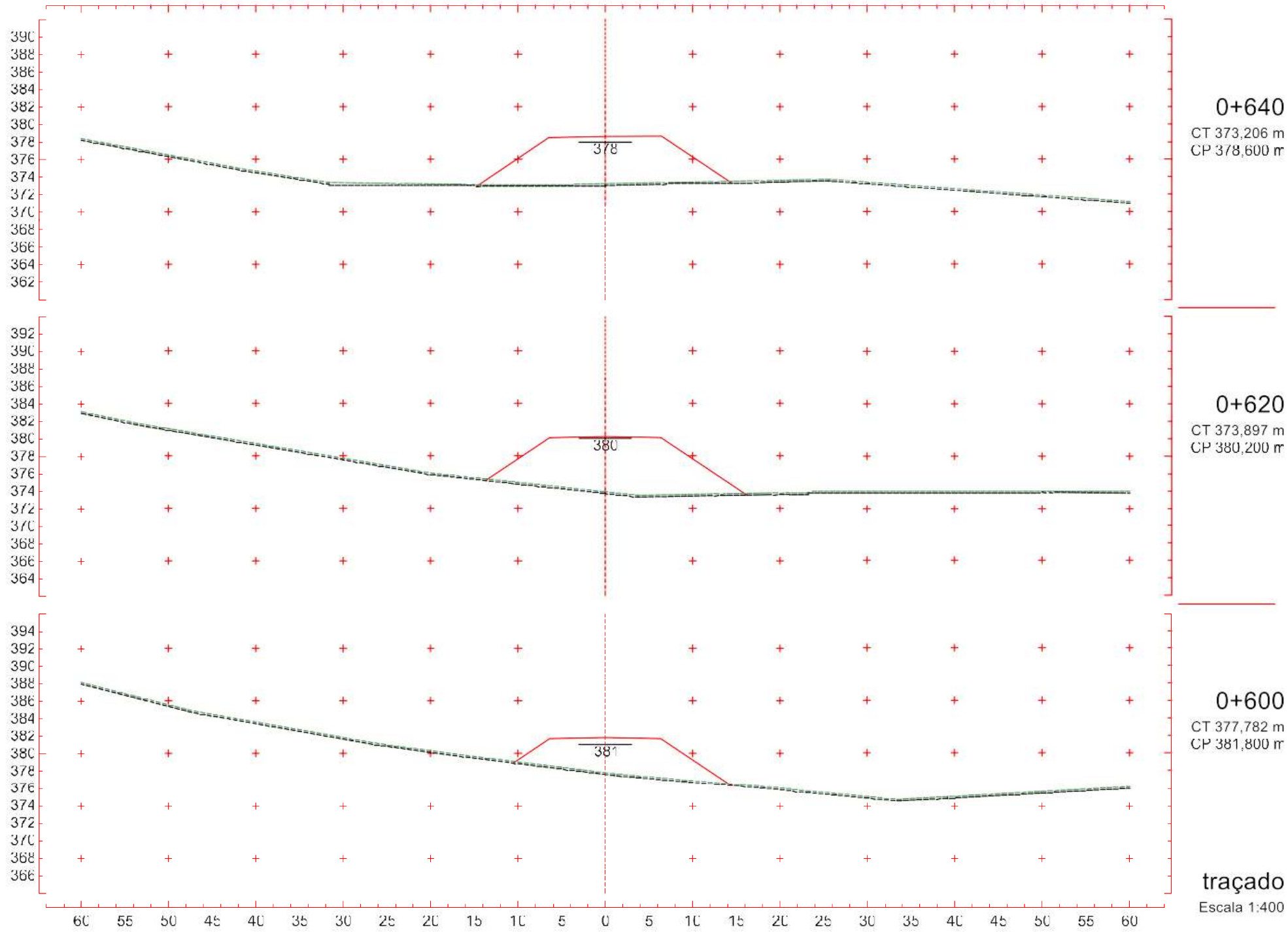

0+340
CT 421,141 m
CP 402,600 m
402
0+320
CT 423,705 m
CP 404,200 m
404
0+300
CT 426,305 m
CP 405,800 m
405
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

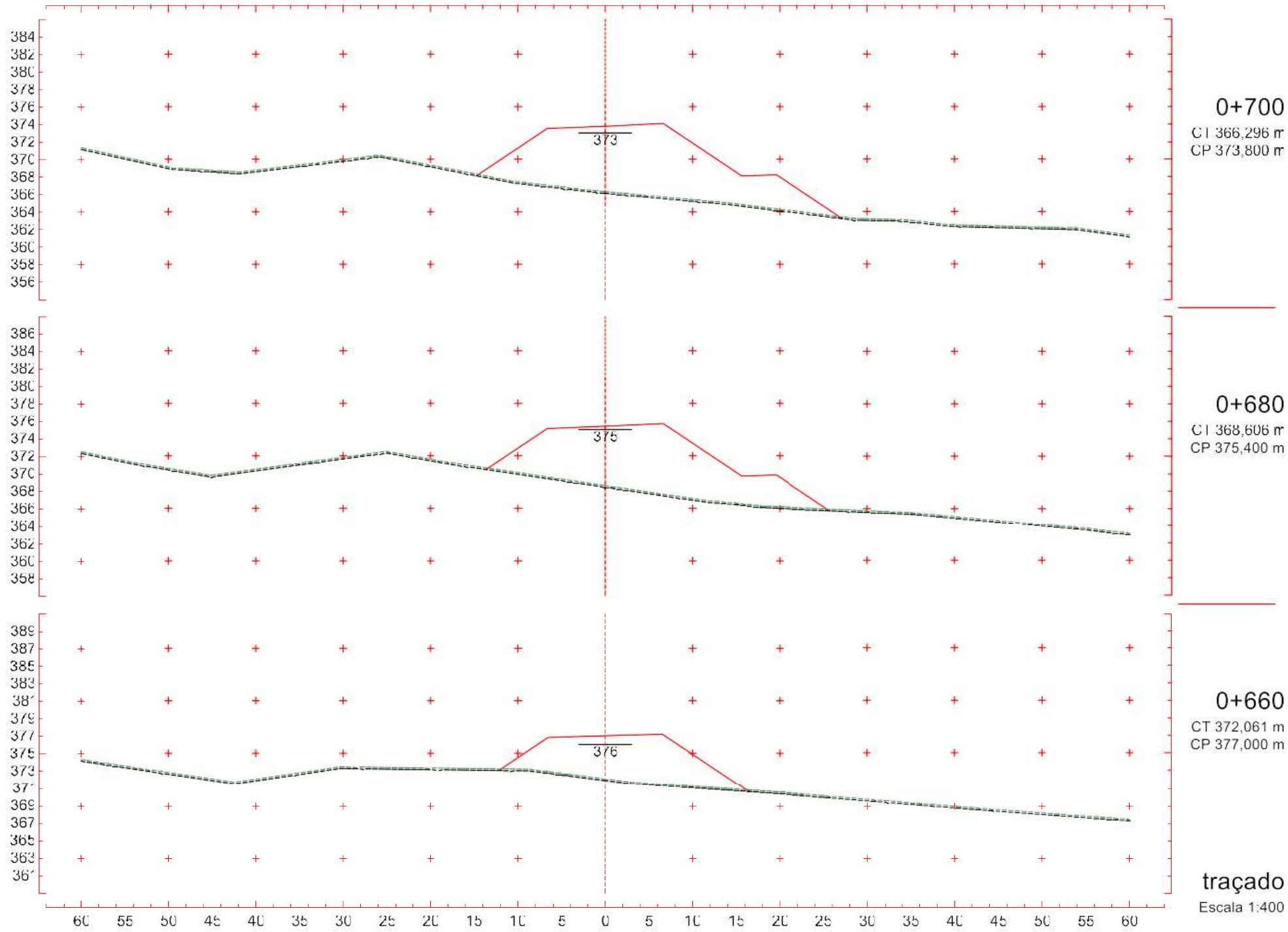

0+400
CT 412,750 m
CP 397,800 m
397
0+380
CT 415,578 m
CP 399,400 m
399
0+360
CT 418,553 m
CP 401,000 m
400
traçado
Escala 1:400

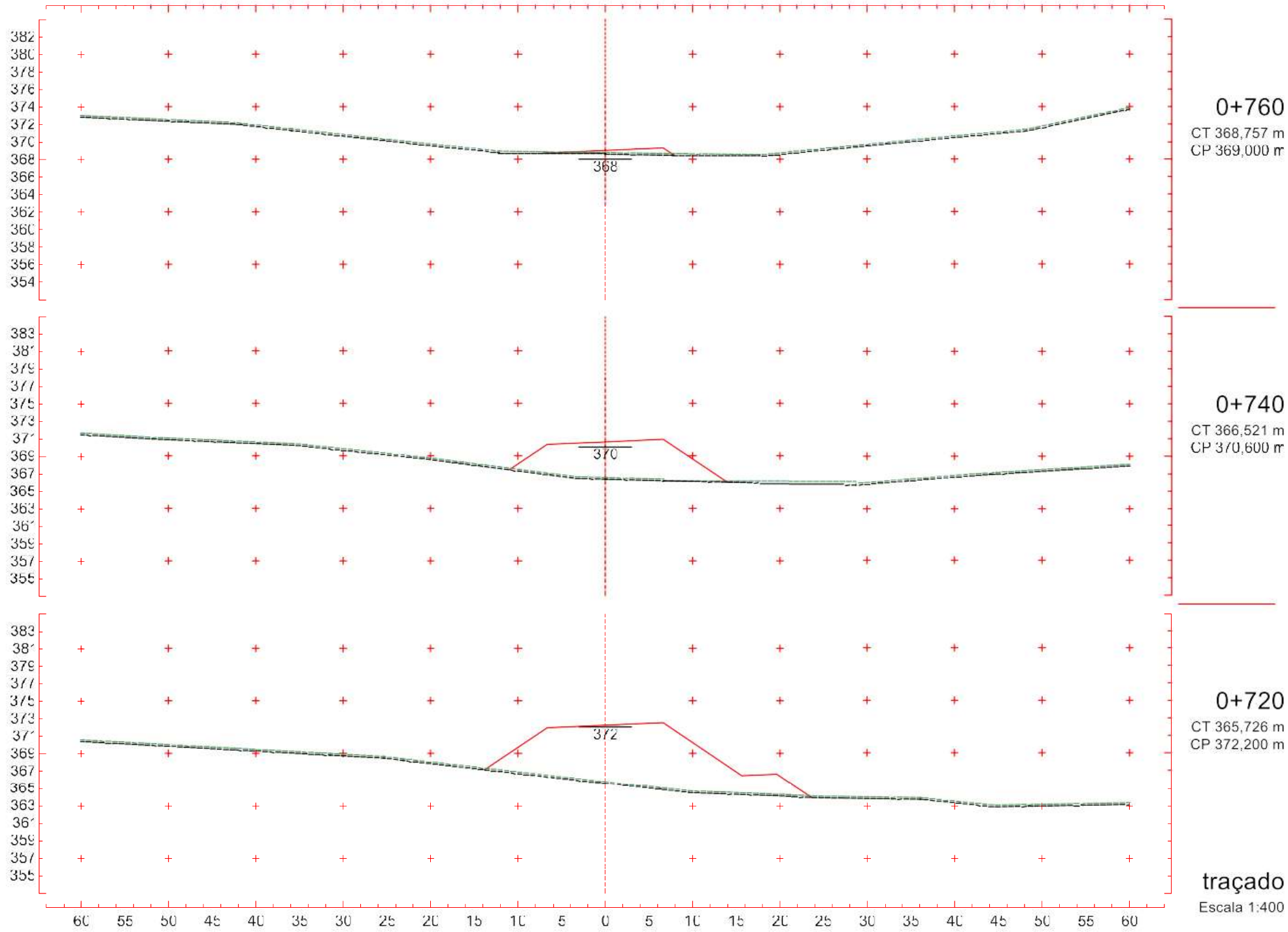

0+460
CT 403,091 m
CP 393,000 m
392
0+440
CT 406,412 m
CP 394,600 m
394
0+420
CT 409,661 m
CP 396,200 m
396
traçado
Escala 1:400

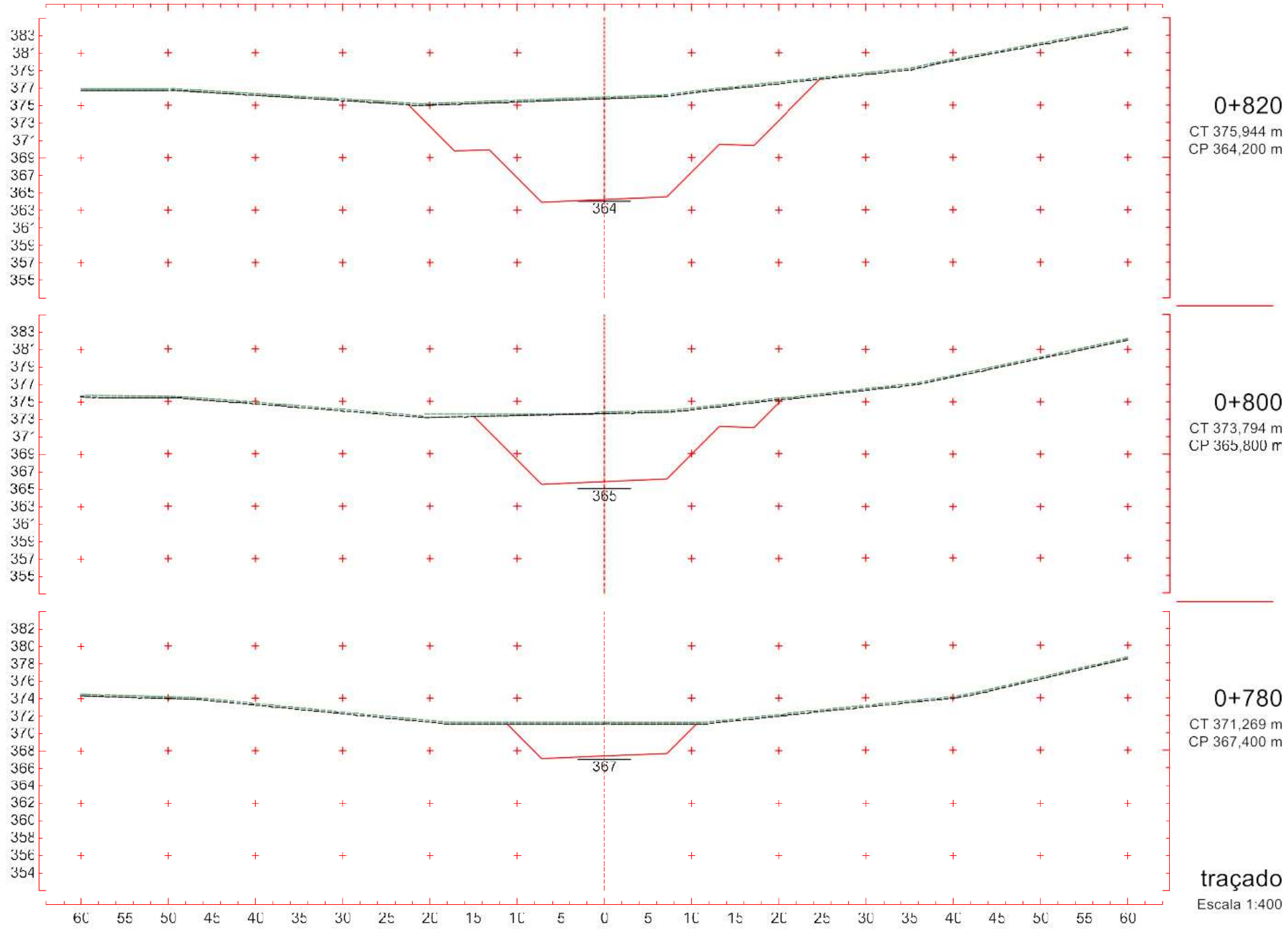

0+520
CT 392,255 m
CP 388,200 m
388
0+500
CT 395,901 m
CP 389,800 m
389
0+480
CT 399,385 m
CP 391,400 m
391
traçado
Escala 1:400

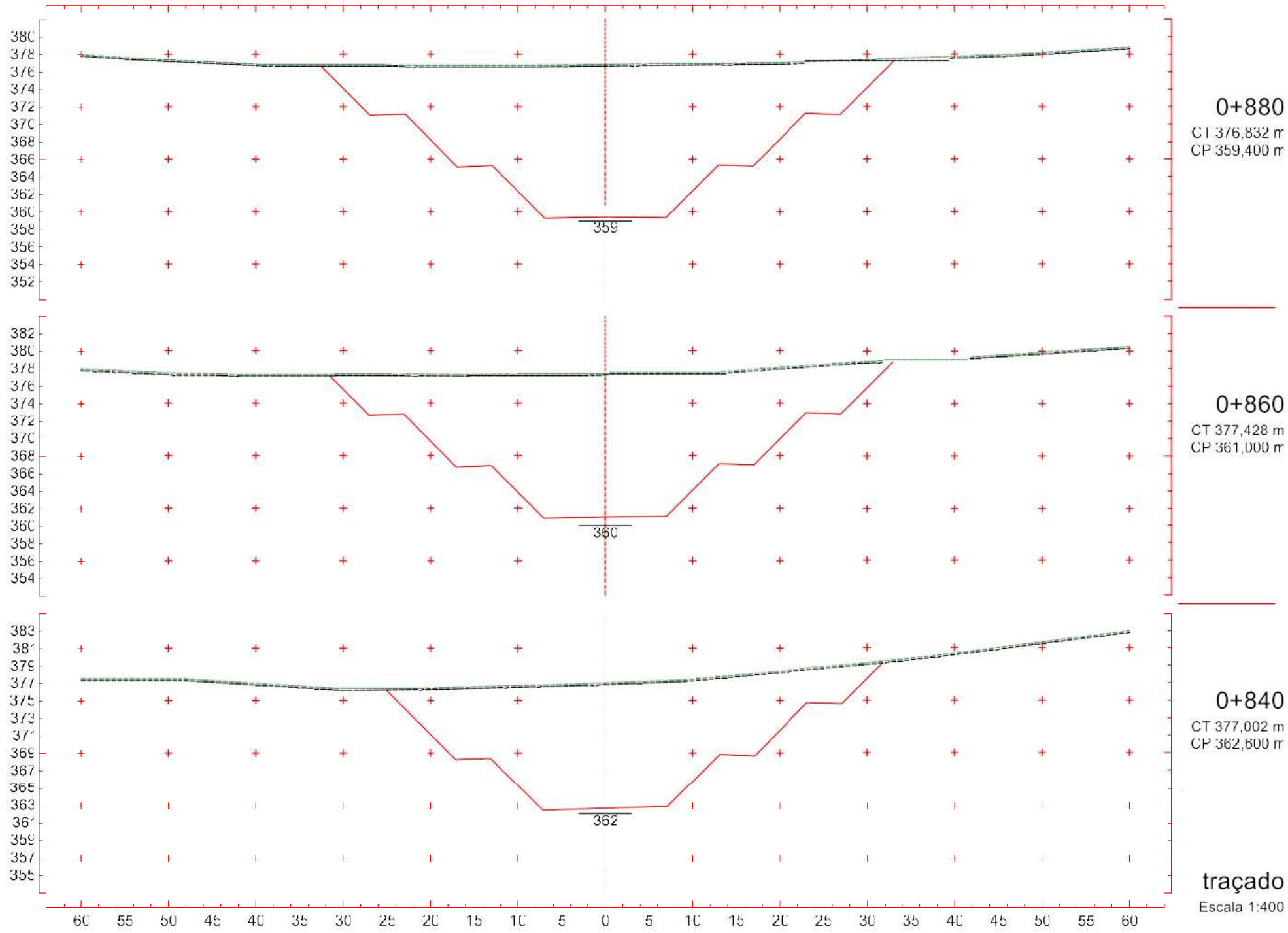

0+580
CT 381,385 m
CP 383,400 m
383
0+560
CT 385,187 m
CP 385,000 m
384
0+540
CT 388,789 m
CP 386,600 m
386
traçado
Escala 1:400

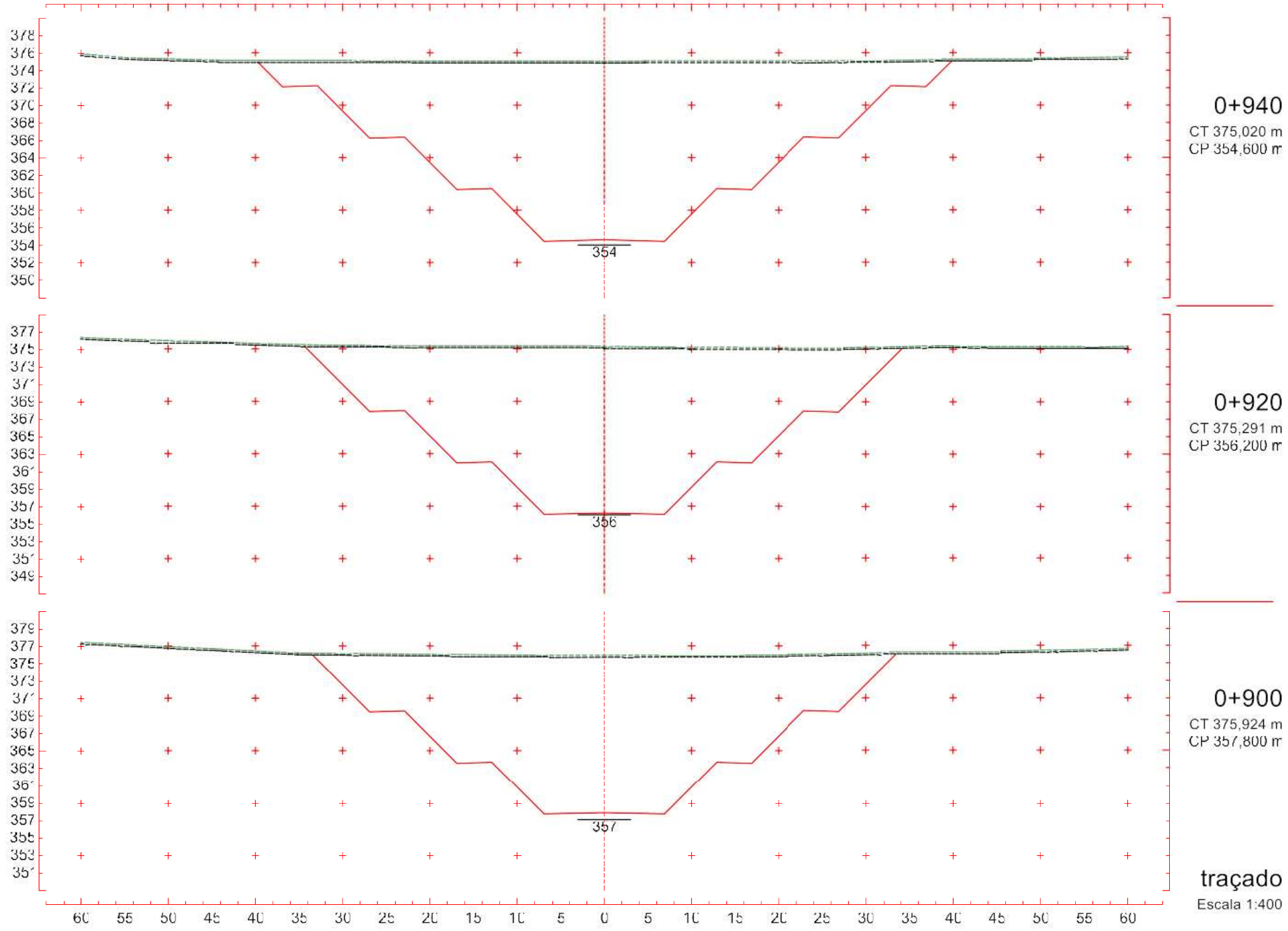

0+640
CT 373,206 m
CP 378,600 m
0+620
CT 373,897 m
CP 380,200 m
0+600
CT 377,782 m
CP 381,800 m
traçado
Escala 1:400

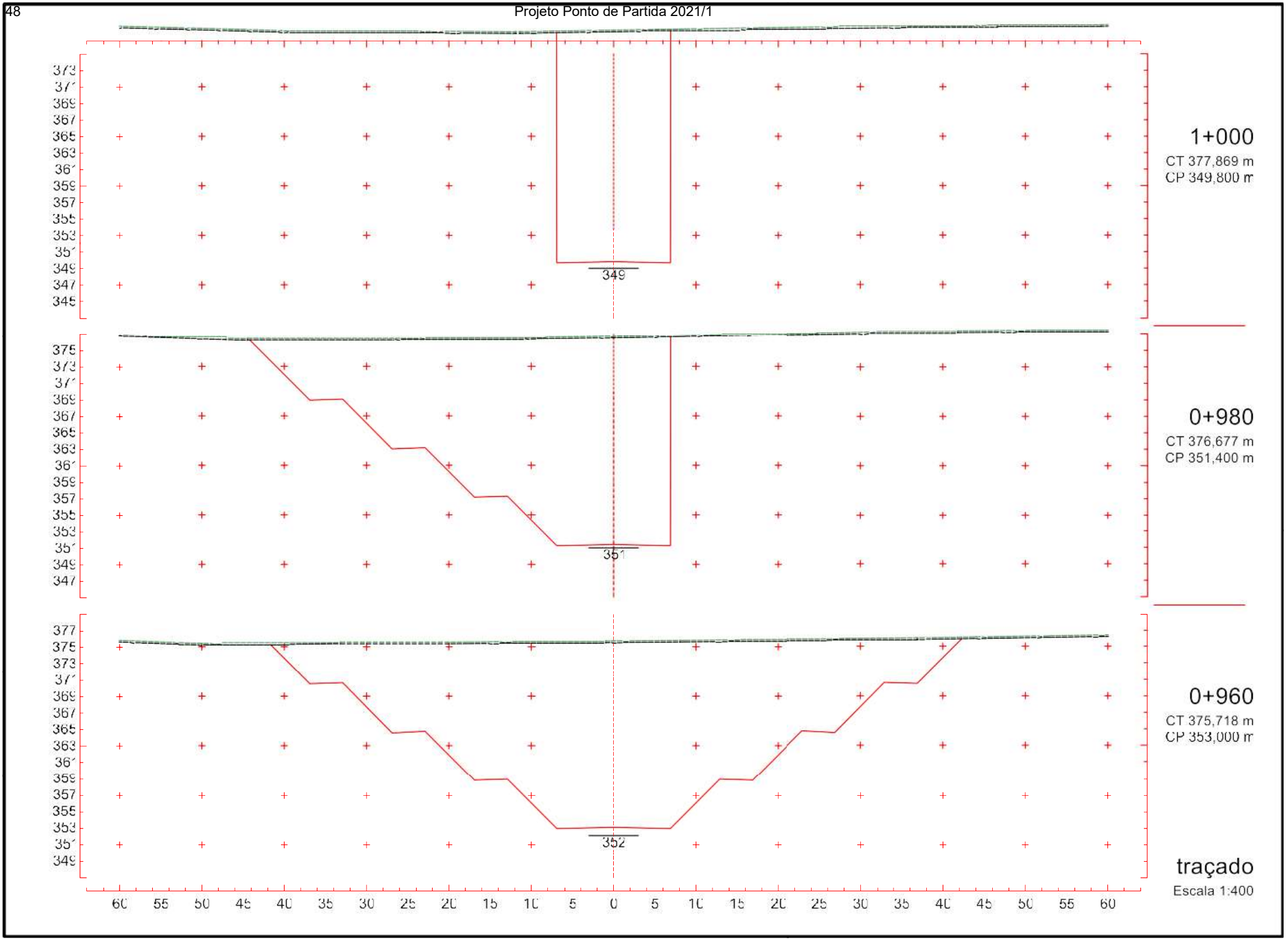

0+700
CT 366,296 m
CP 373,800 m
373
0+680
CT 368,606 m
CP 375,400 m
375
0+660
CT 372,061 m
CP 377,000 m
376
traçado
Escala 1:400

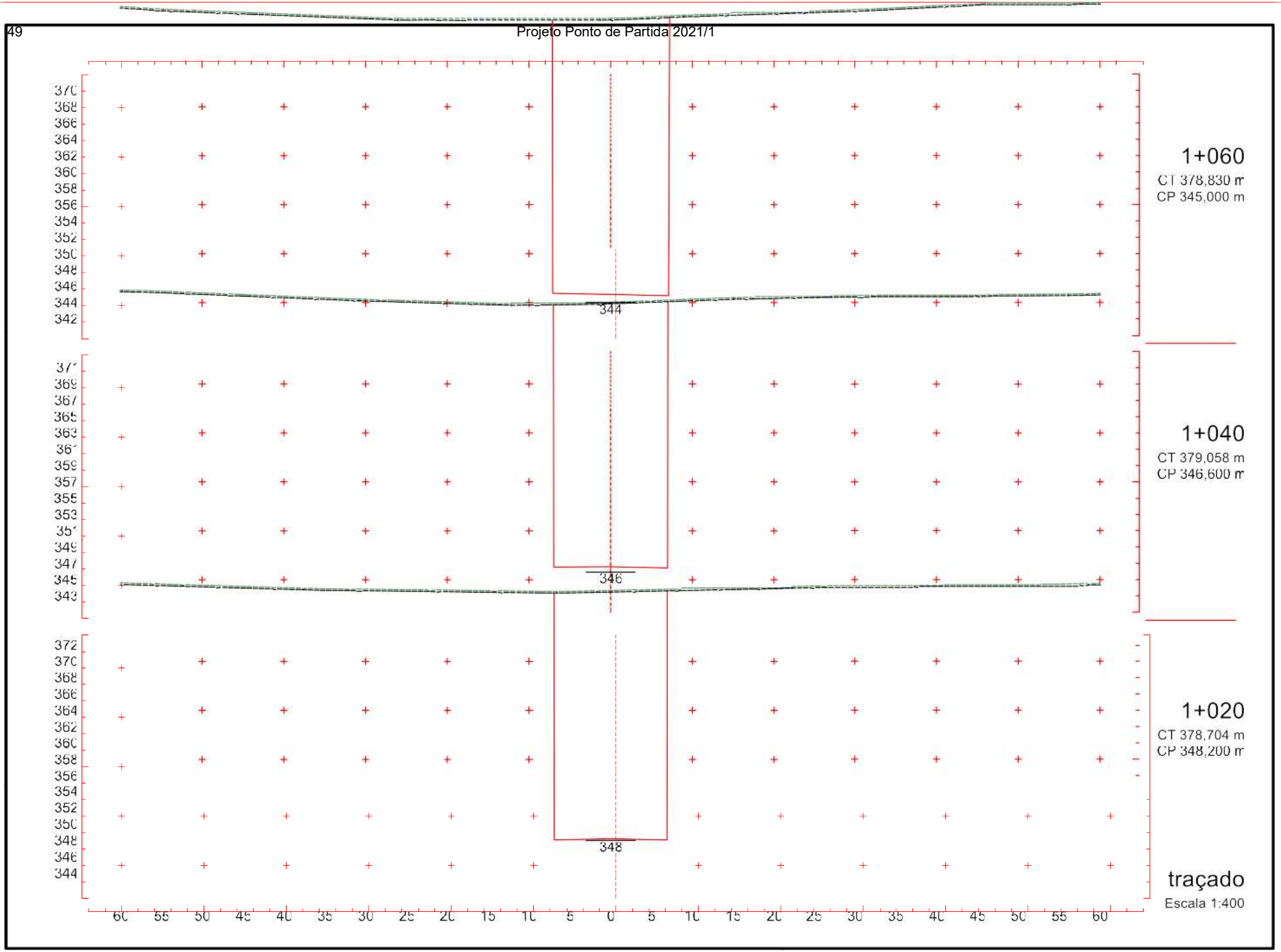

0+760
CT 368,757 m
CP 369,000 m
0+740
CT 366,521 m
CP 370,600 m
0+720
CT 365,726 m
CP 372,200 m
traçado
Escala 1:400

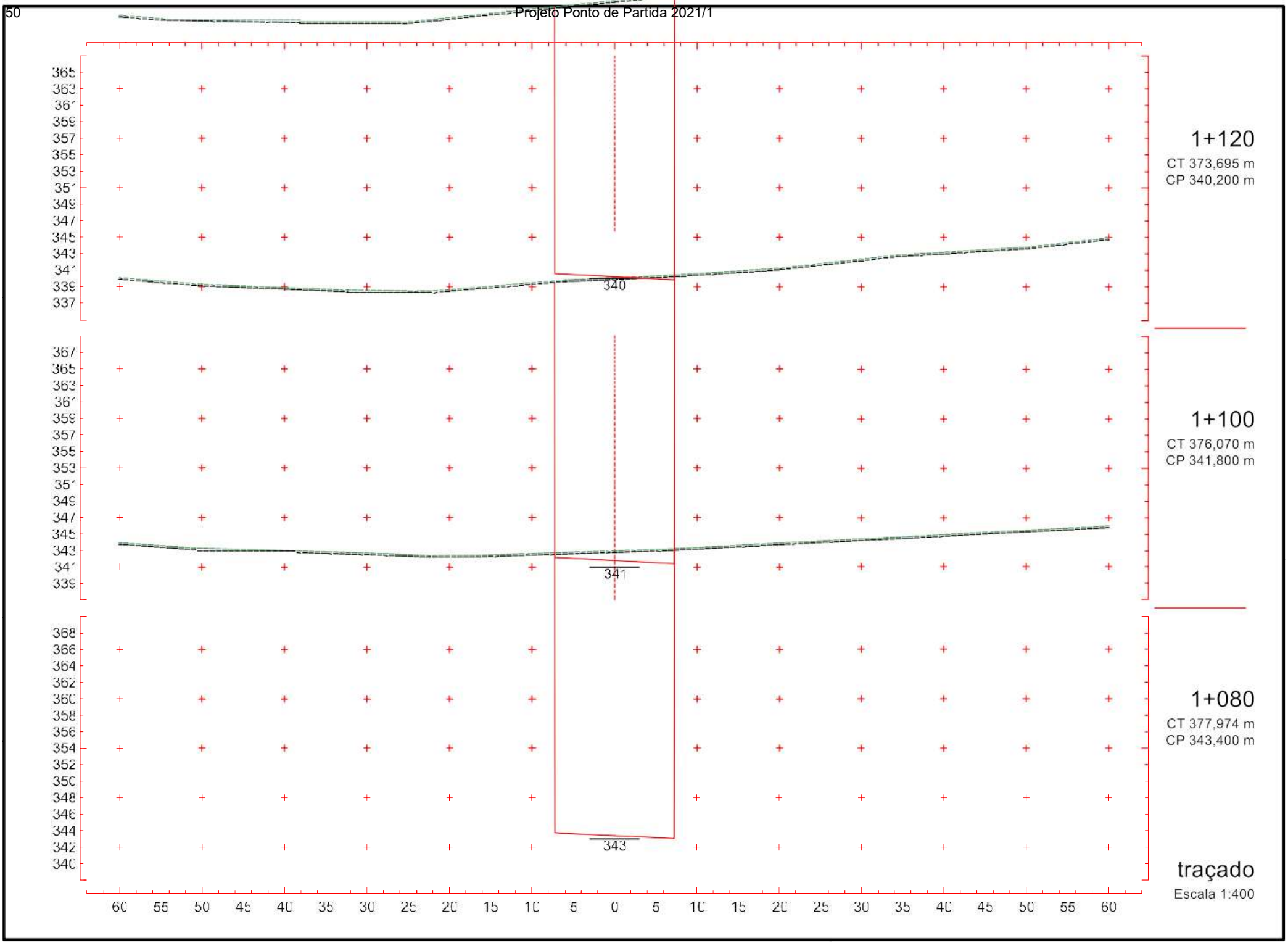

0+820
CT 375,944 m
CP 364,200 m
364
0+800
CT 373,794 m
CP 365,800 m
365
0+780
CT 371,269 m
CP 367,400 m
367
traçado
Escala 1:400

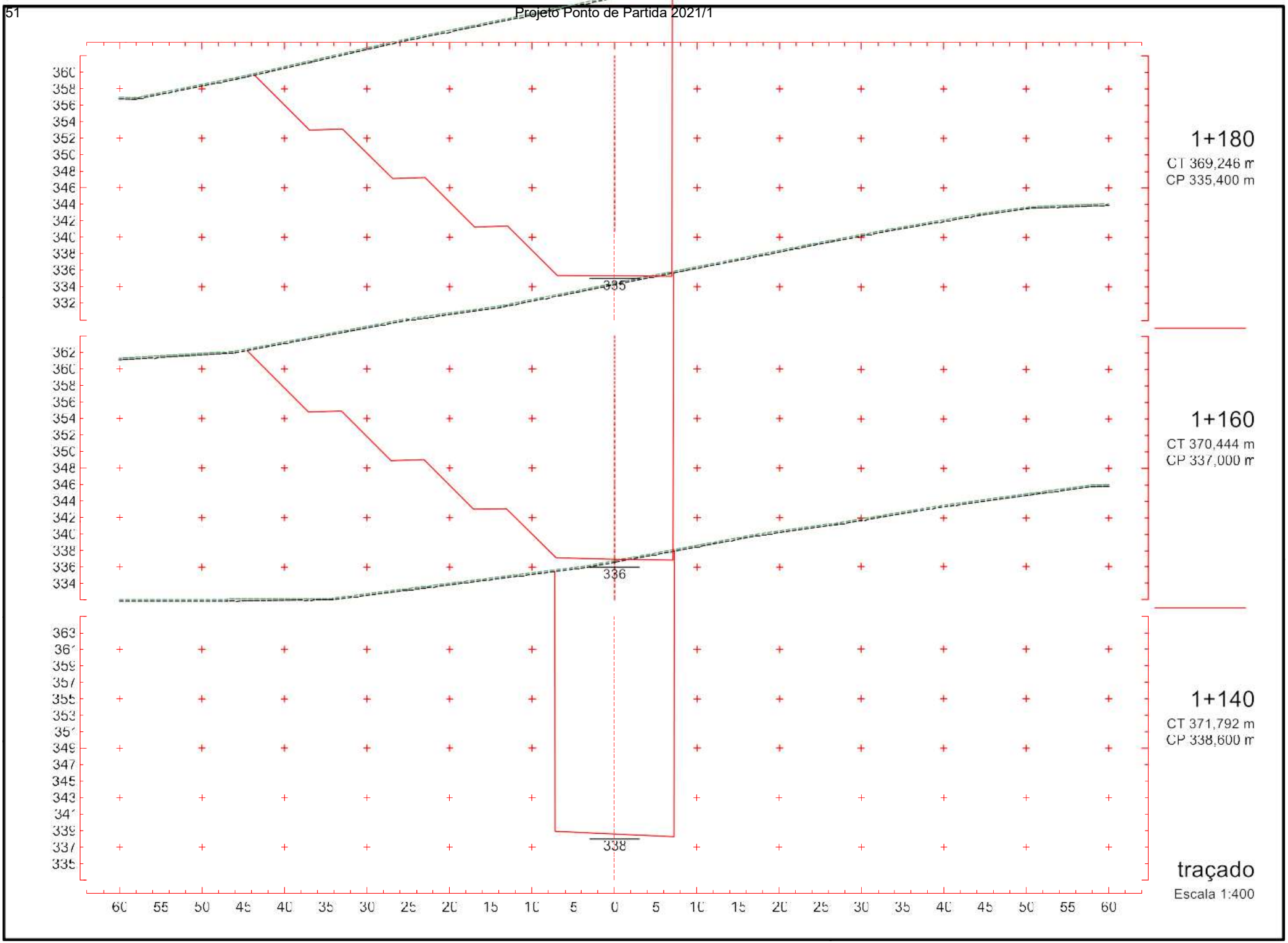

0+880
CT 376,832 m
CP 359,400 m
359
0+860
CT 377,428 m
CP 361,000 m
360
0+840
CT 377,002 m
CP 362,600 m
362
traçado
Escala 1:400

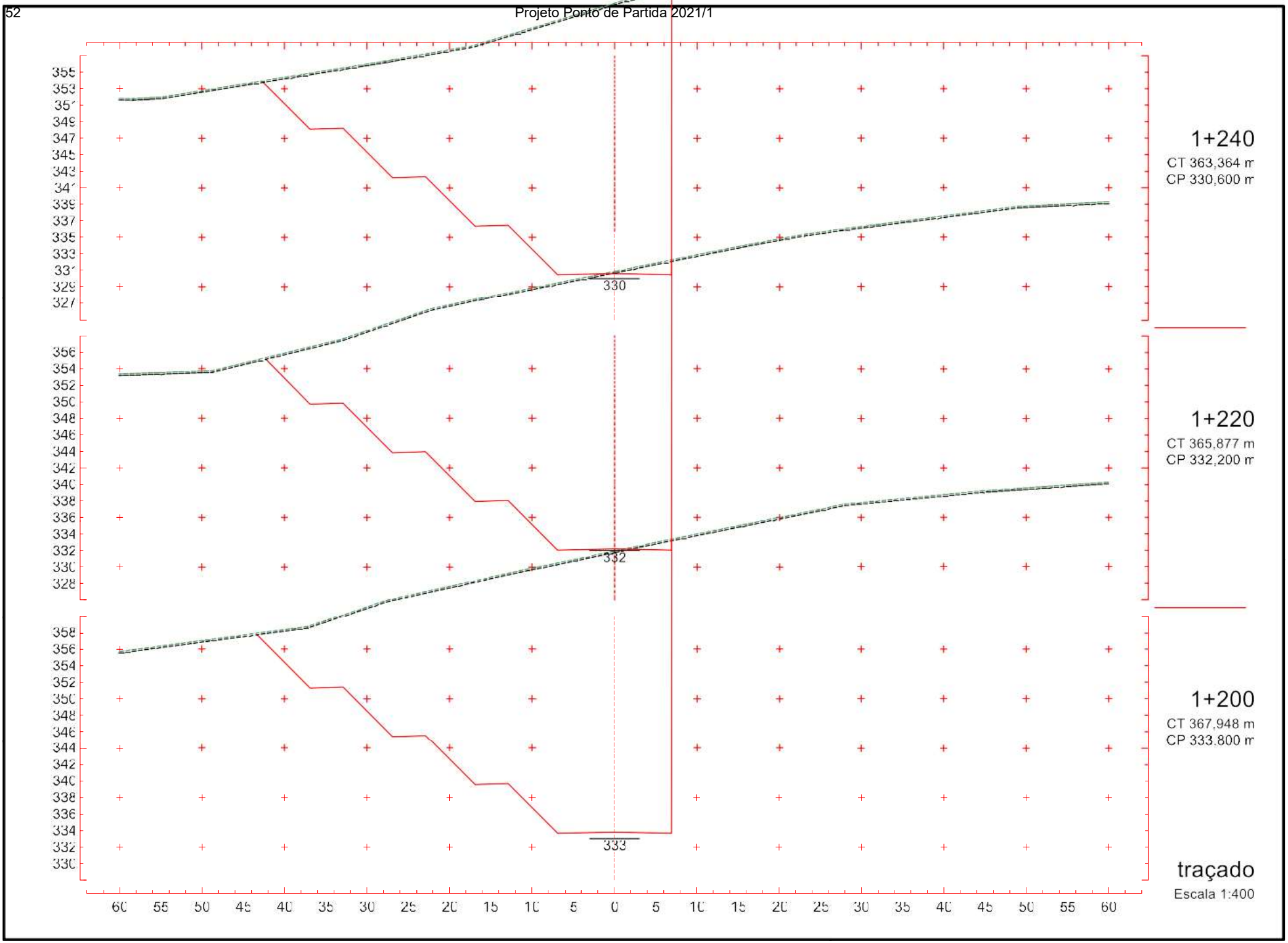

0+940
CT 375,020 m
CP 354,600 m
354
0+920
CT 375,291 m
CP 356,200 m
356
0+900
CT 375,924 m
CP 357,800 m
357
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

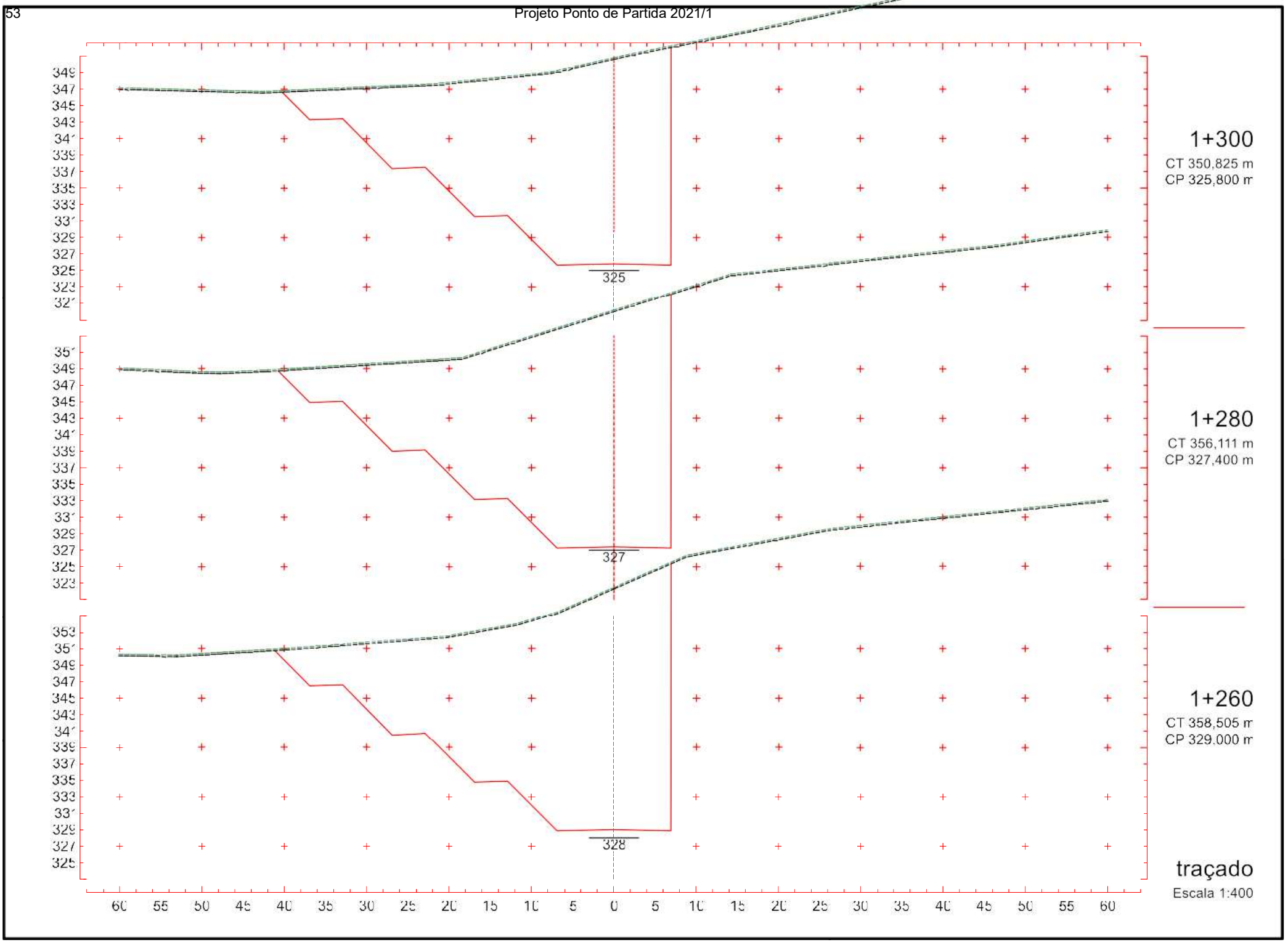

1+000
CT 377,869 m
CP 349,800 m
349
0+980
CT 376,677 m
CP 351,400 m
351
0+960
CT 375,718 m
CP 353,000 m
352
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

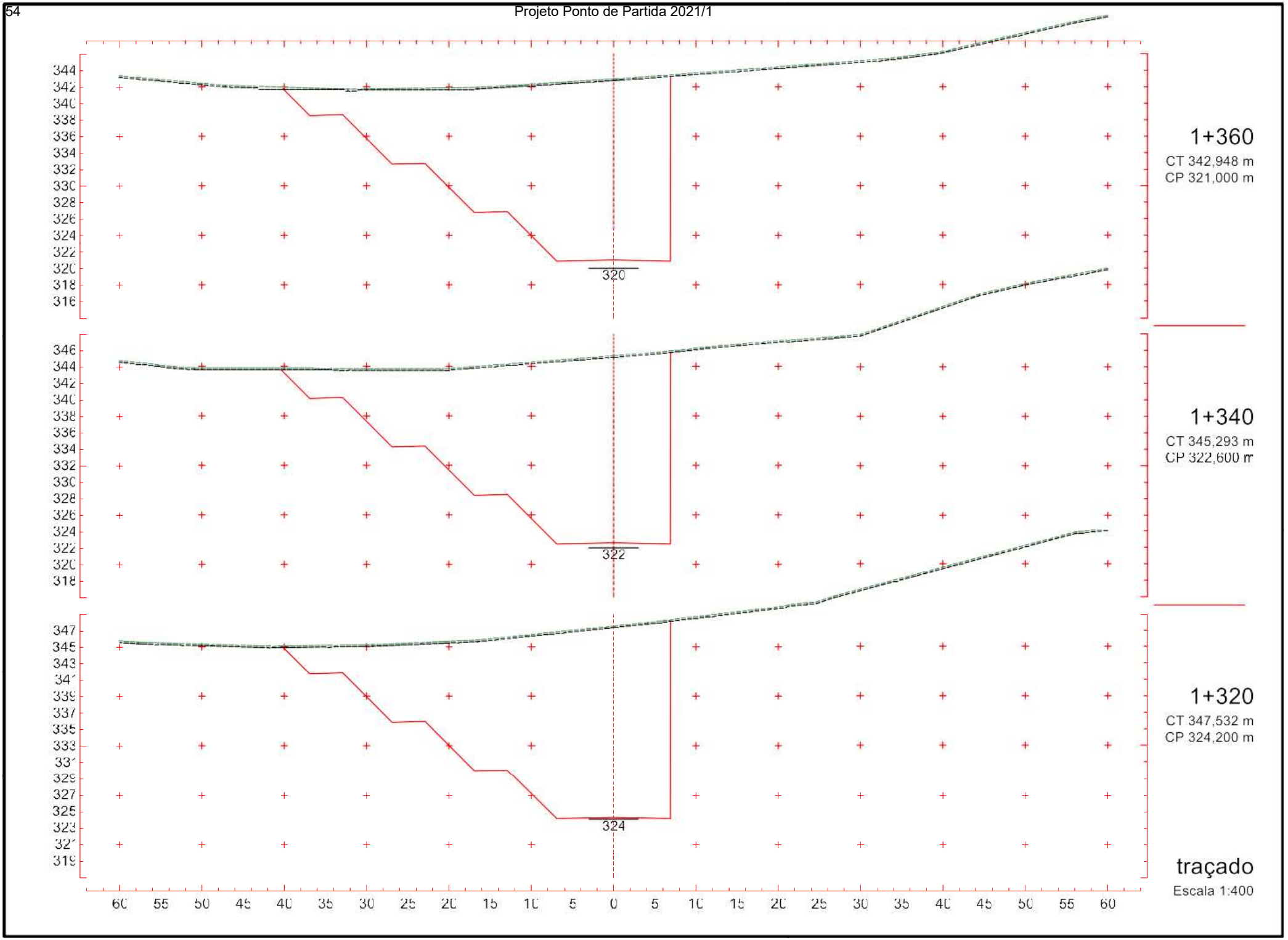

1+060
CT 378,830 m
CP 345,000 m
344
1+040
CT 379,058 m
CP 346,600 m
346
1+020
CT 378,704 m
CP 348,200 m
348
traçado
Escala 1:400

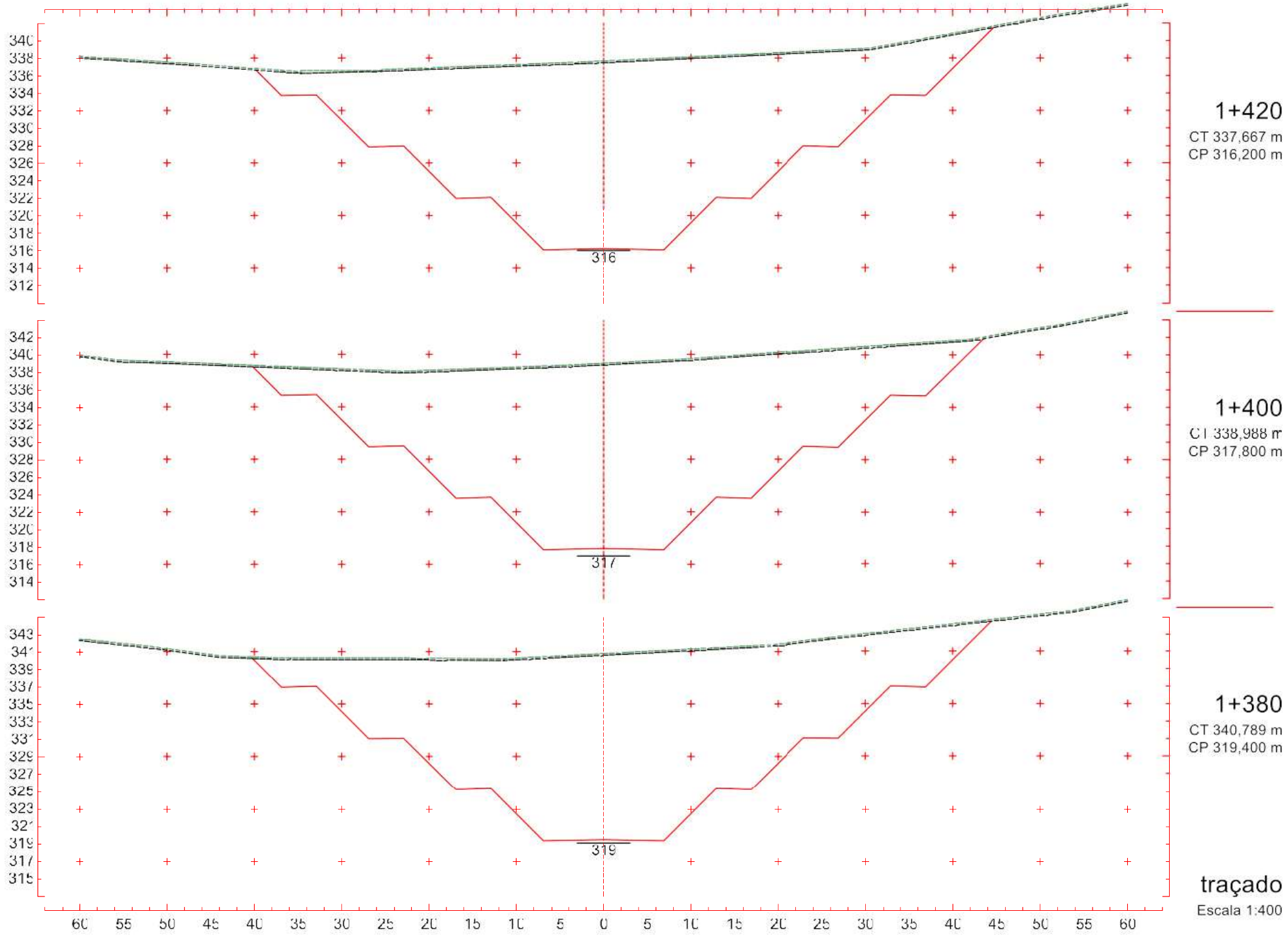

1+120
CT 373,695 m
CP 340,200 m
1+100
CT 376,070 m
CP 341,800 m
1+080
CT 377,974 m
CP 343,400 m
traçado
Escala 1:400
340
341
343
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

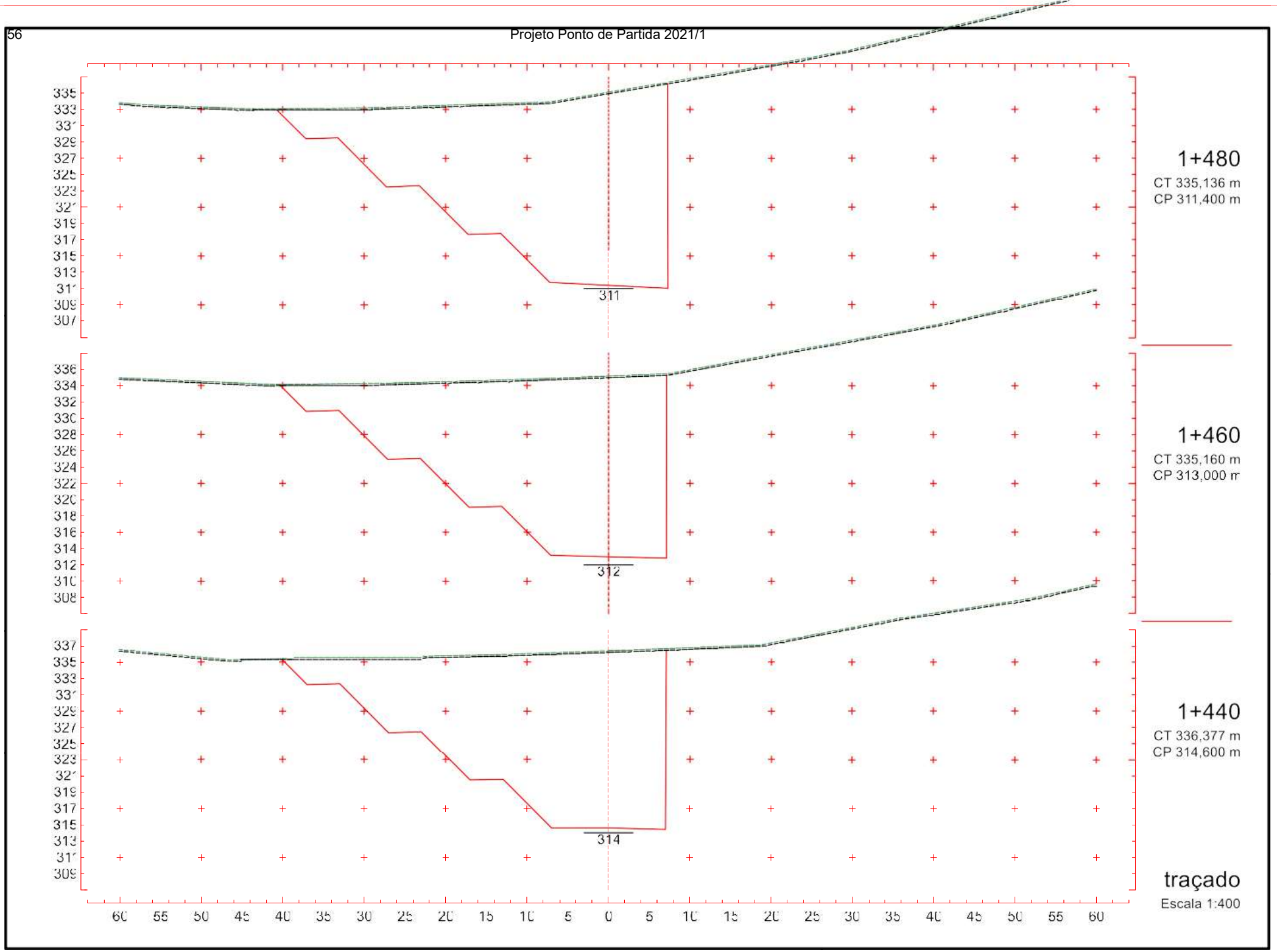

1+180
CT 369,246 m
CP 335,400 m
335
1+160
CT 370,444 m
CP 337,000 m
336
1+140
CT 371,792 m
CP 338,600 m
338
traçado
Escala 1:400

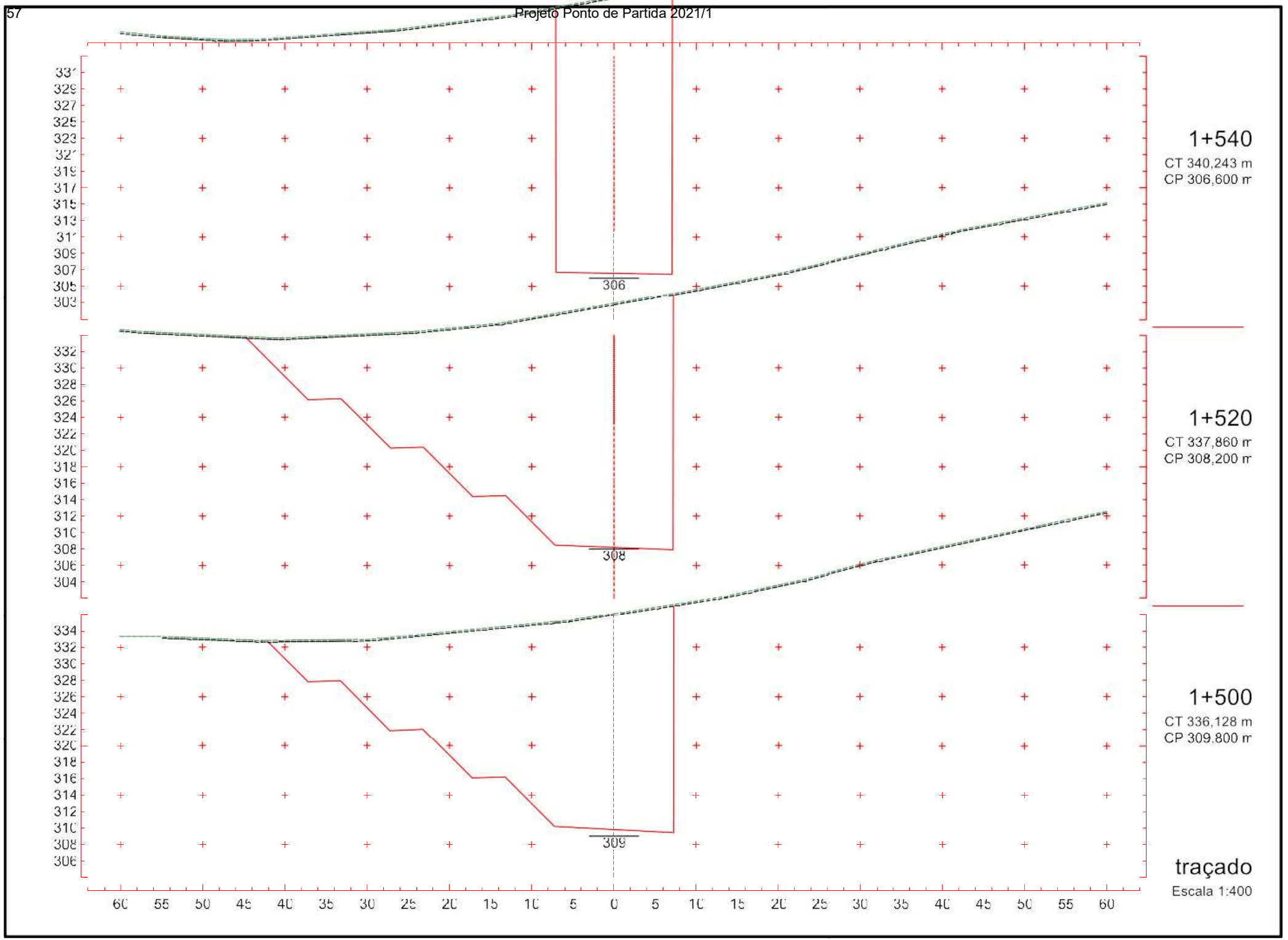

1+240
CT 363,364 m
CP 330,600 m
330
1+220
CT 365,877 m
CP 332,200 m
332
1+200
CT 367,948 m
CP 333,800 m
333
traçado
Escala 1:400

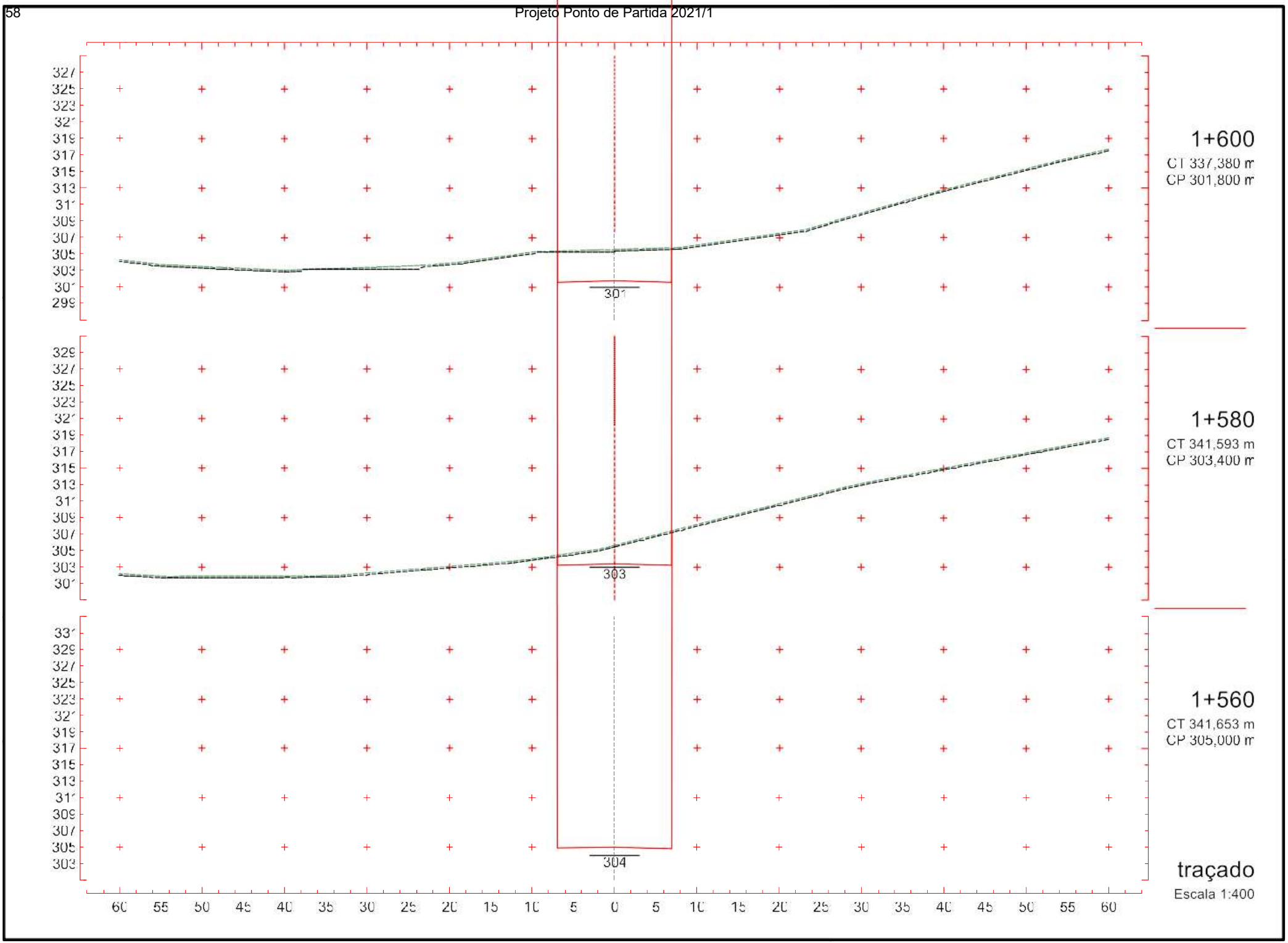

1+300
CT 350,825 m
CP 325,800 m
325
1+280
CT 356,111 m
CP 327,400 m
327
1+260
CT 358,505 m
CP 329,000 m
328
traçado
Escala 1:400

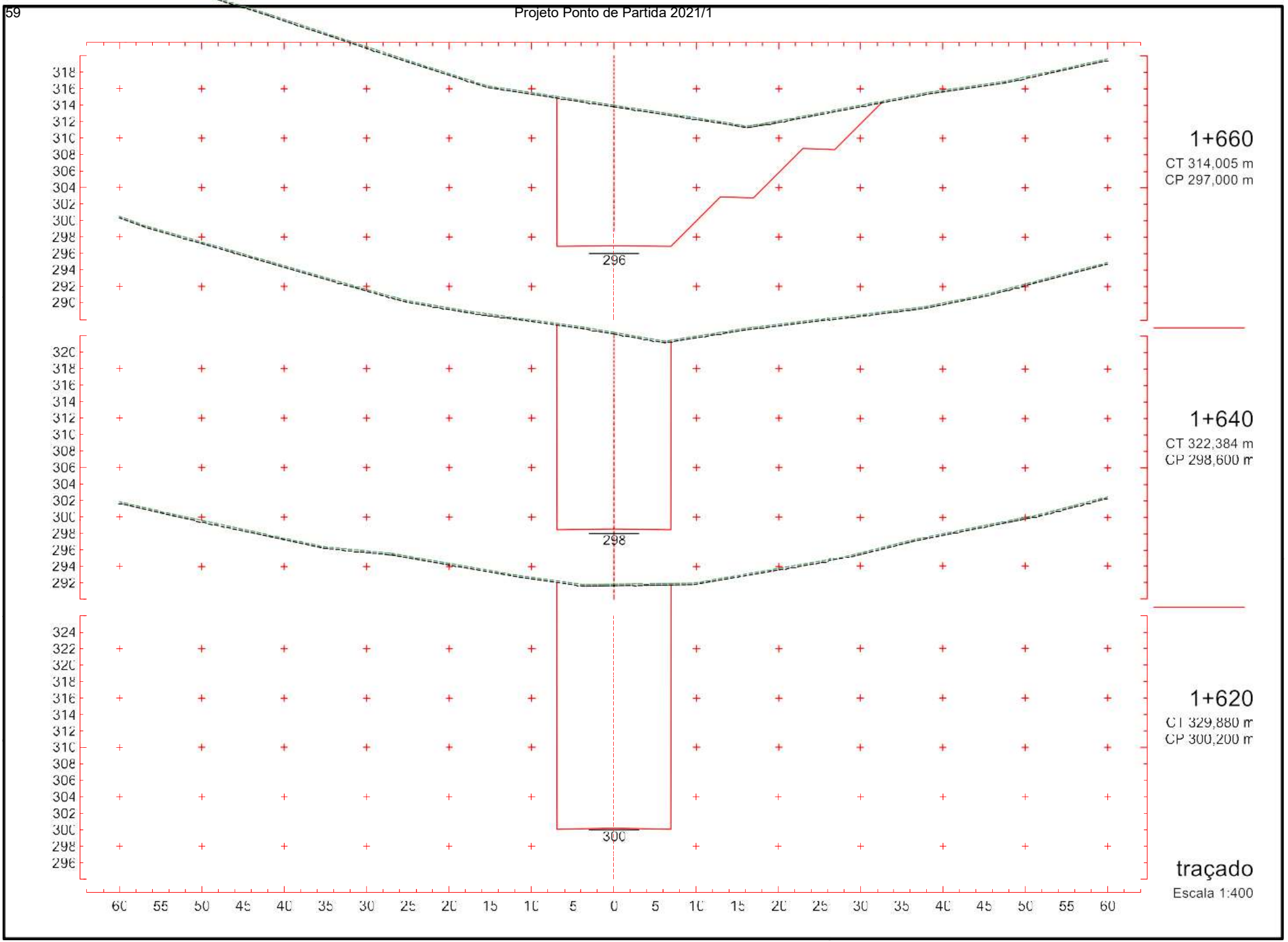

1+360
CT 342,948 m
CP 321,000 m
320
1+340
CT 345,293 m
CP 322,600 m
322
1+320
CT 347,532 m
CP 324,200 m
324
traçado
Escala 1:400


1+420
CT 337,667 m
CP 316,200 m
316
1+400
CT 338,988 m
CP 317,800 m
317
1+380
CT 340,789 m
CP 319,400 m
319
traçado
Escala 1:400

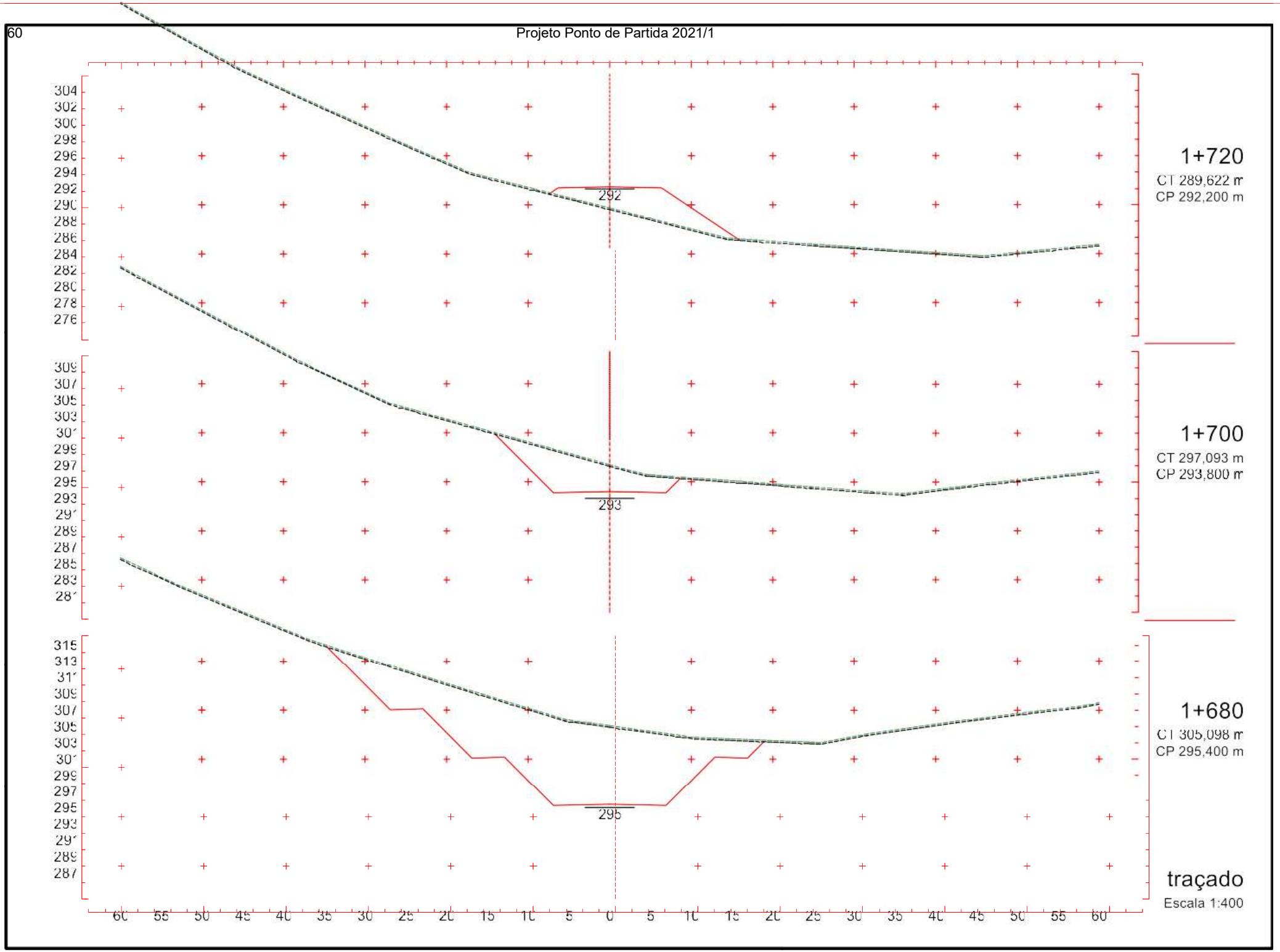

1+480
CT 335,136 m
CP 311,400 m
311
1+460
CT 335,160 m
CP 313,000 m
312
1+440
CT 336,377 m
CP 314,600 m
314
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60


1+540
CT 340,243 m
CP 306,600 m
306
1+520
CT 337,860 m
CP 308,200 m
308
1+500
CT 336,128 m
CP 309,800 m
309
traçado
Escala 1:400

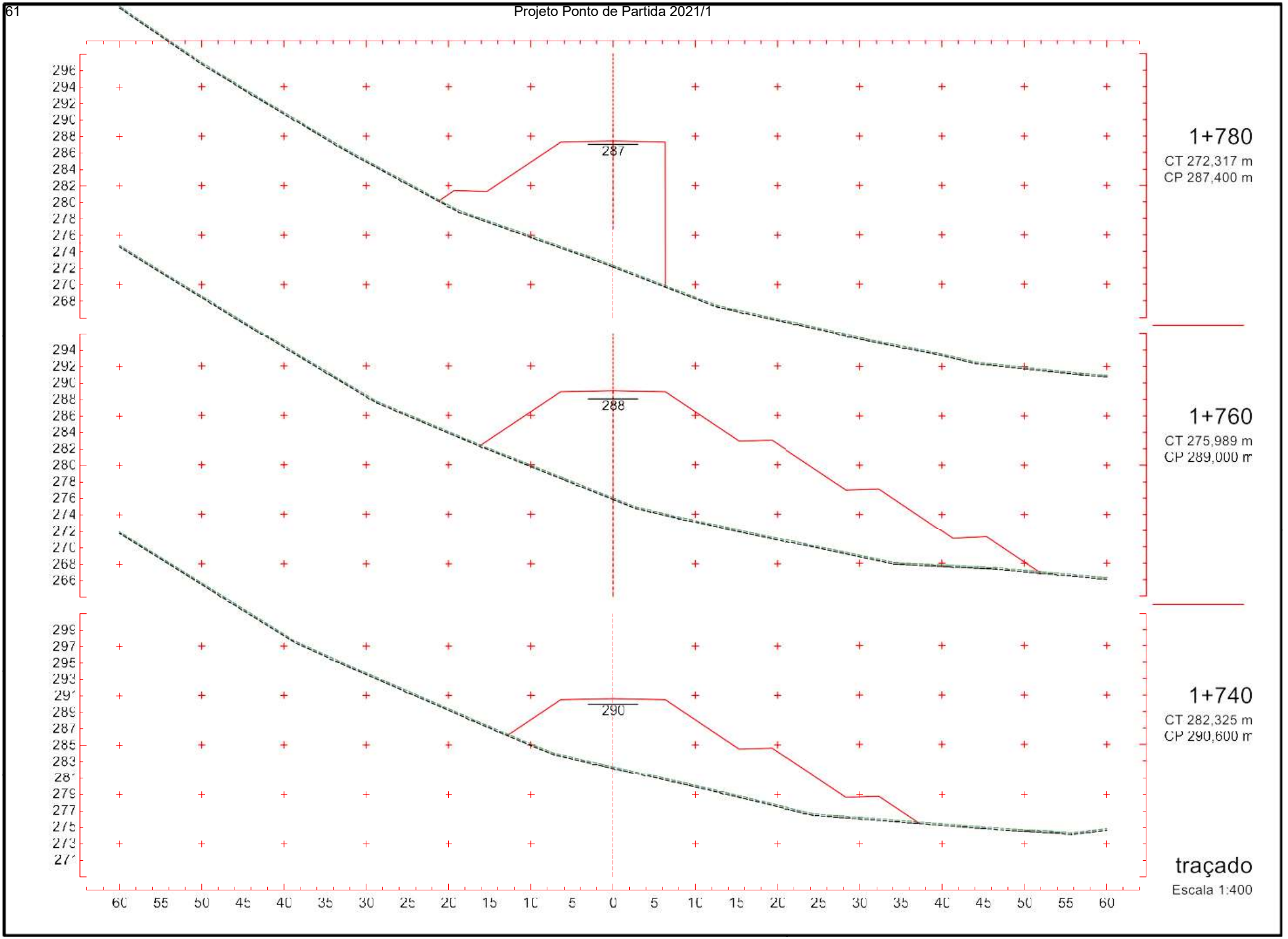

1+600
CT 337,380 m
CP 301,800 m
301
1+580
CT 341,593 m
CP 303,400 m
303
1+560
CT 341,653 m
CP 305,000 m
304
traçado
Escala 1:400


1+660
CT 314,005 m
CP 297,000 m
296
1+640
CT 322,384 m
CP 298,600 m
298
1+620
CT 329,880 m
CP 300,200 m
300
traçado
Escala 1:400

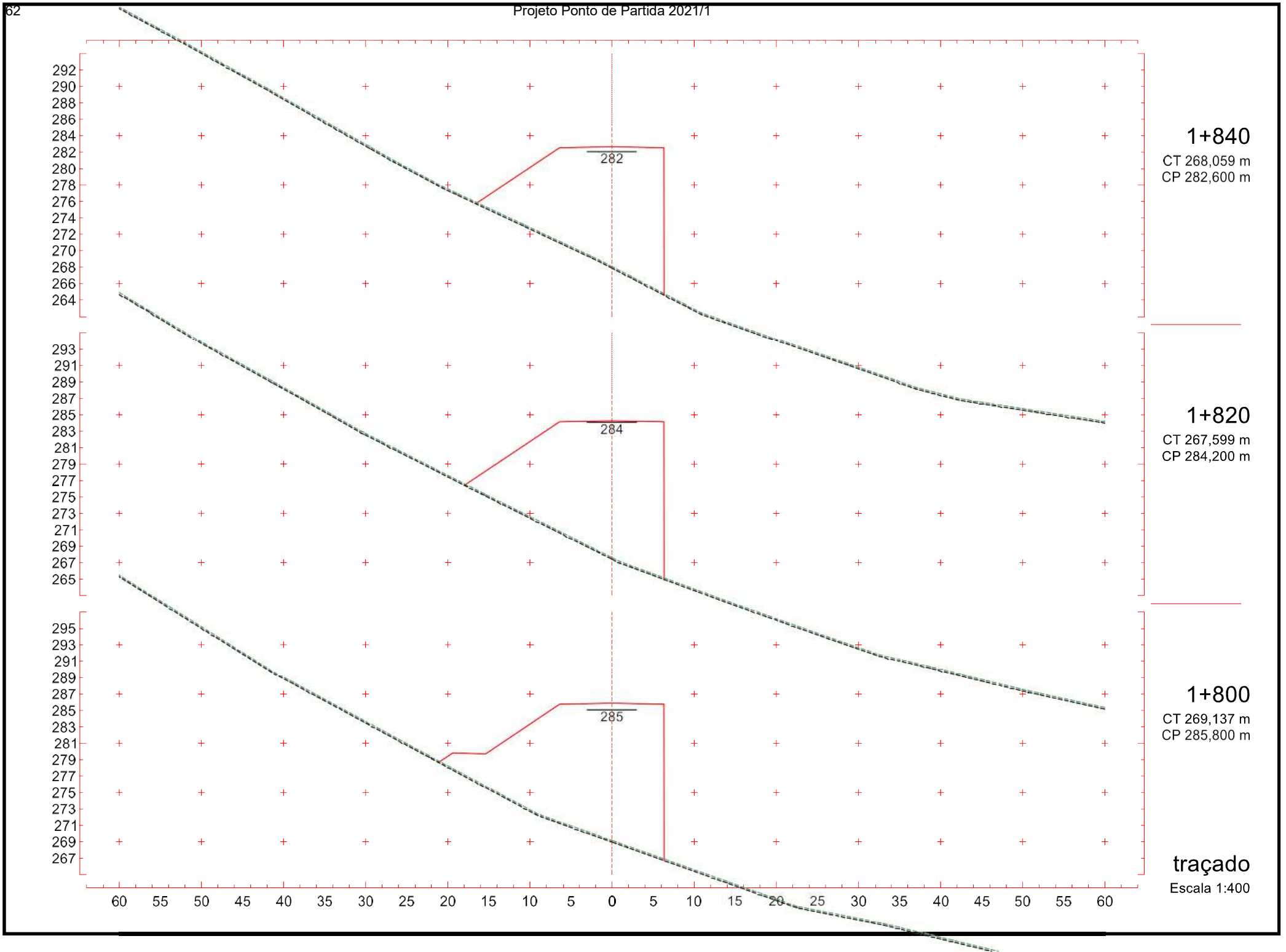
Projeto Ponto de Partida 2021/1



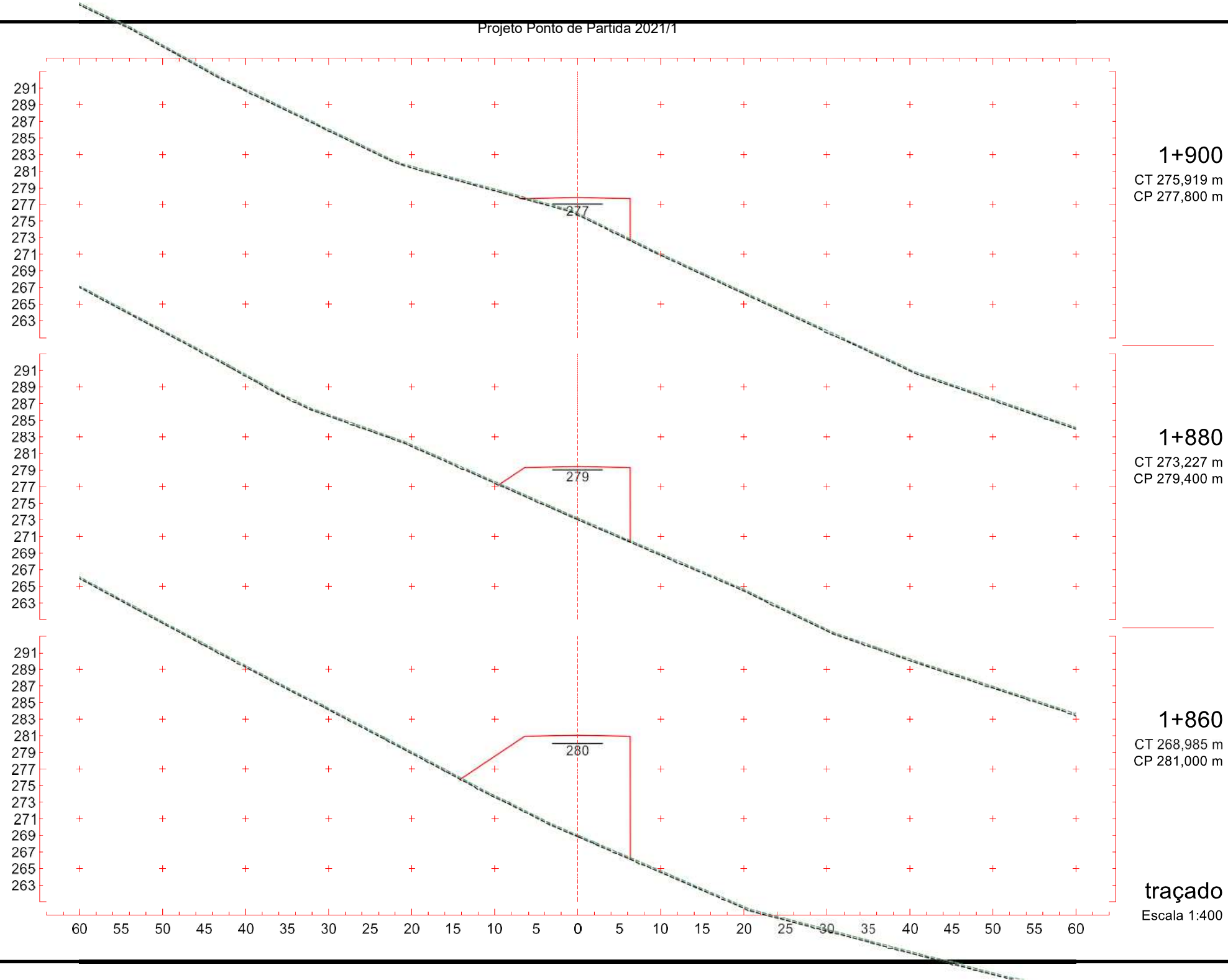
Projeto Ponto de Partida 2021/1



Projeto Ponto de Partida 2021/1



Projeto Ponto de Partida 2021/1



1+900

CT 275,919 m
CP 277,800 m

1+880

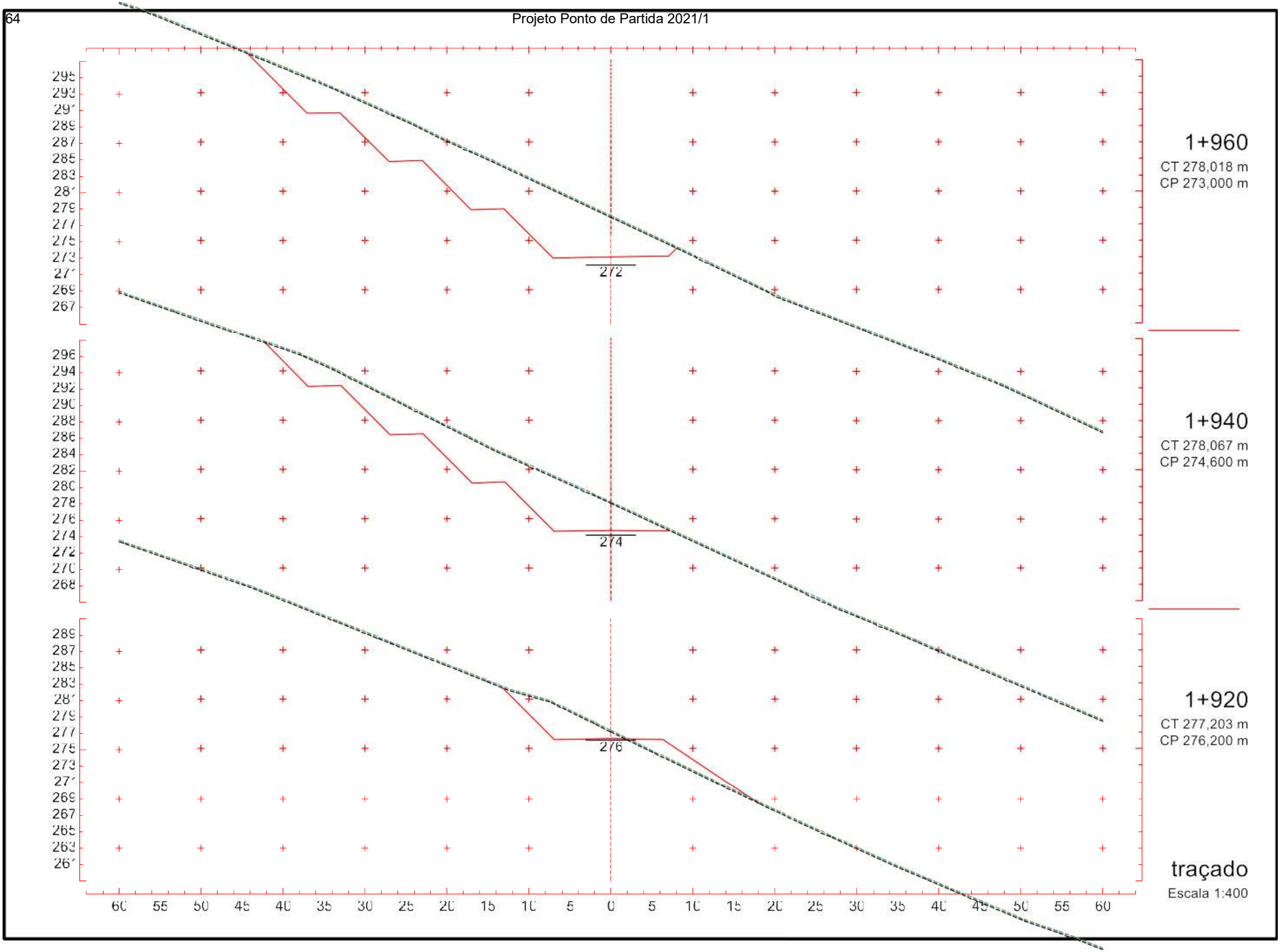
CT 273,227 m
CP 279,400 m

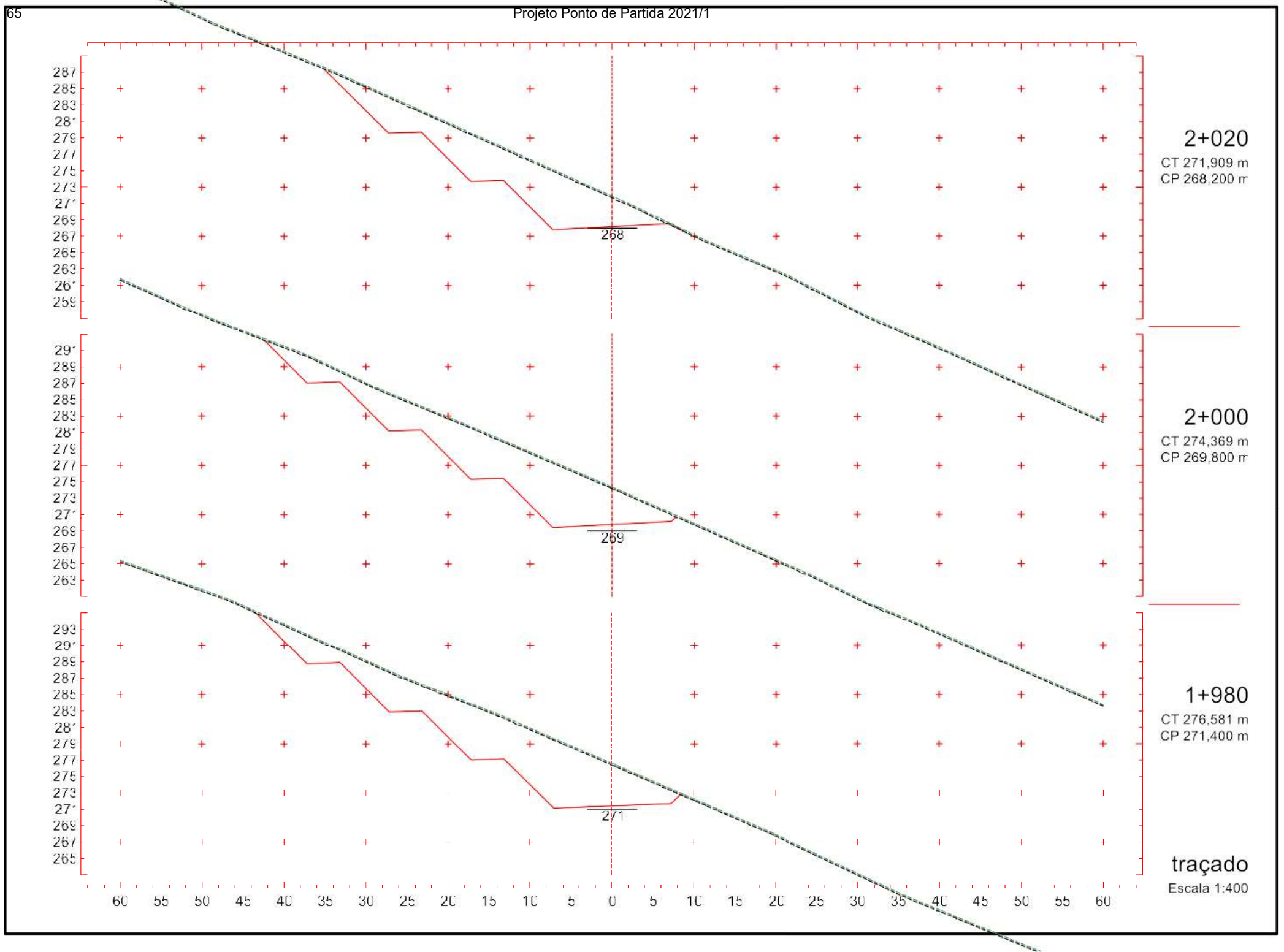
1+860

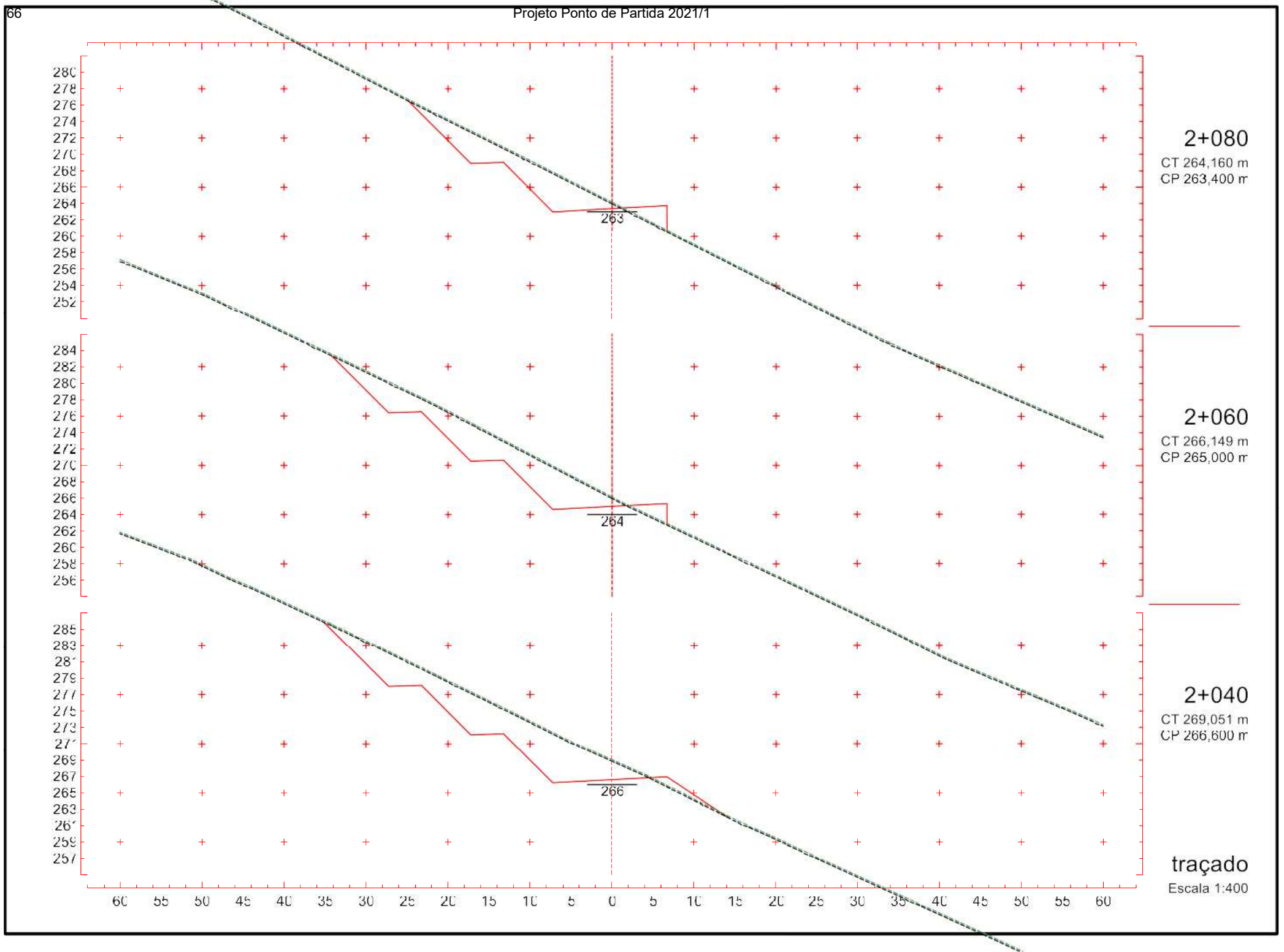
CT 268,985 m
CP 281,000 m

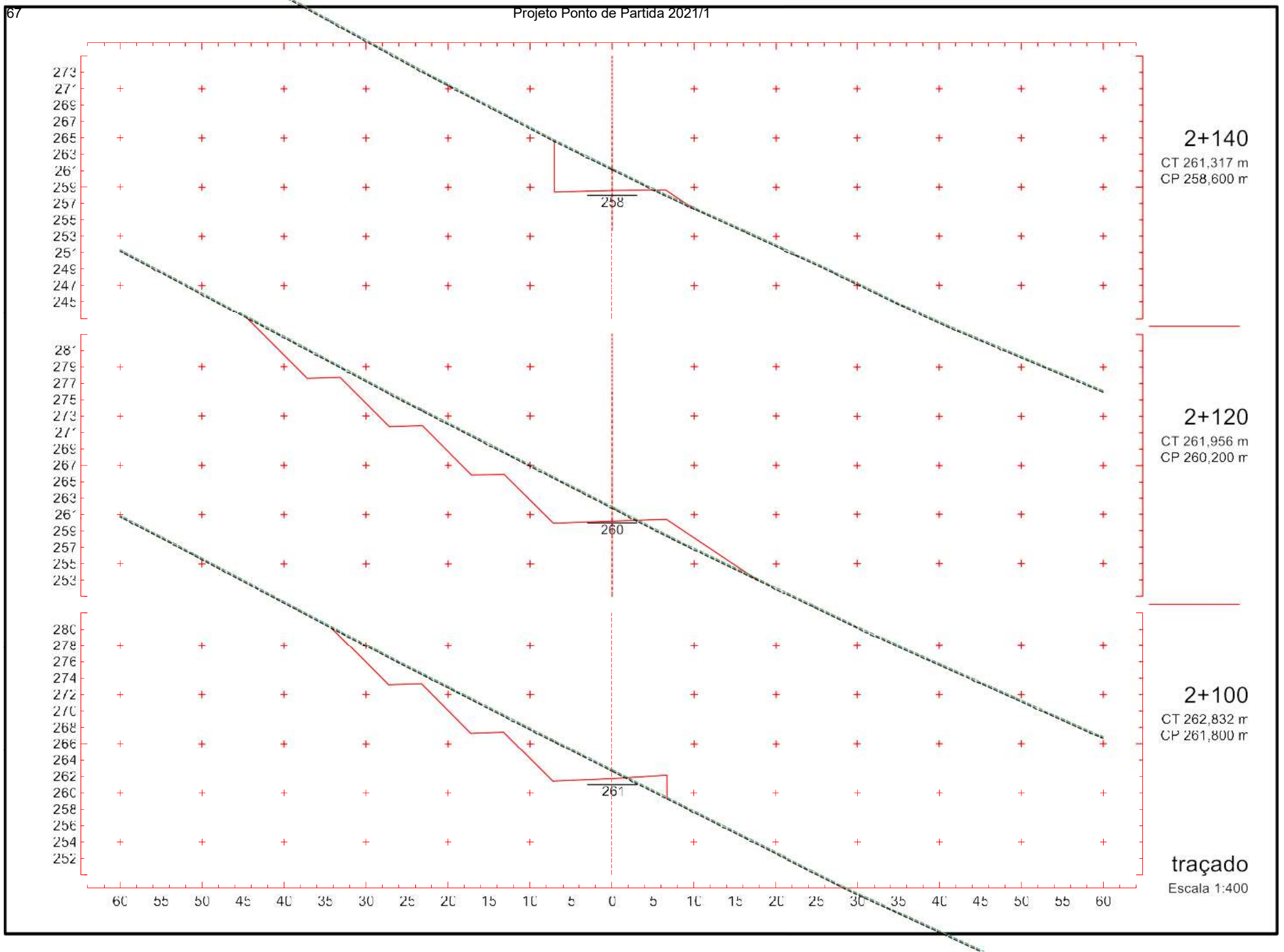
traçado

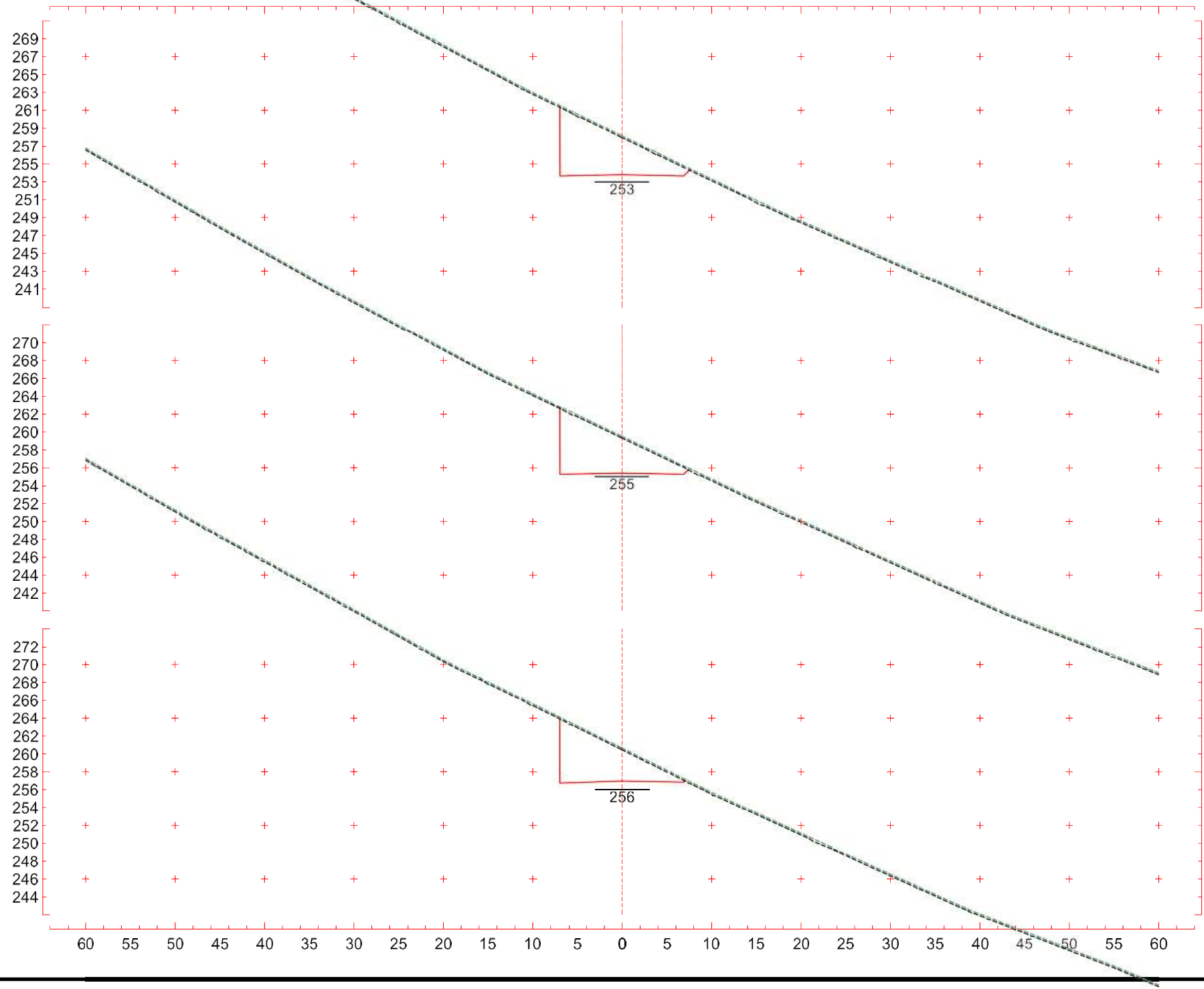
Escala 1:400


1+960
CT 278,018 m
CP 273,000 m
272
1+940
CT 278,067 m
CP 274,600 m
274
1+920
CT 277,203 m
CP 276,200 m
276
traçado
Escala 1:400


2+020
CT 271,909 m
CP 268,200 m
268
2+000
CT 274,369 m
CP 269,800 m
269
1+980
CT 276,581 m
CP 271,400 m
271
traçado
Escala 1:400


2+080
CT 264,160 m
CP 263,400 m
263
2+060
CT 266,149 m
CP 265,000 m
264
2+040
CT 269,051 m
CP 266,600 m
266
traçado
Escala 1:400


2+140
CT 261,317 m
CP 258,600 m
258
2+120
CT 261,956 m
CP 260,200 m
260
2+100
CT 262,832 m
CP 261,800 m
261
traçado
Escala 1:400

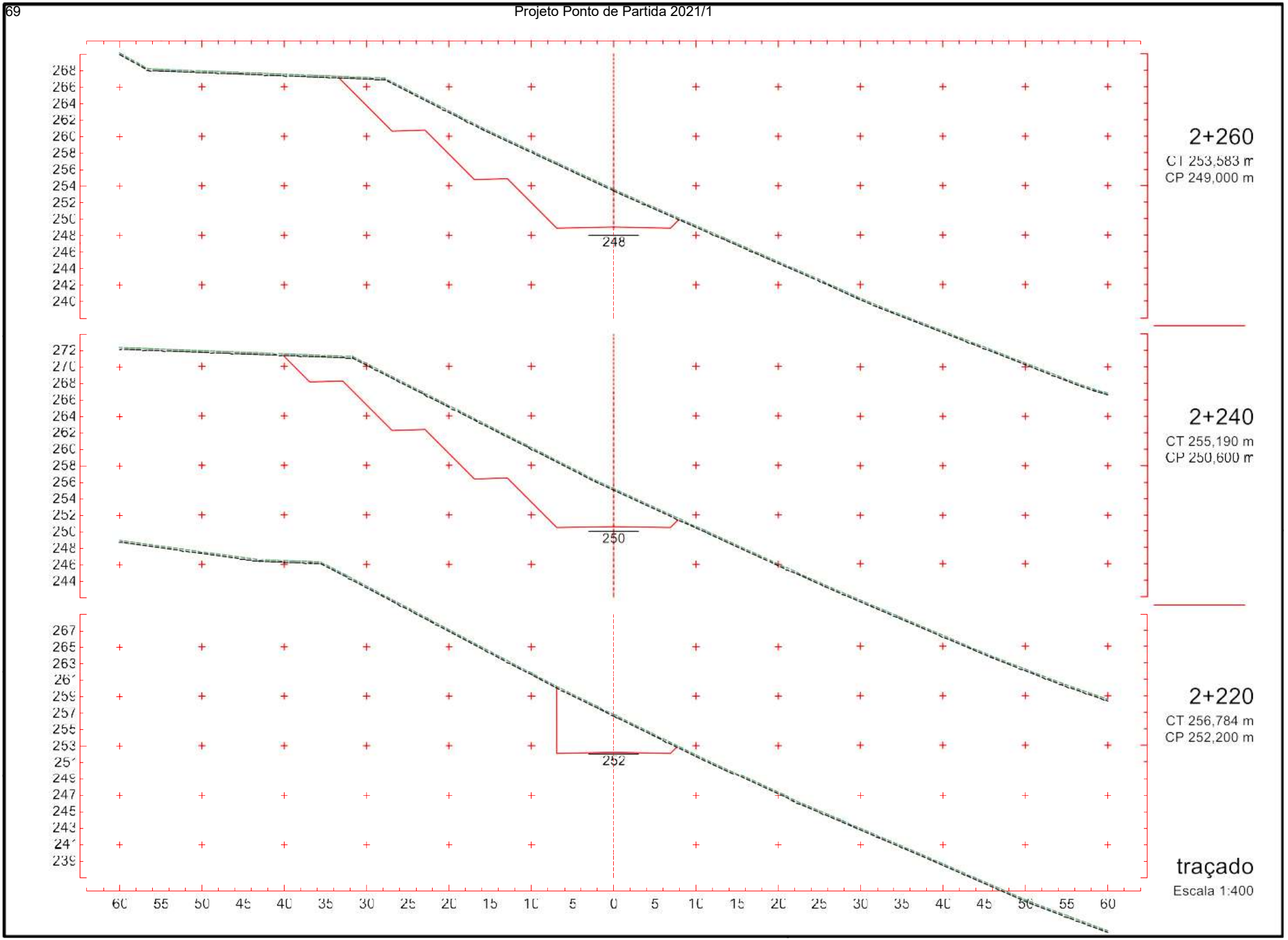


2+200
CT 258,156 m
CP 253,800 m

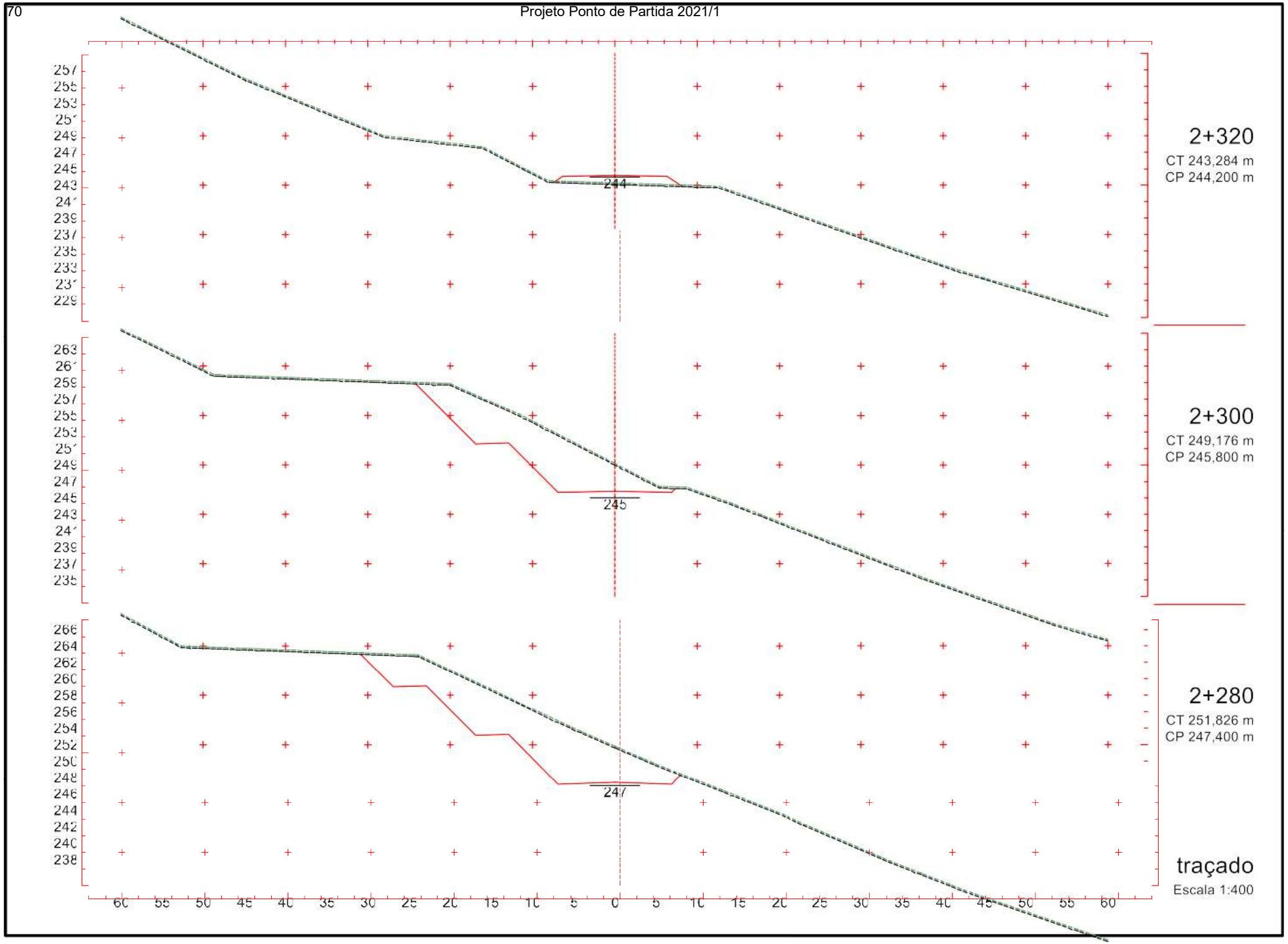
2+180
CT 259,515 m
CP 255,400 m

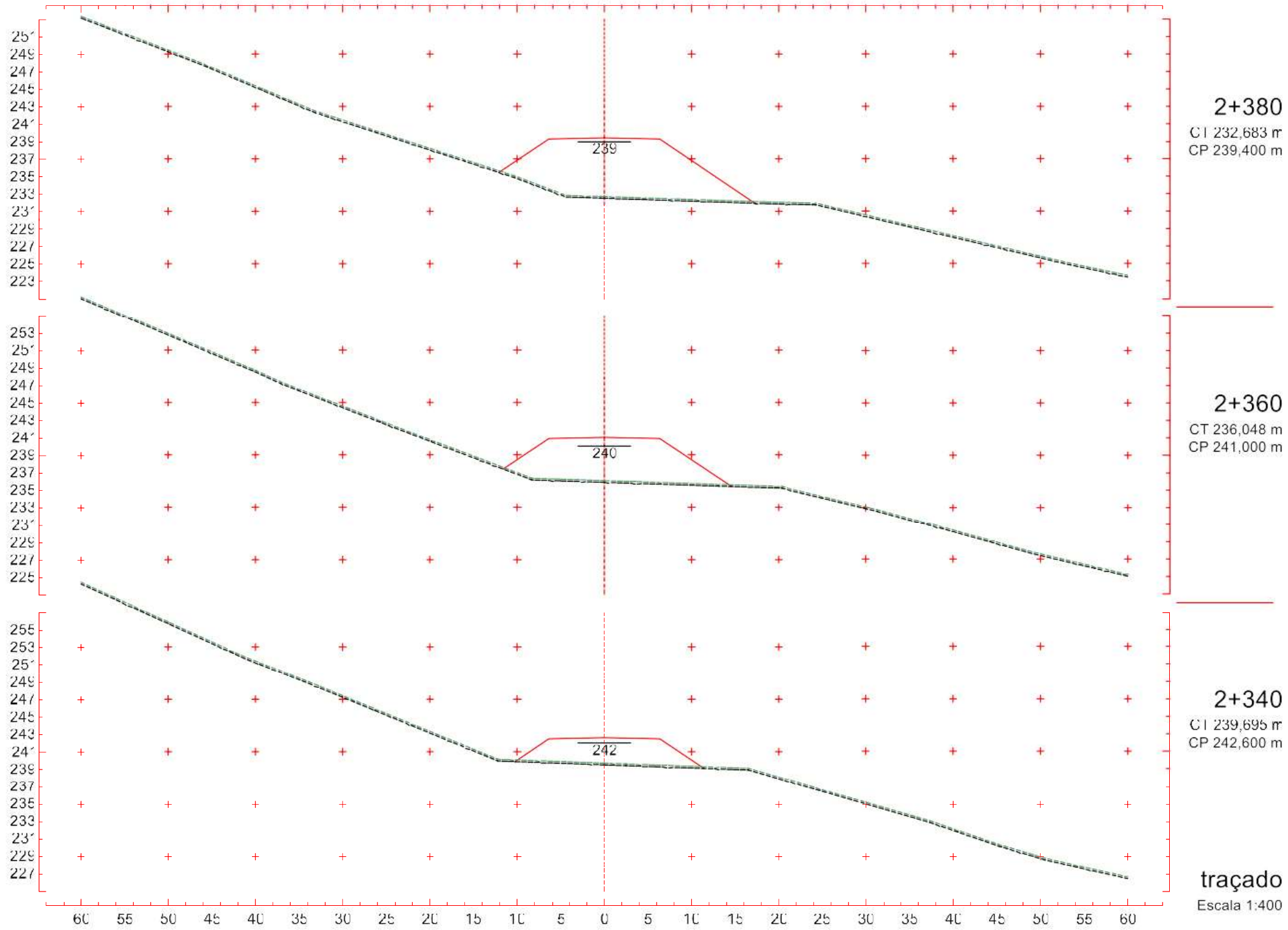
2+160
CT 260,702 m
CP 257,000 m

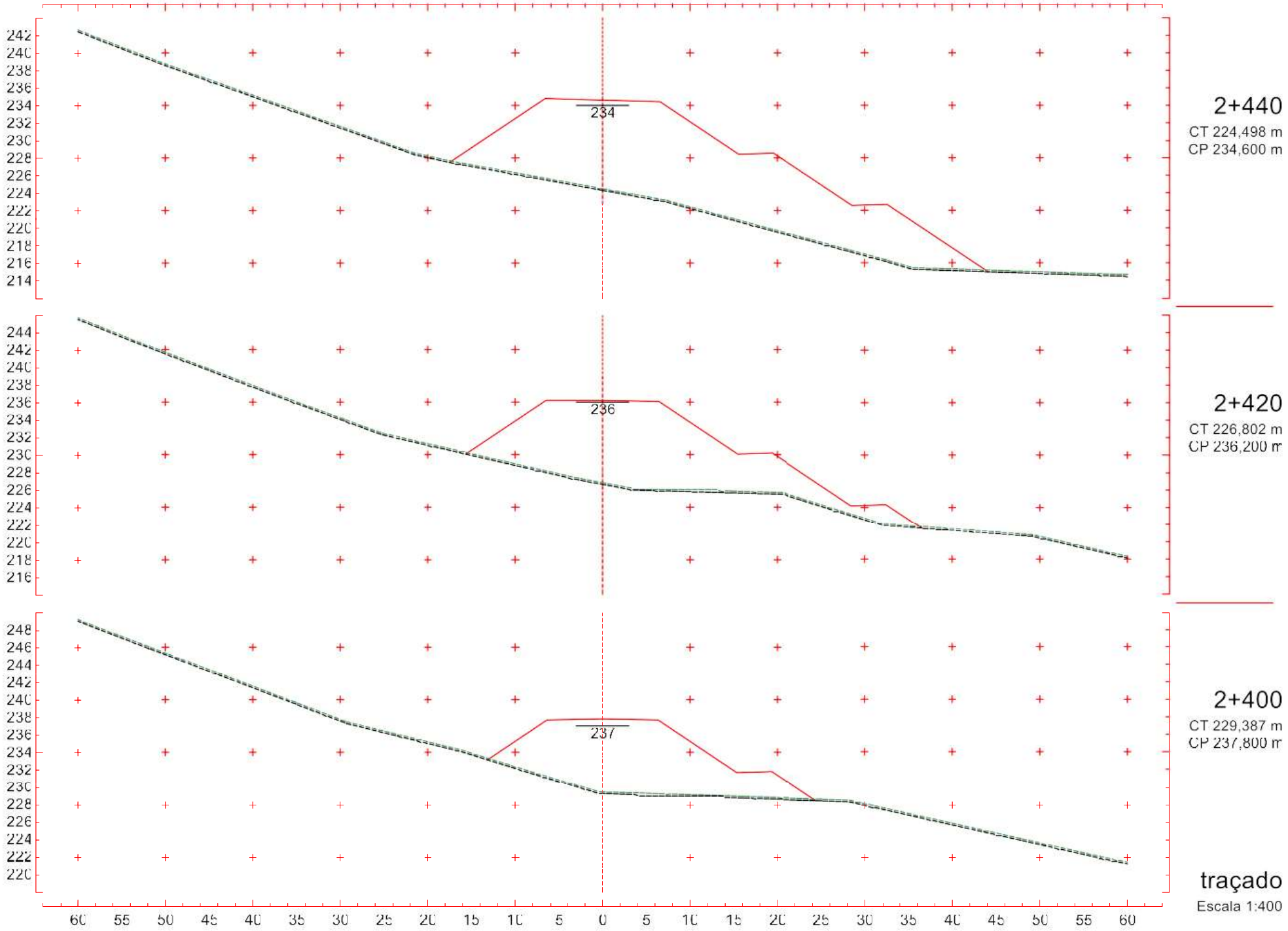
traçado
Escala 1:400


2+260
CT 253,583 m
CP 249,000 m
248
2+240
CT 255,190 m
CP 250,600 m
250
2+220
CT 256,784 m
CP 252,200 m
252
traçado
Escala 1:400

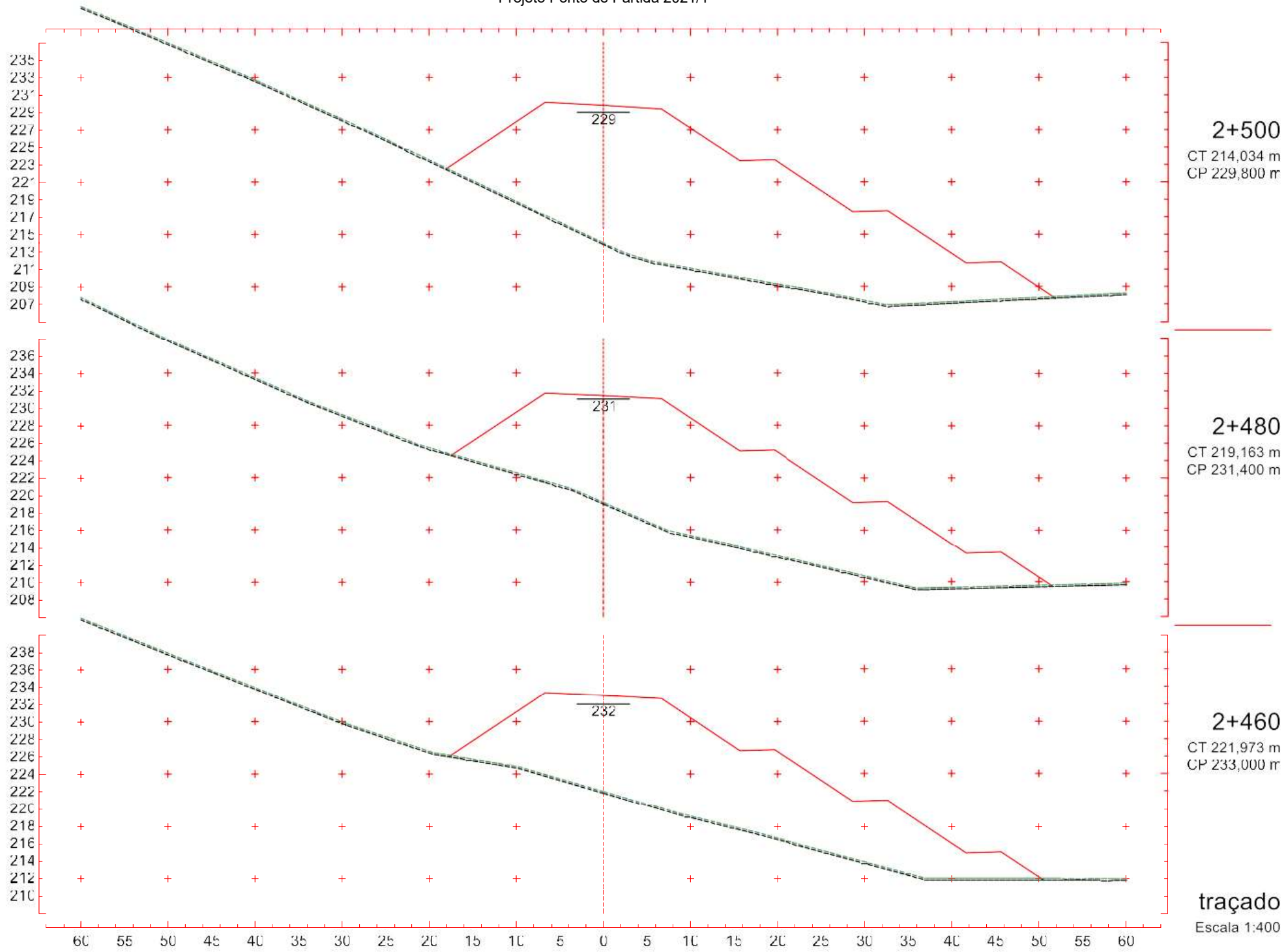
Projeto Ponto de Partida 2021/1

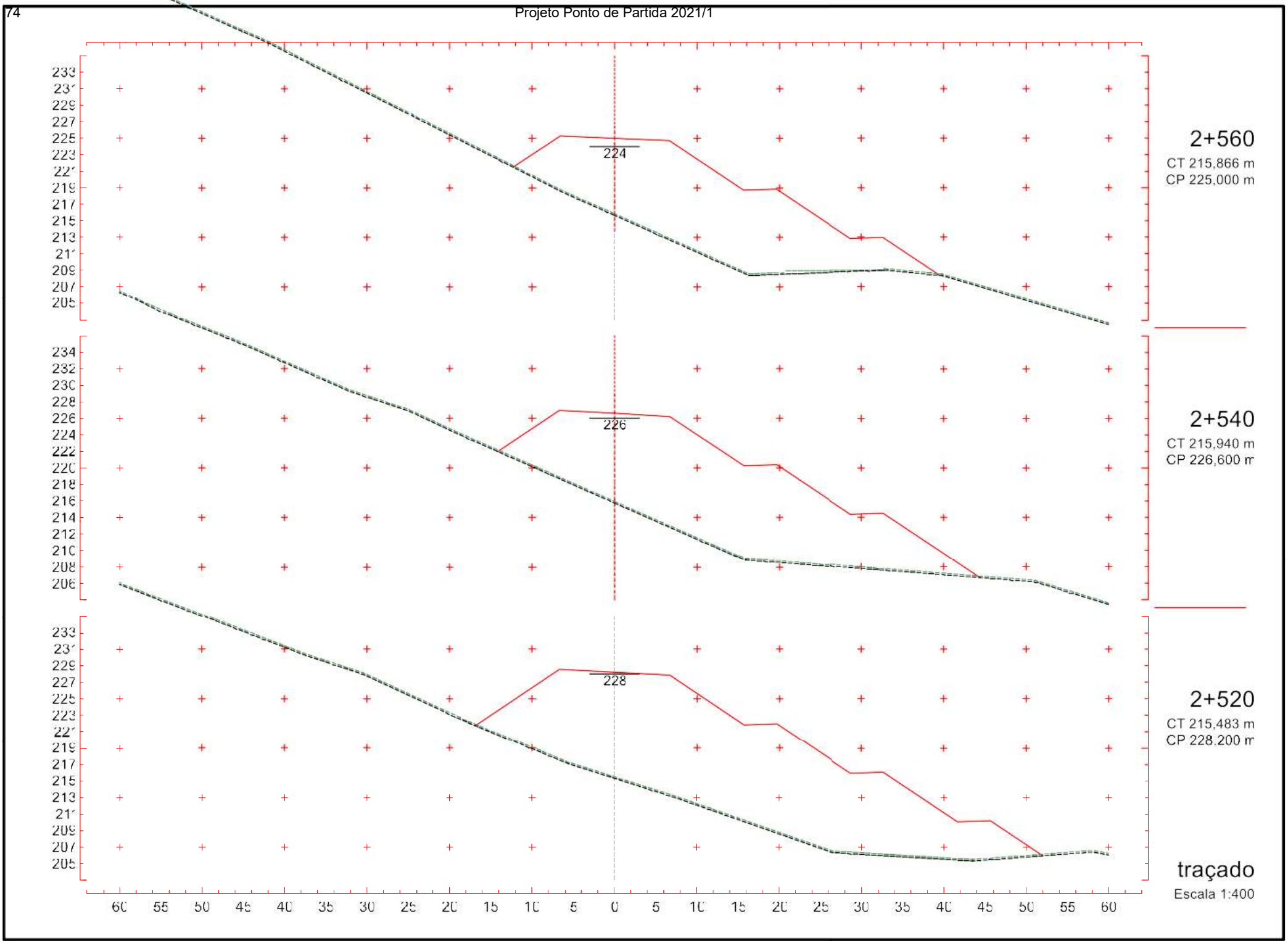


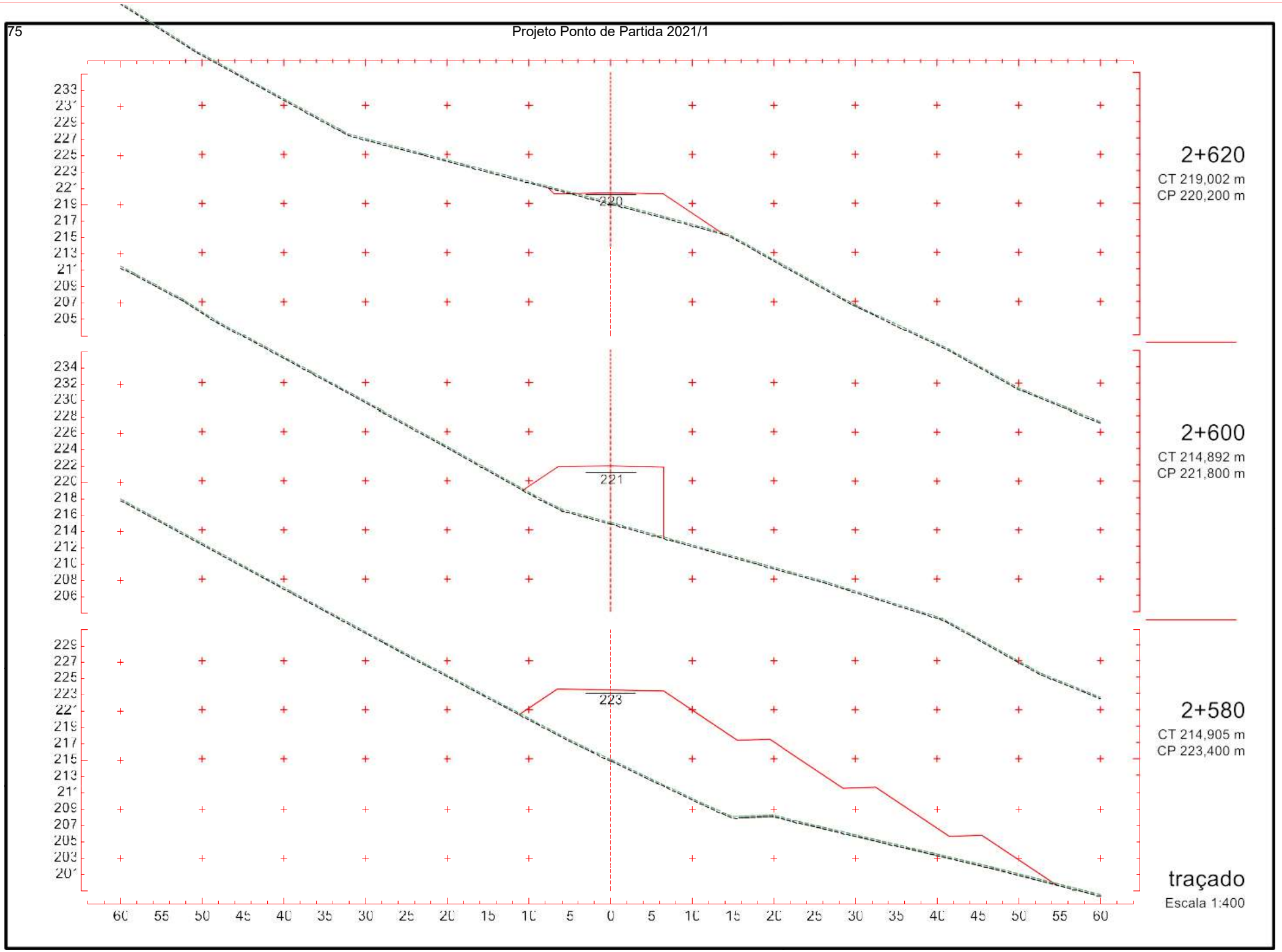

2+380
CT 232,683 m
CP 239,400 m
239
2+360
CT 236,048 m
CP 241,000 m
240
2+340
CT 239,695 m
CP 242,600 m
242
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60


242
240
238
236
234
232
230
228
226
224
222
220
218
216
214
234
2+440
CT 224,498 m
CP 234,600 m
244
242
240
238
236
234
232
230
228
226
224
222
220
218
216
236
2+420
CT 226,802 m
CP 236,200 m
248
246
244
242
240
238
236
234
232
230
228
226
224
222
220
237
2+400
CT 229,387 m
CP 237,800 m
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60
traçado
Escala 1:400

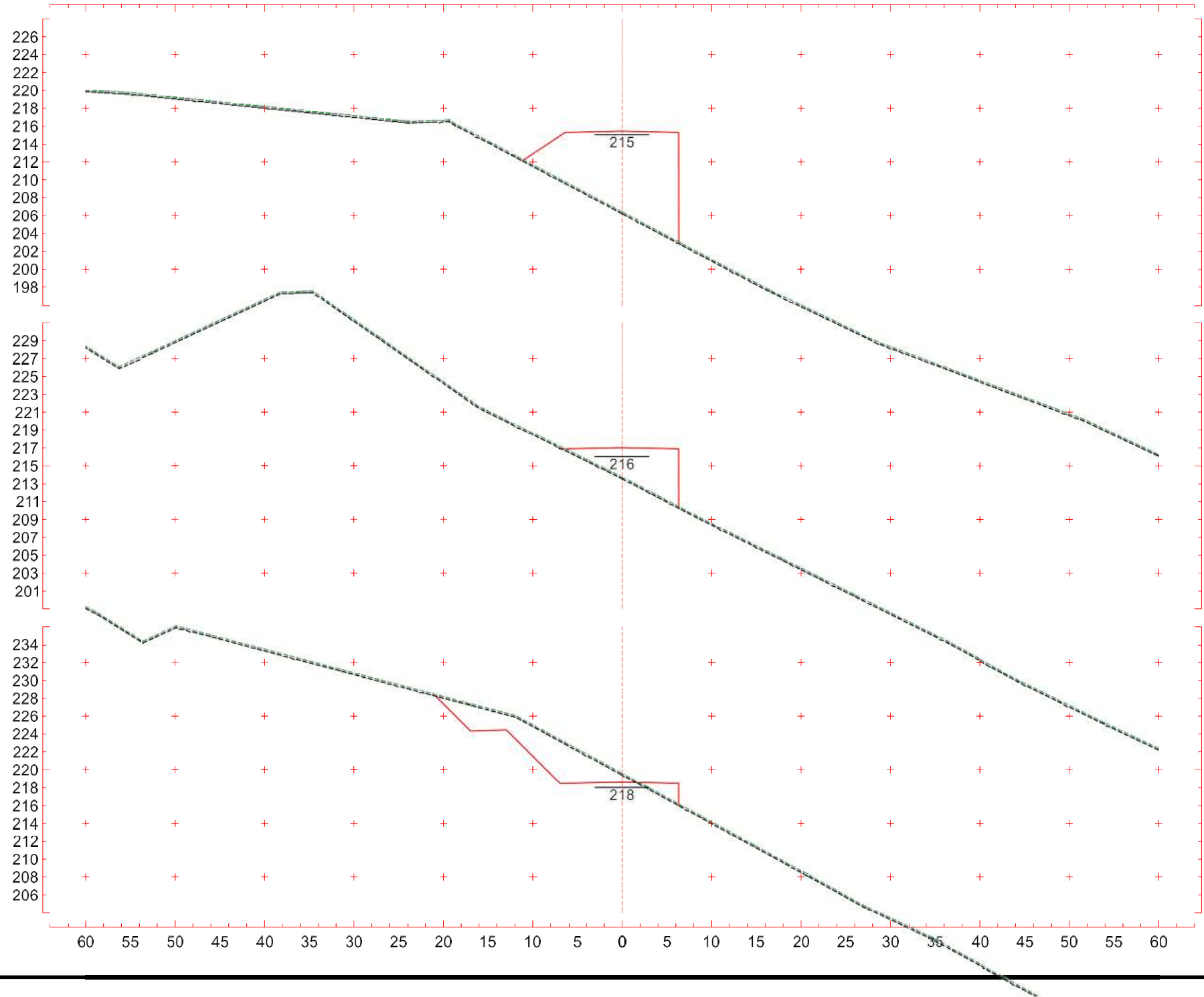
Projeto Ponto de Partida 2021/1




2+560
CT 215,866 m
CP 225,000 m
224
2+540
CT 215,940 m
CP 226,600 m
226
2+520
CT 215,483 m
CP 228,200 m
228
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60


2+620
CT 219,002 m
CP 220,200 m
220
2+600
CT 214,892 m
CP 221,800 m
221
2+580
CT 214,905 m
CP 223,400 m
223
traçado
Escala 1:400

Projeto Ponto de Partida 2021/1



2+680

CT 206,390 m
CP 215,400 m

2+660

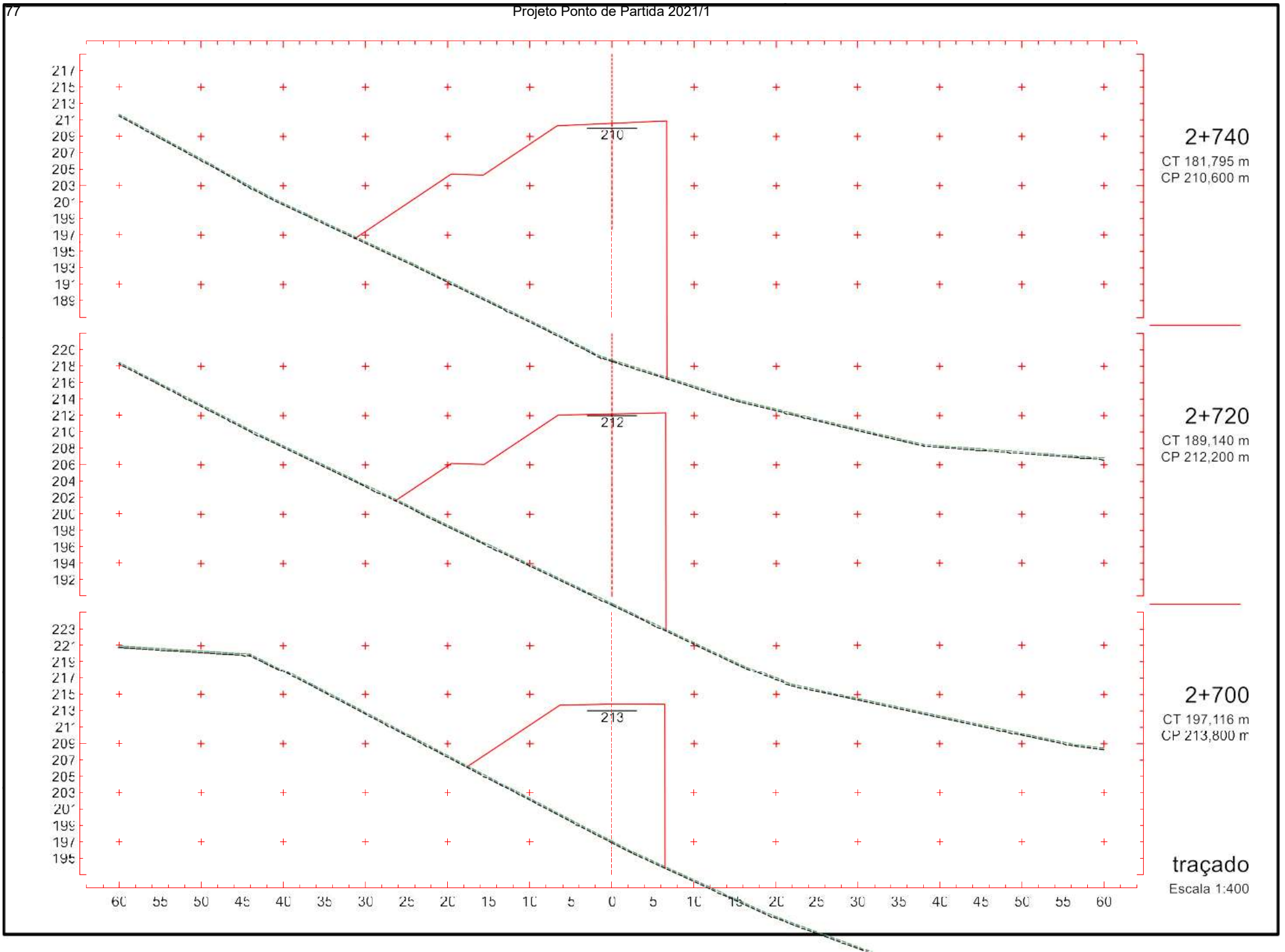
CT 213,736 m
CP 217,000 m

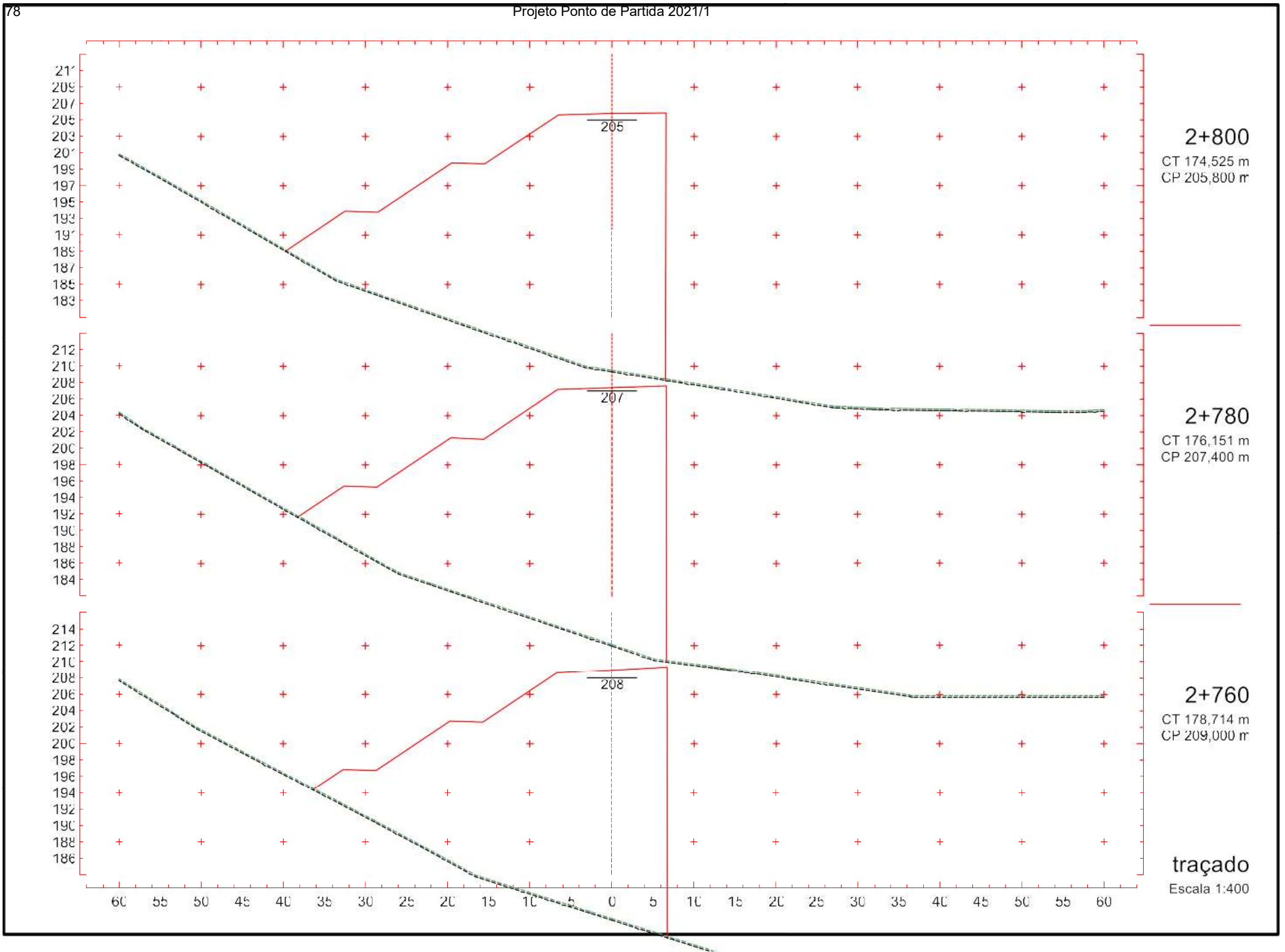
2+640

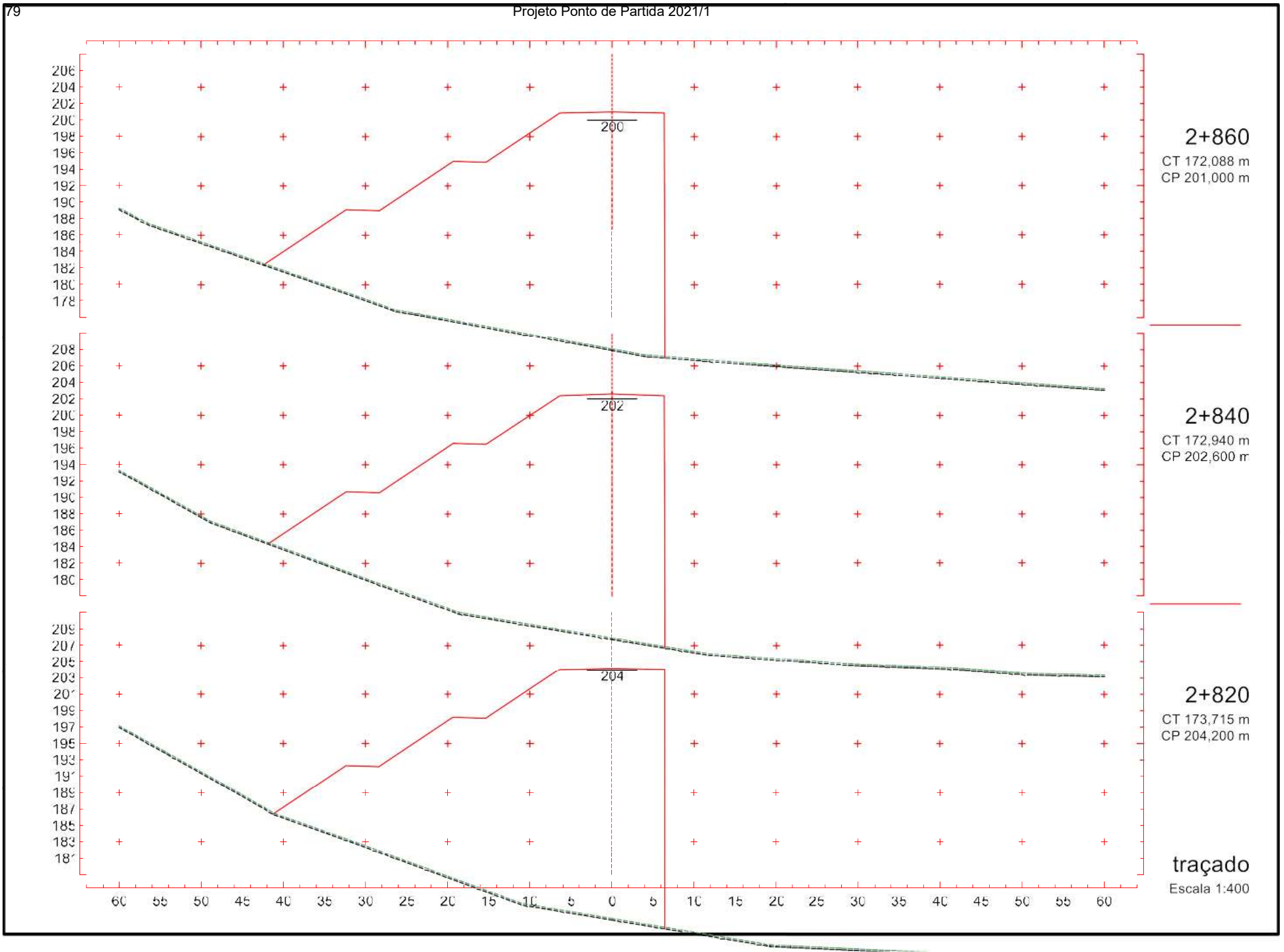
CT 219,623 m
CP 218,600 m

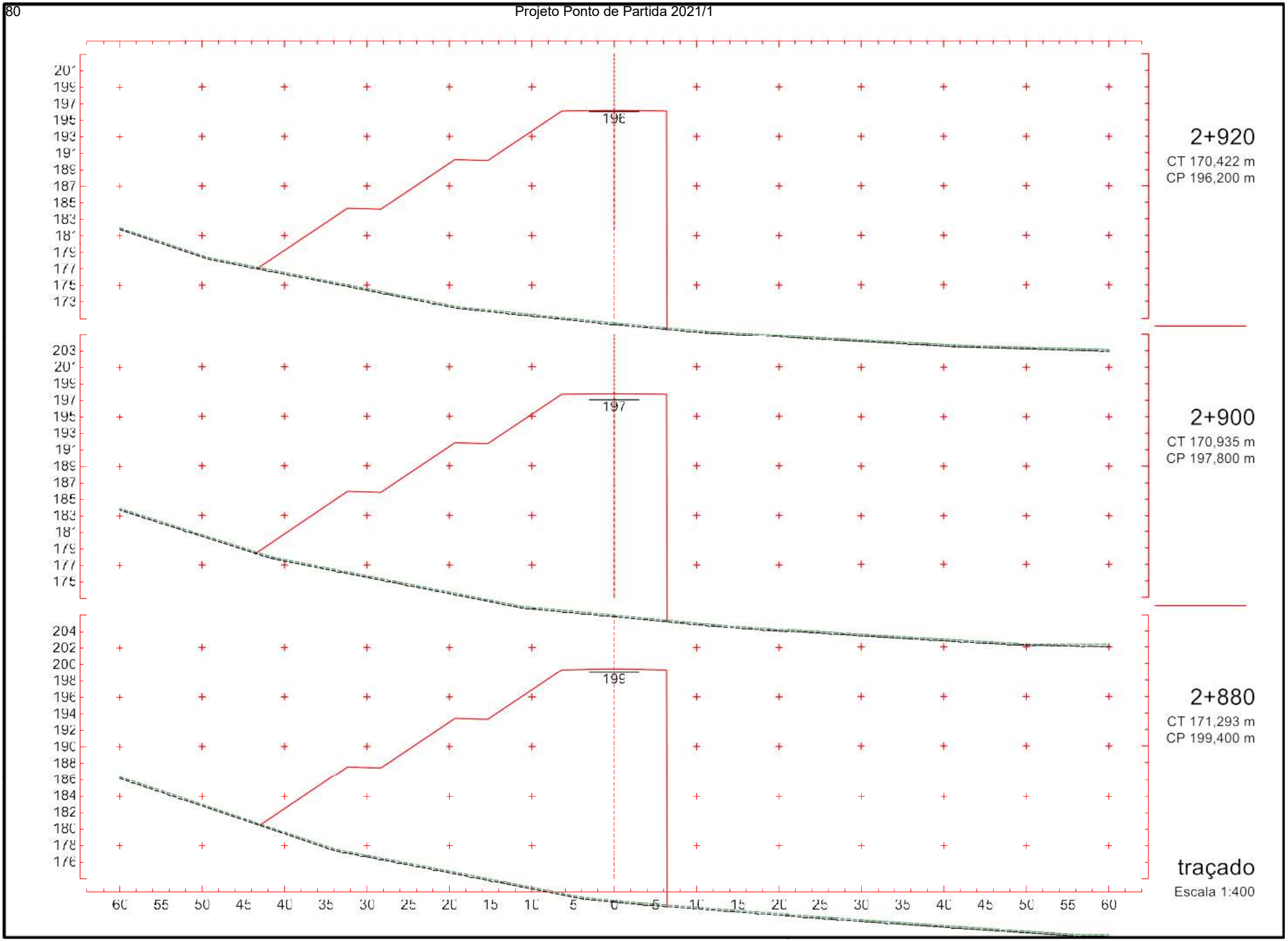
traçado

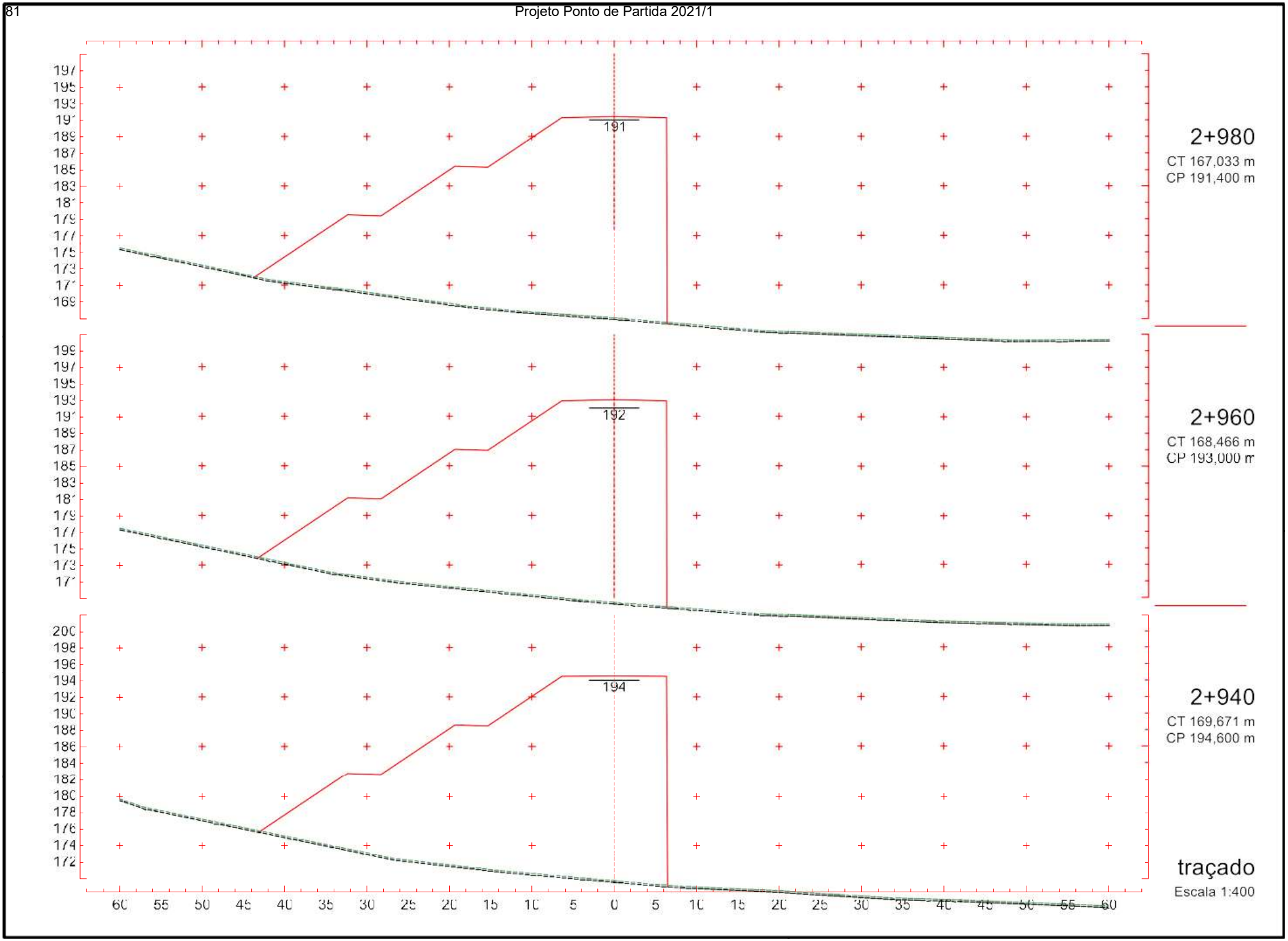
Escala 1:400

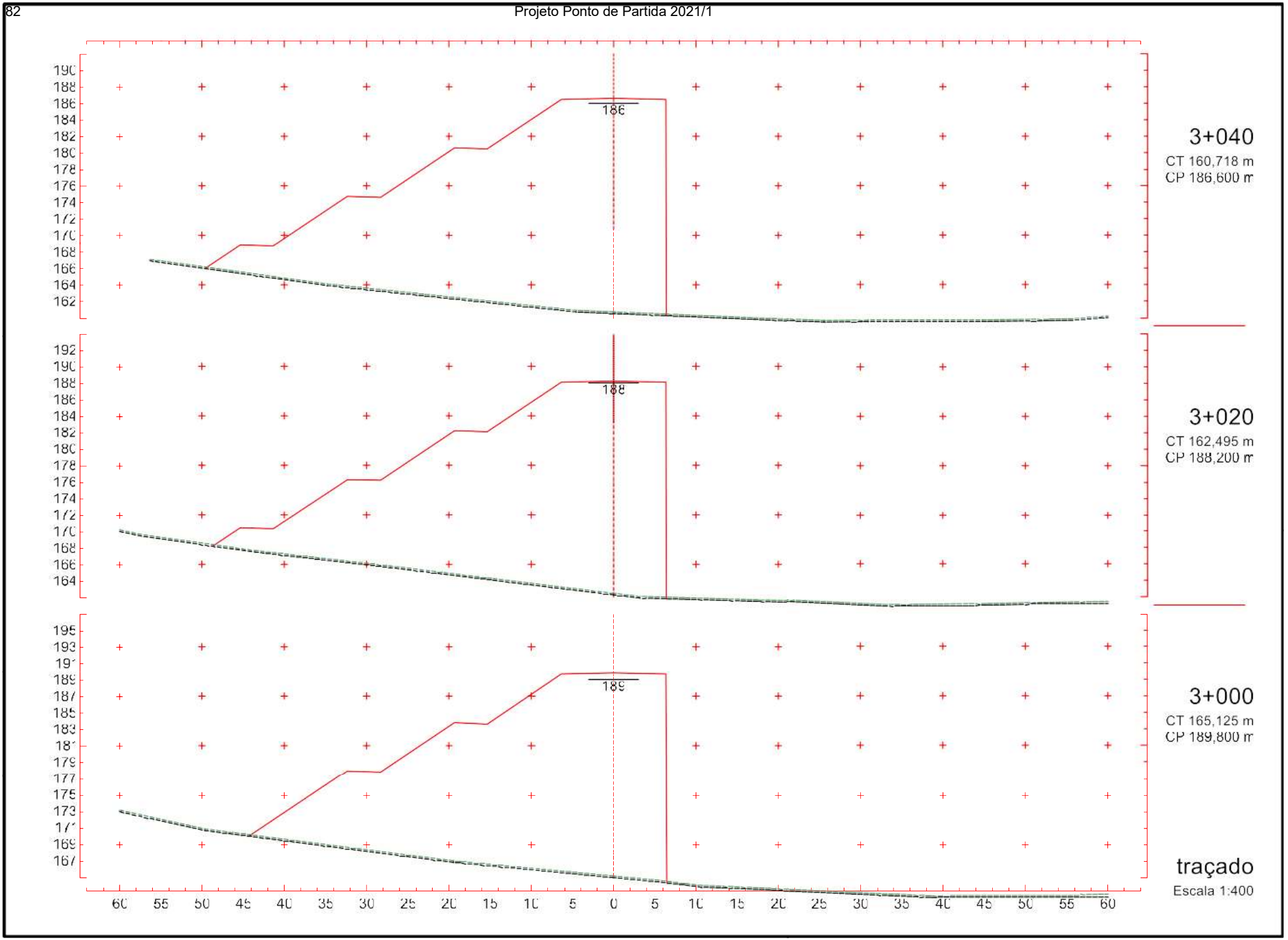

2+740
CT 181,795 m
CP 210,600 m
210
2+720
CT 189,140 m
CP 212,200 m
212
2+700
CT 197,116 m
CP 213,800 m
213
traçado
Escala 1:400

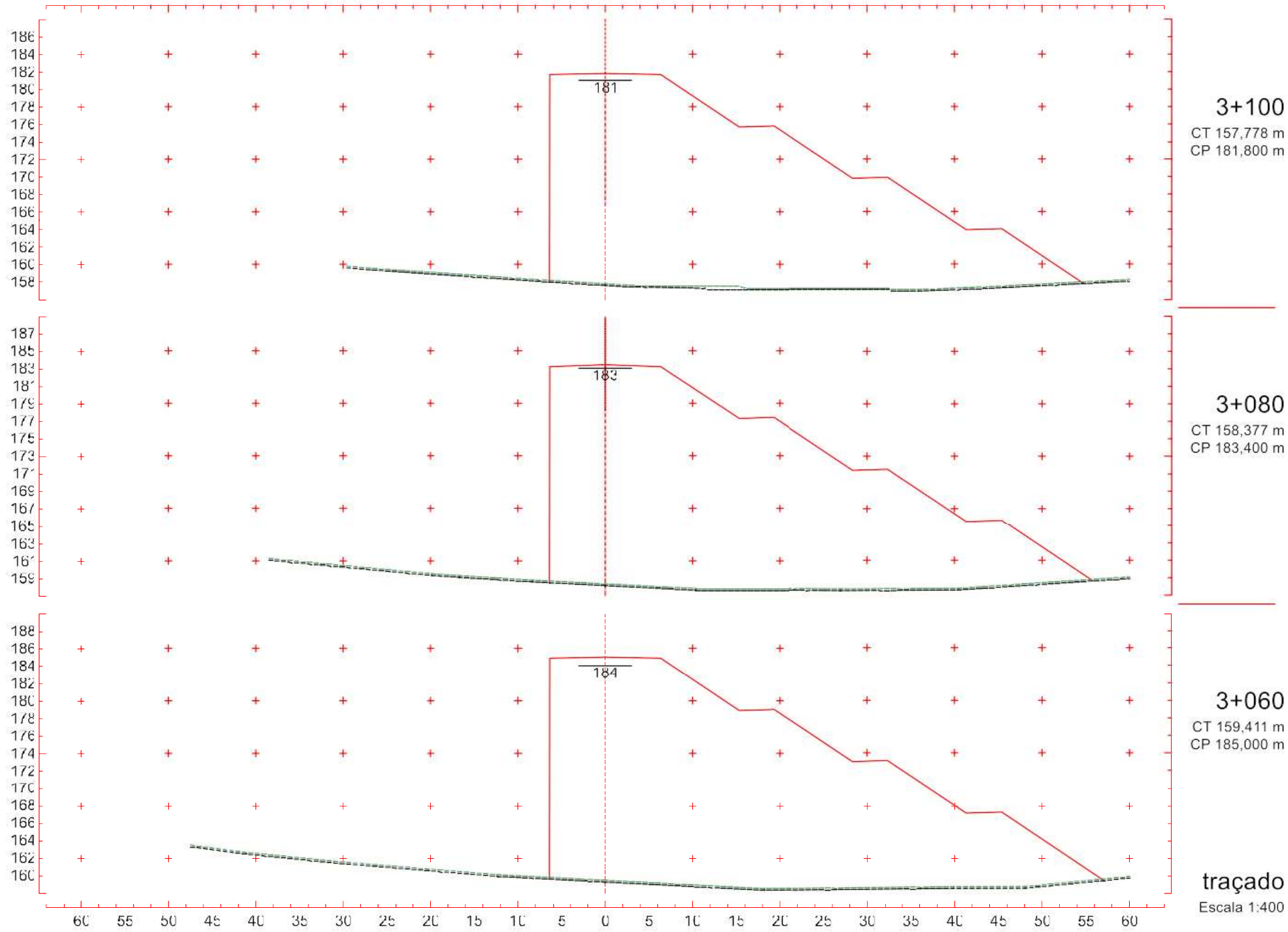

205
207
208
2+800
CT 174,525 m
CP 205,800 m
2+780
CT 176,151 m
CP 207,400 m
2+760
CT 178,714 m
CP 209,000 m
traçado
Escala 1:400

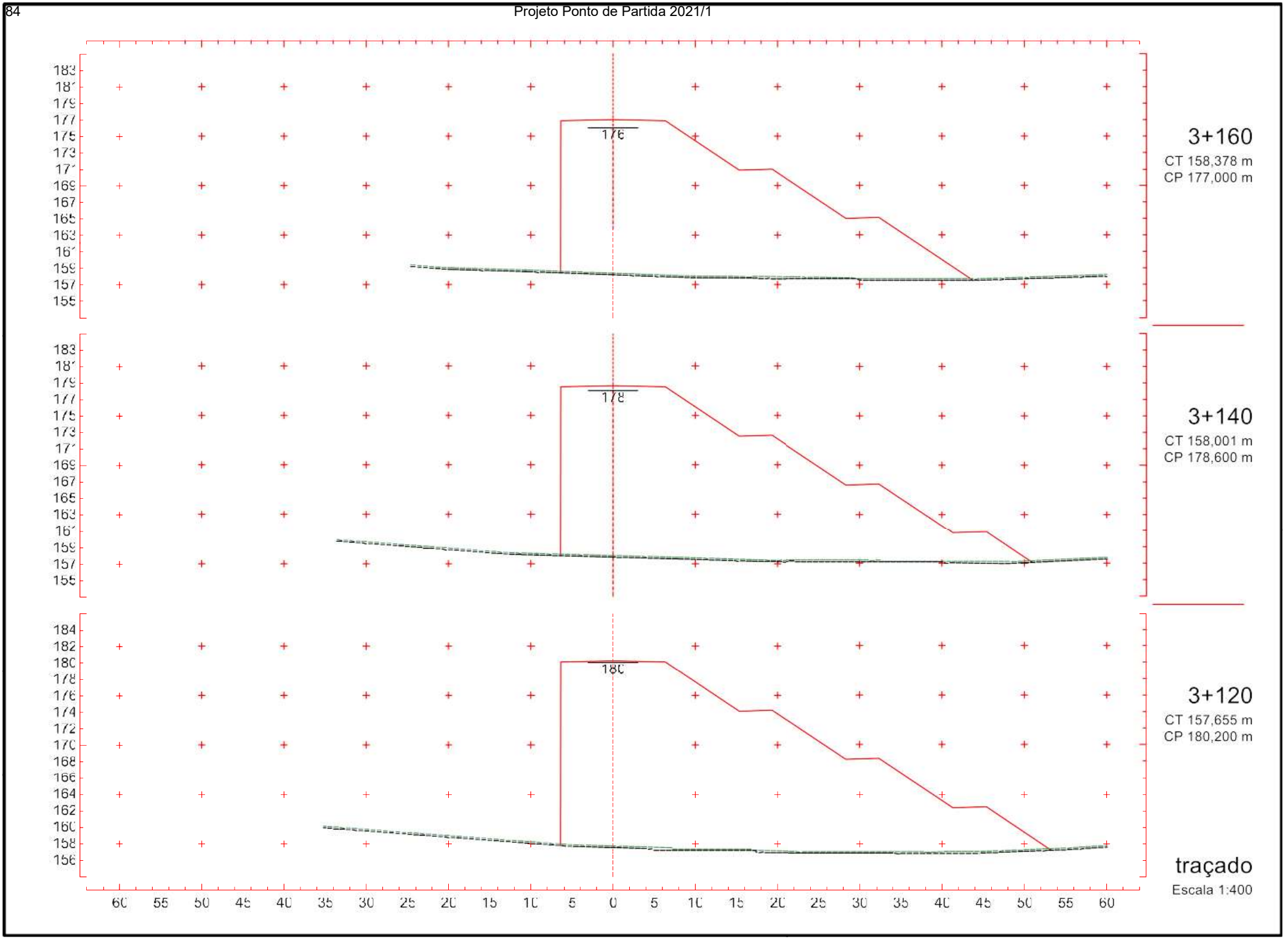

200
2+860
CT 172,088 m
CP 201,000 m
202
2+840
CT 172,940 m
CP 202,600 m
204
2+820
CT 173,715 m
CP 204,200 m
traçado
Escala 1:400

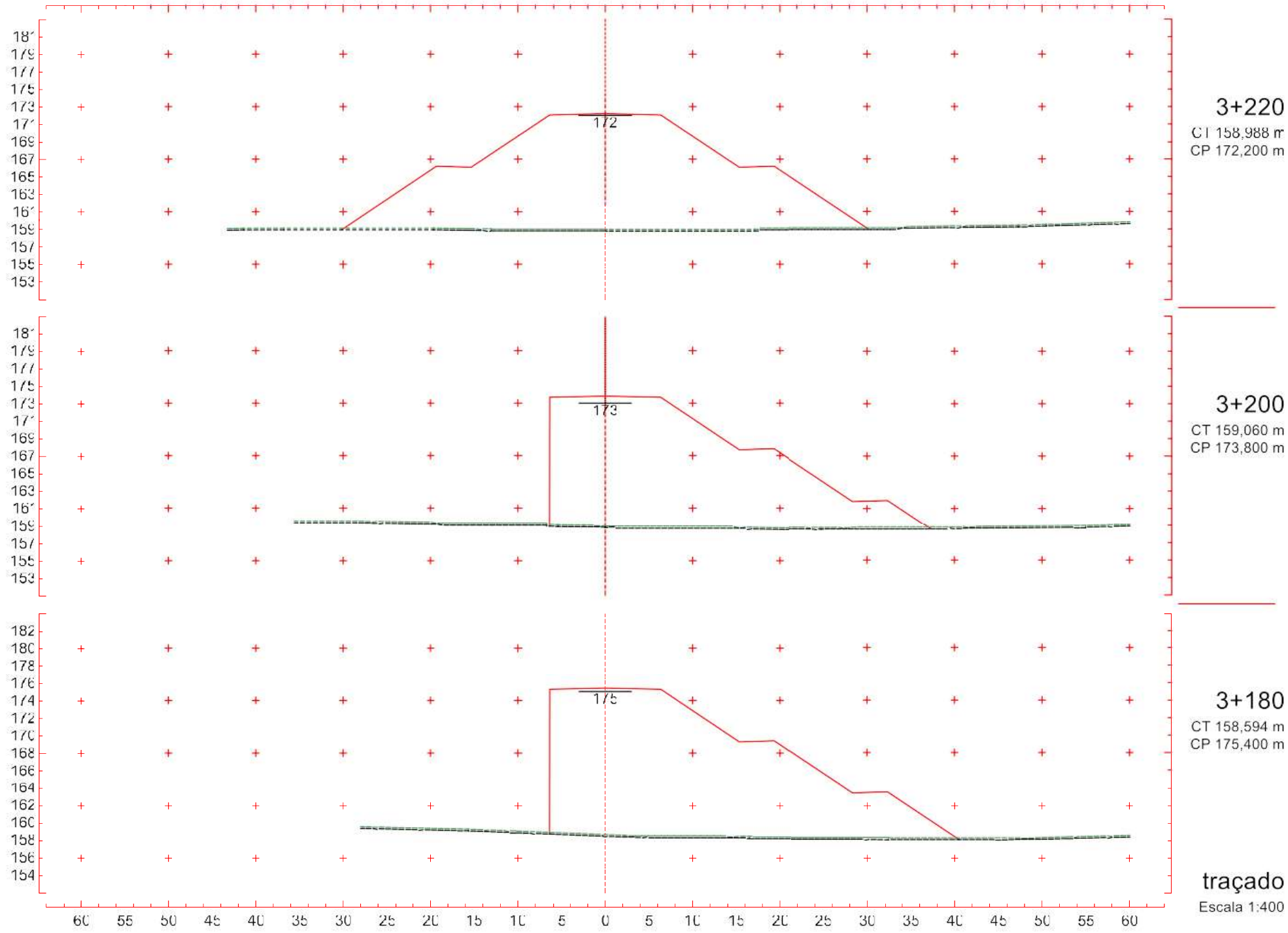

2+920
CT 170,422 m
CP 196,200 m
2+900
CT 170,935 m
CP 197,800 m
2+880
CT 171,293 m
CP 199,400 m
traçado
Escala 1:400

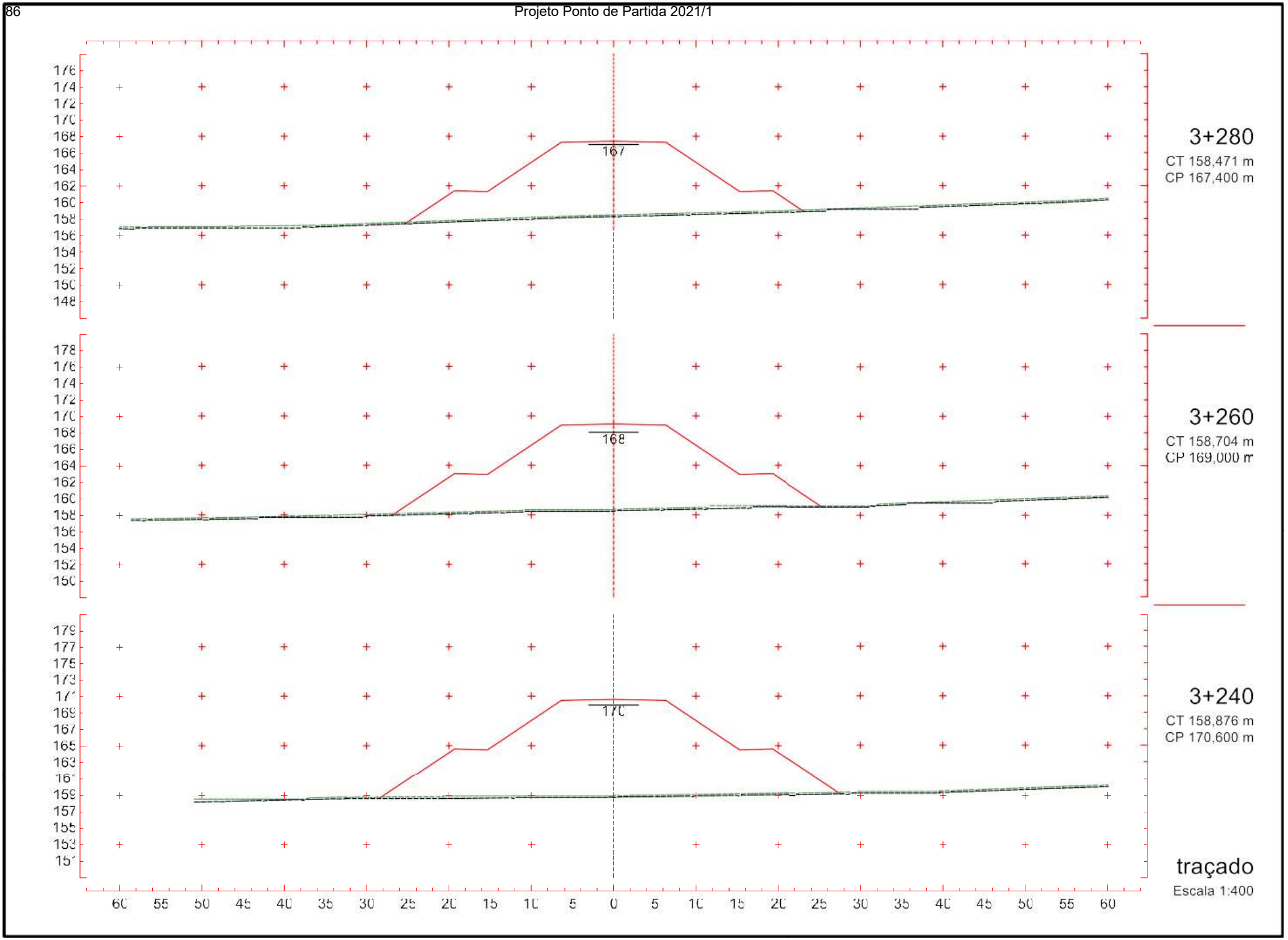

191
2+980
CT 167,033 m
CP 191,400 m
192
2+960
CT 168,466 m
CP 193,000 m
194
2+940
CT 169,671 m
CP 194,600 m
traçado
Escala 1:400

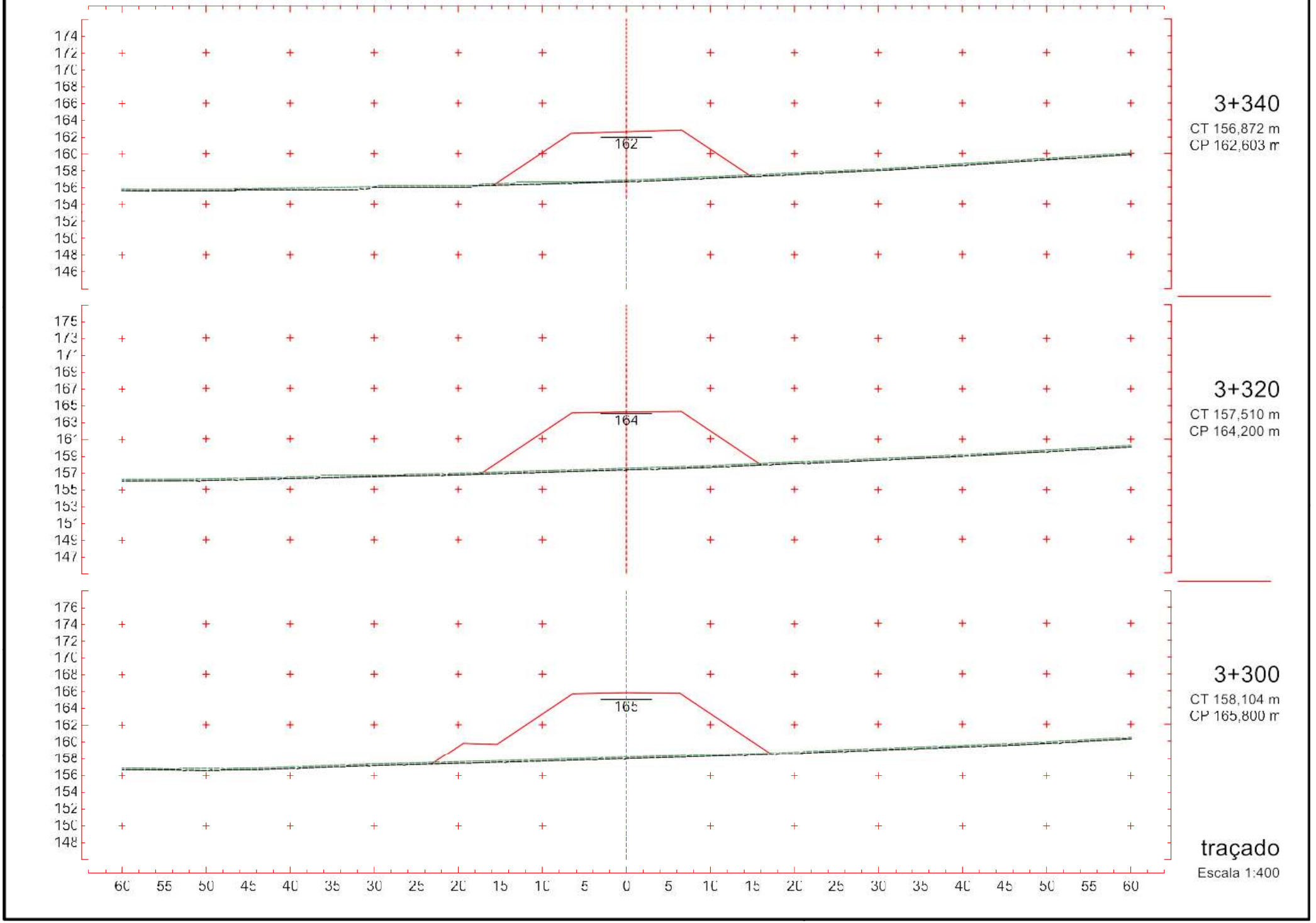

3+040
CT 160,718 m
CP 186,600 m
3+020
CT 162,495 m
CP 188,200 m
3+000
CT 165,125 m
CP 189,800 m
traçado
Escala 1:400

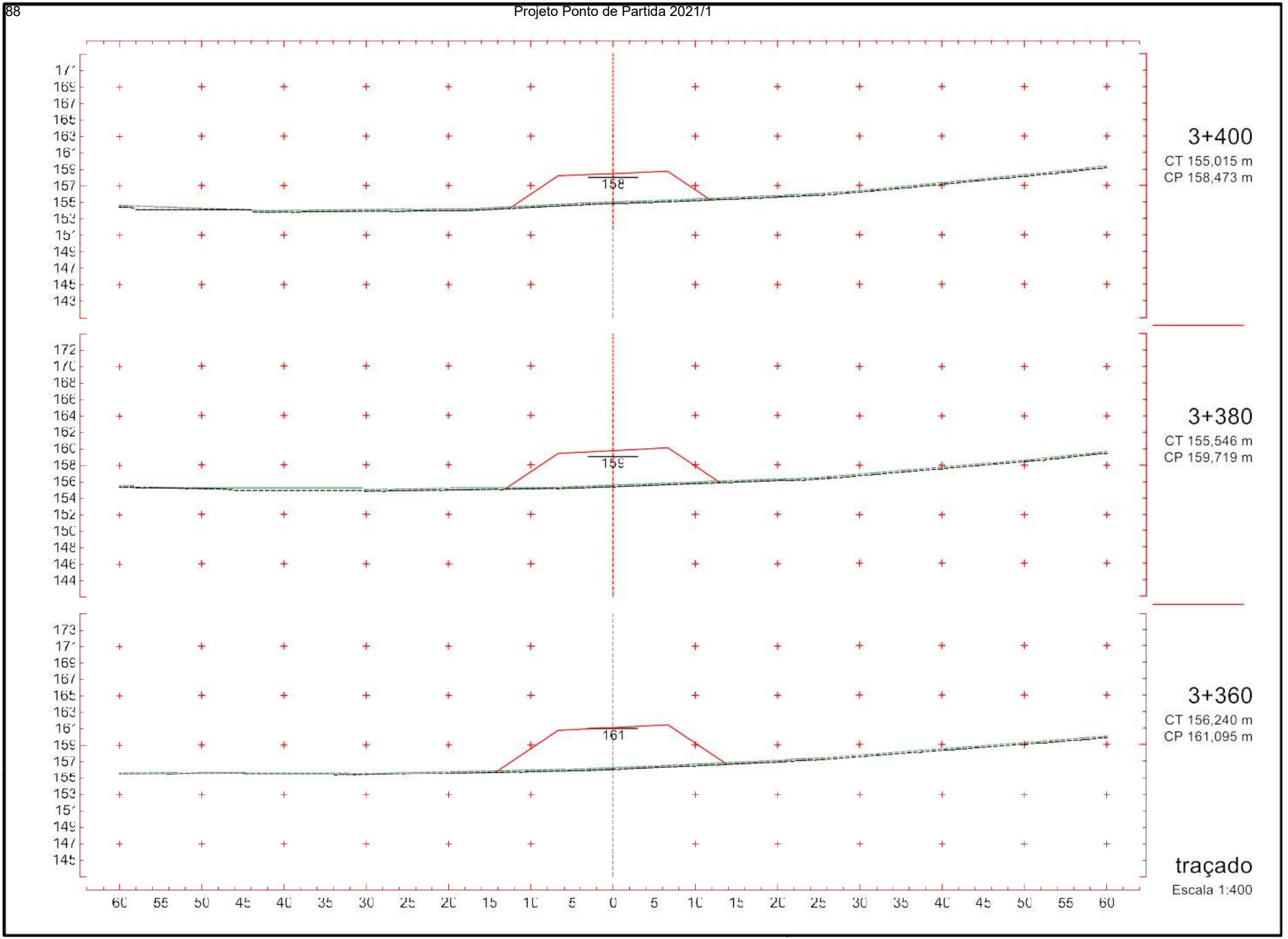

186
184
182
180
178
176
174
172
170
168
166
164
162
160
158
181
3+100
CT 157,778 m
CP 181,800 m
187
185
183
181
179
177
175
173
171
169
167
165
163
161
159
183
3+080
CT 158,377 m
CP 183,400 m
188
186
184
182
180
178
176
174
172
170
168
166
164
162
160
184
3+060
CT 159,411 m
CP 185,000 m
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60
traçado
Escala 1:400

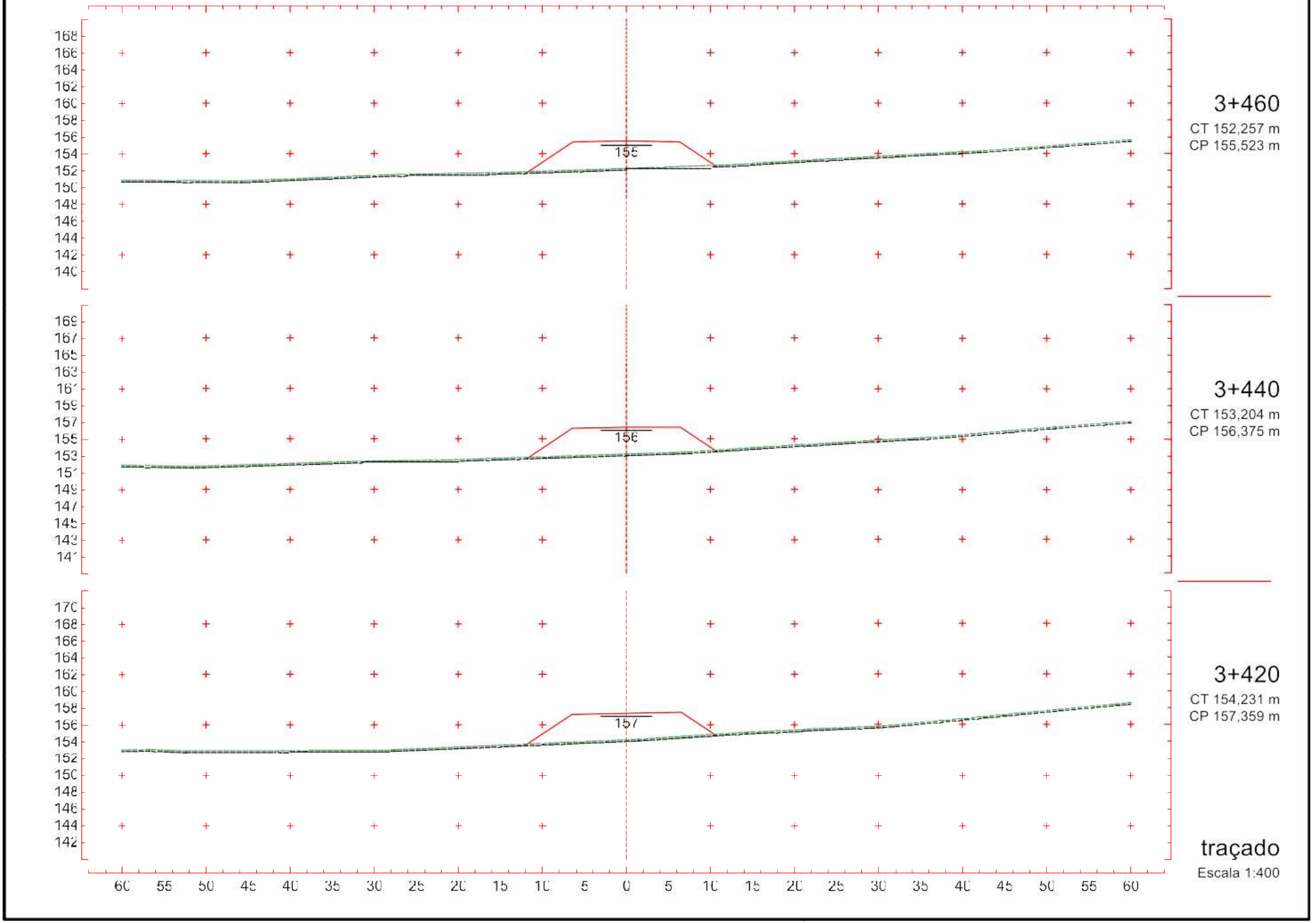

3+160
CT 158,378 m
CP 177,000 m
3+140
CT 158,001 m
CP 178,600 m
3+120
CT 157,655 m
CP 180,200 m
traçado
Escala 1:400

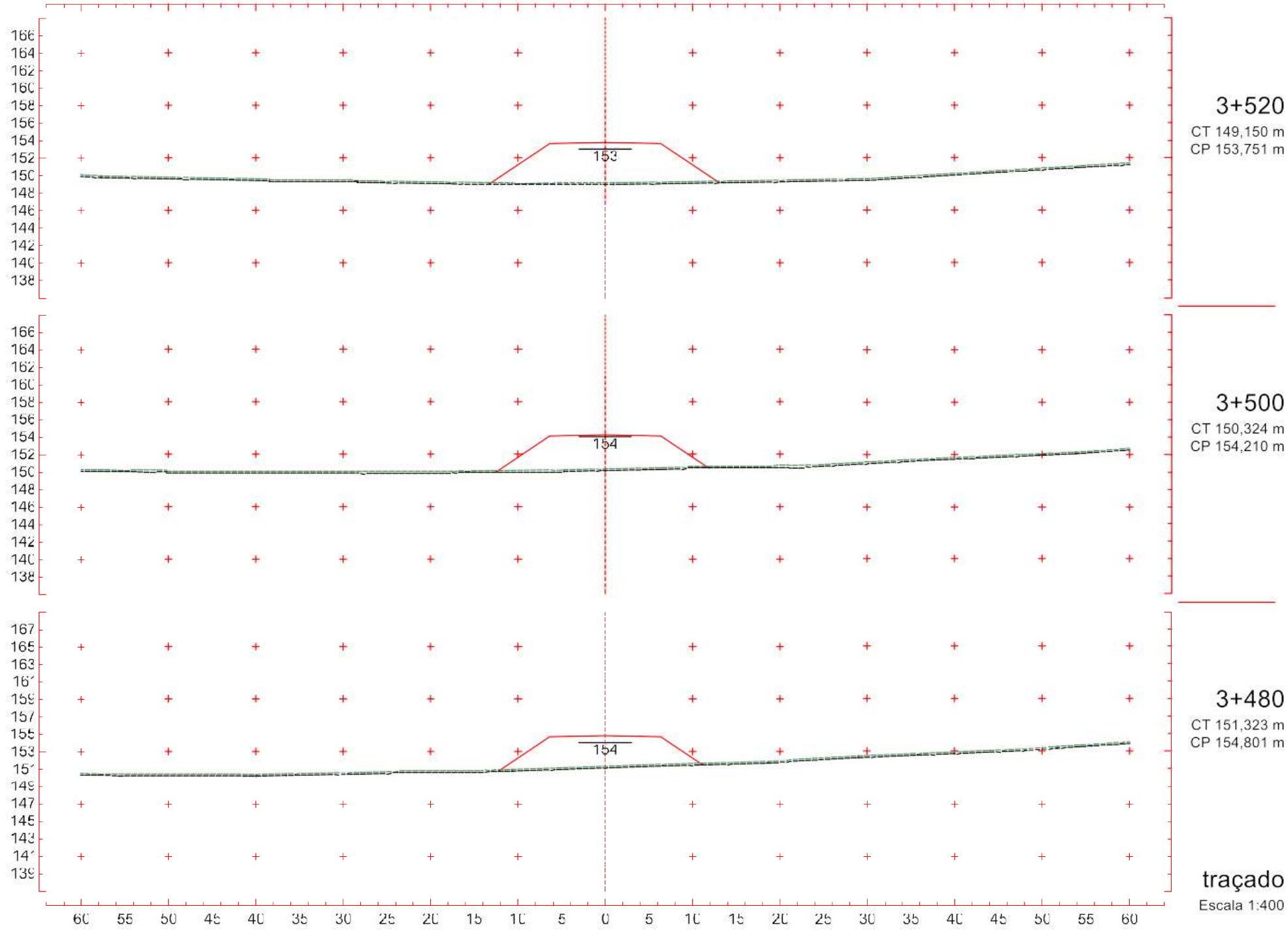

3+220
CT 158,988 m
CP 172,200 m
3+200
CT 159,060 m
CP 173,800 m
3+180
CT 158,594 m
CP 175,400 m
traçado
Escala 1:400

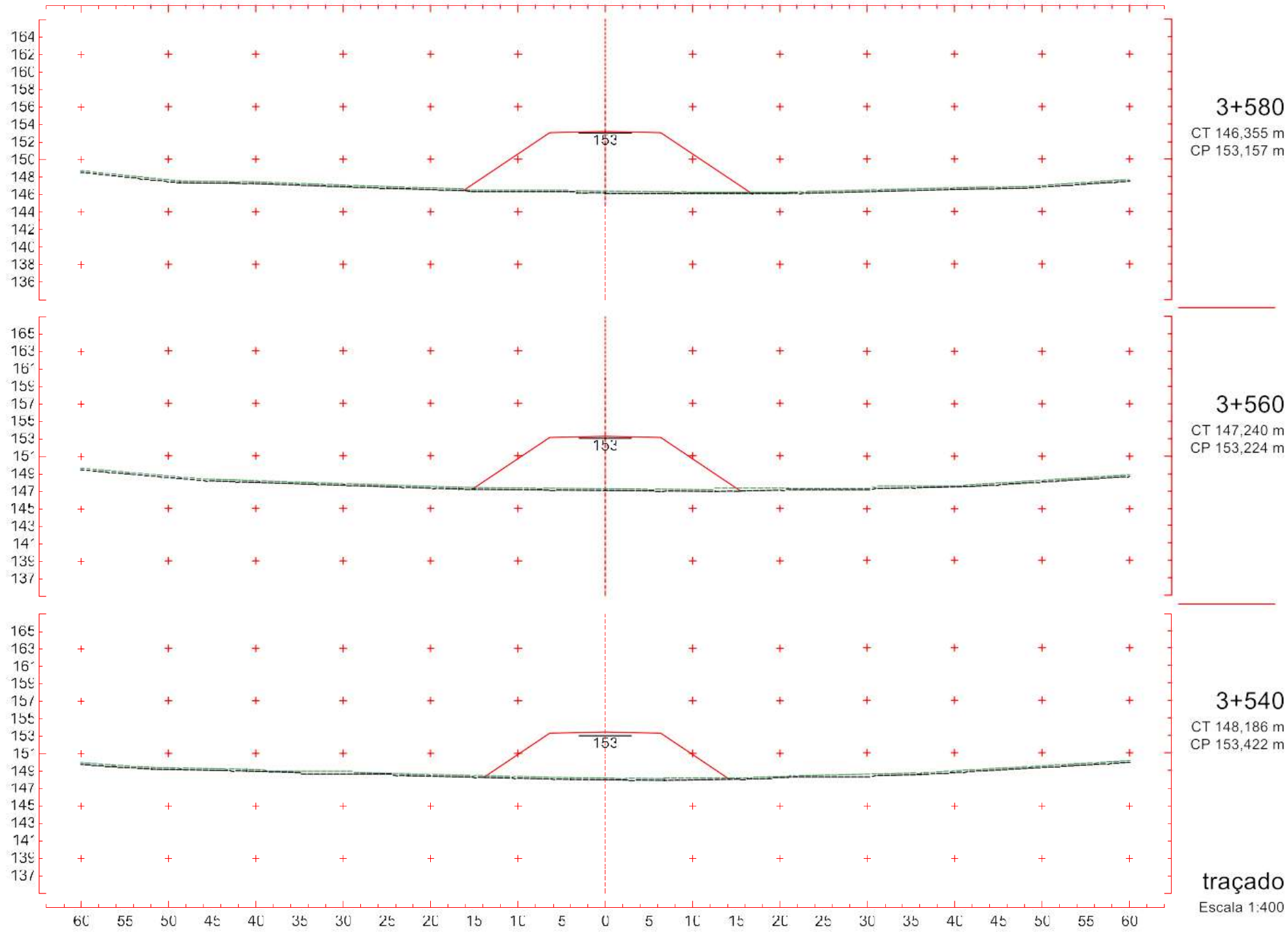

3+280
CT 158,471 m
CP 167,400 m
3+260
CT 158,704 m
CP 169,000 m
3+240
CT 158,876 m
CP 170,600 m
traçado
Escala 1:400

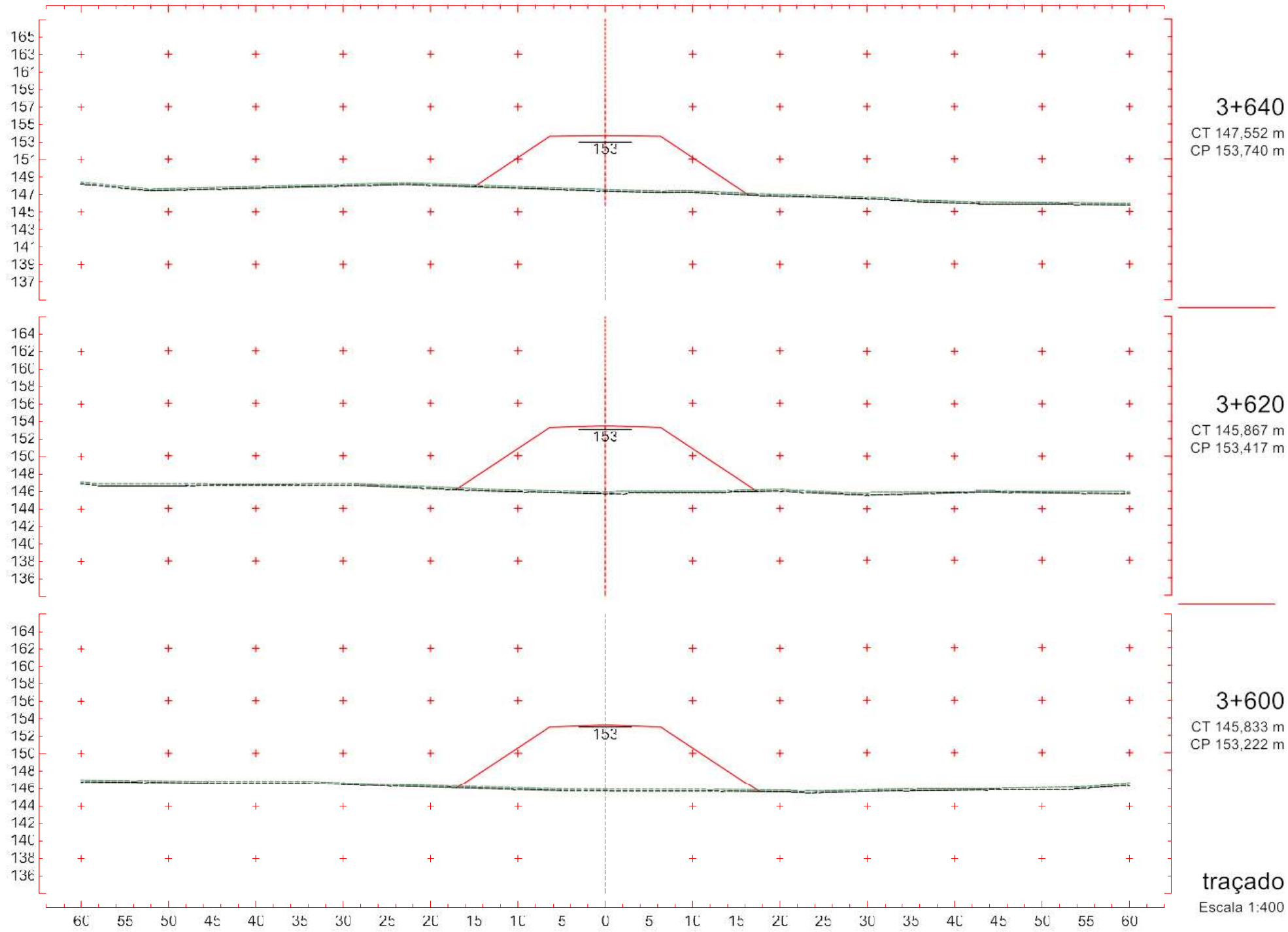

3+340
CT 156,872 m
CP 162,603 m
3+320
CT 157,510 m
CP 164,200 m
3+300
CT 158,104 m
CP 165,800 m
traçado
Escala 1:400

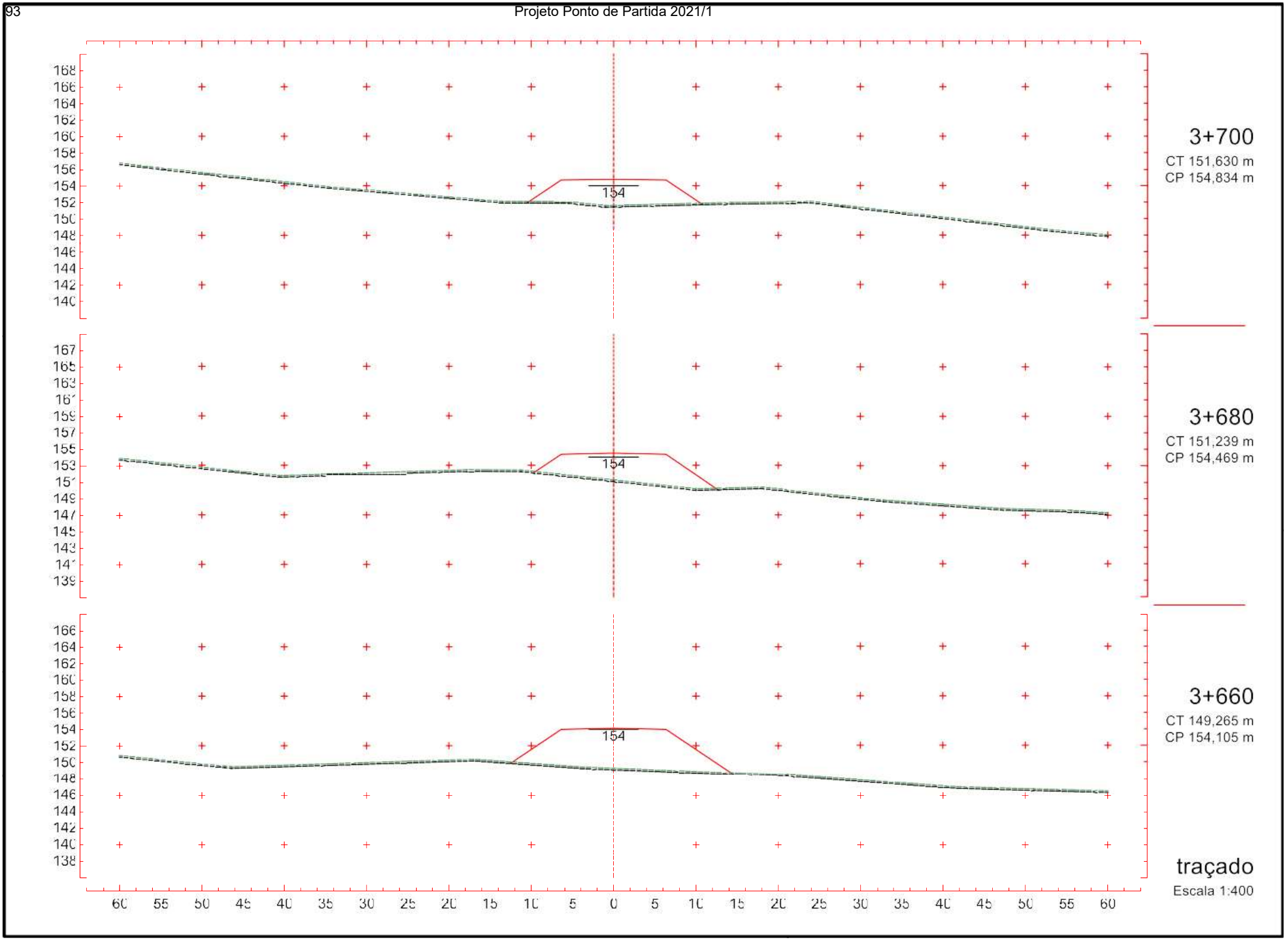

3+400
CT 155,015 m
CP 158,473 m
3+380
CT 155,546 m
CP 159,719 m
3+360
CT 156,240 m
CP 161,095 m
traçado
Escala 1:400

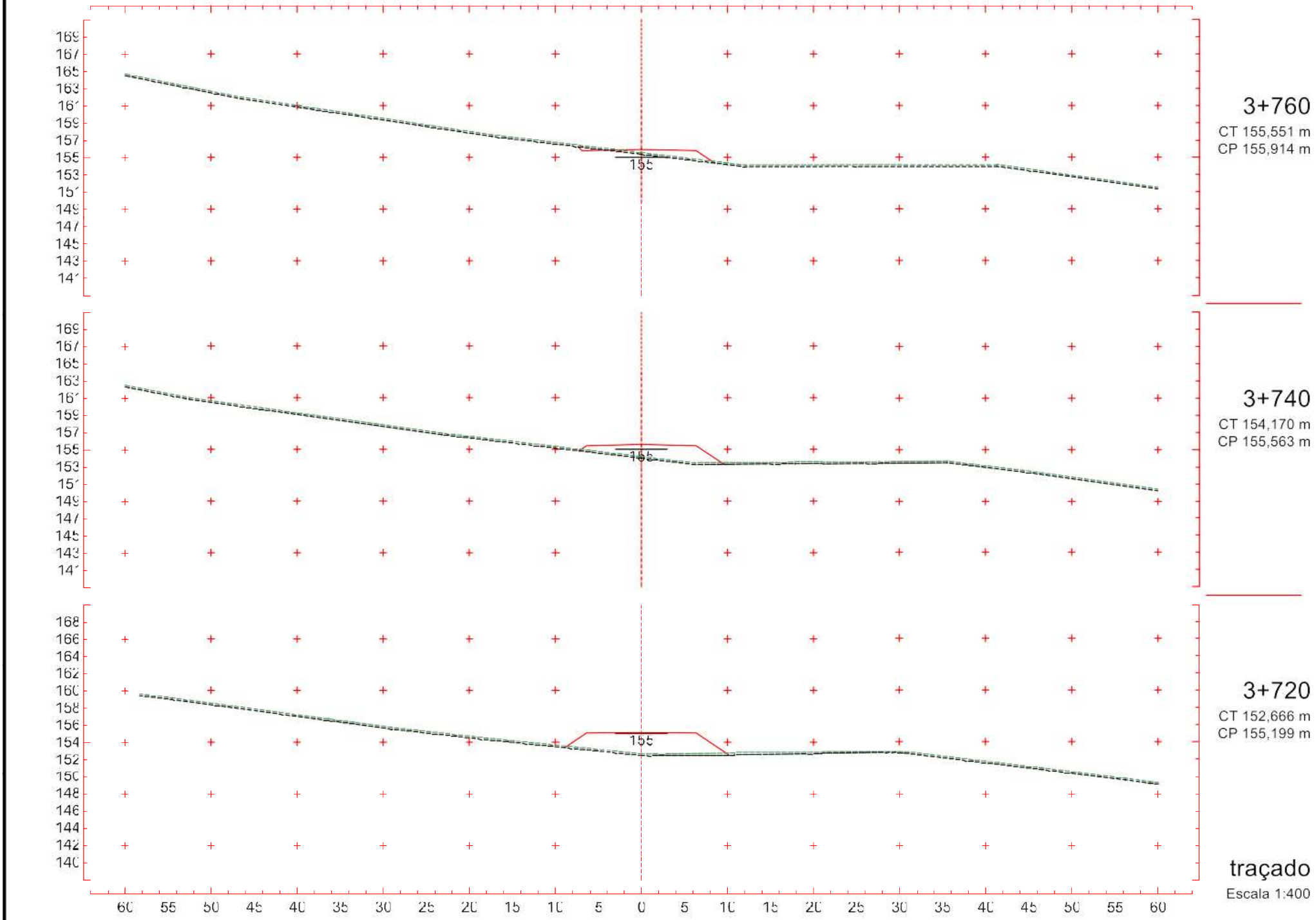

3+460
CT 152,257 m
CP 155,523 m
3+440
CT 153,204 m
CP 156,375 m
3+420
CT 154,231 m
CP 157,359 m
traçado
Escala 1:400

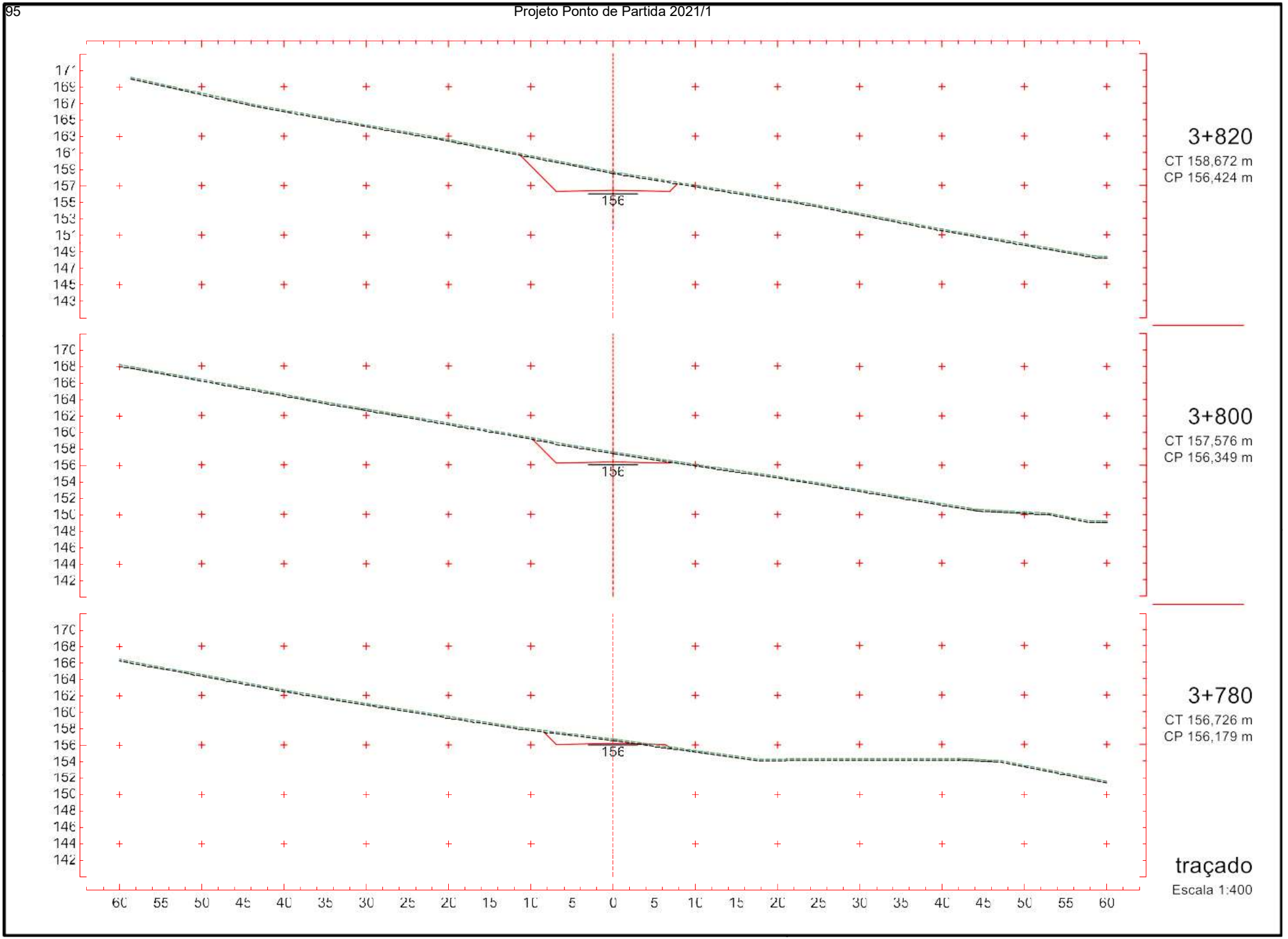

3+520
CT 149,150 m
CP 153,751 m
153
3+500
CT 150,324 m
CP 154,210 m
154
3+480
CT 151,323 m
CP 154,801 m
154
traçado
Escala 1:400

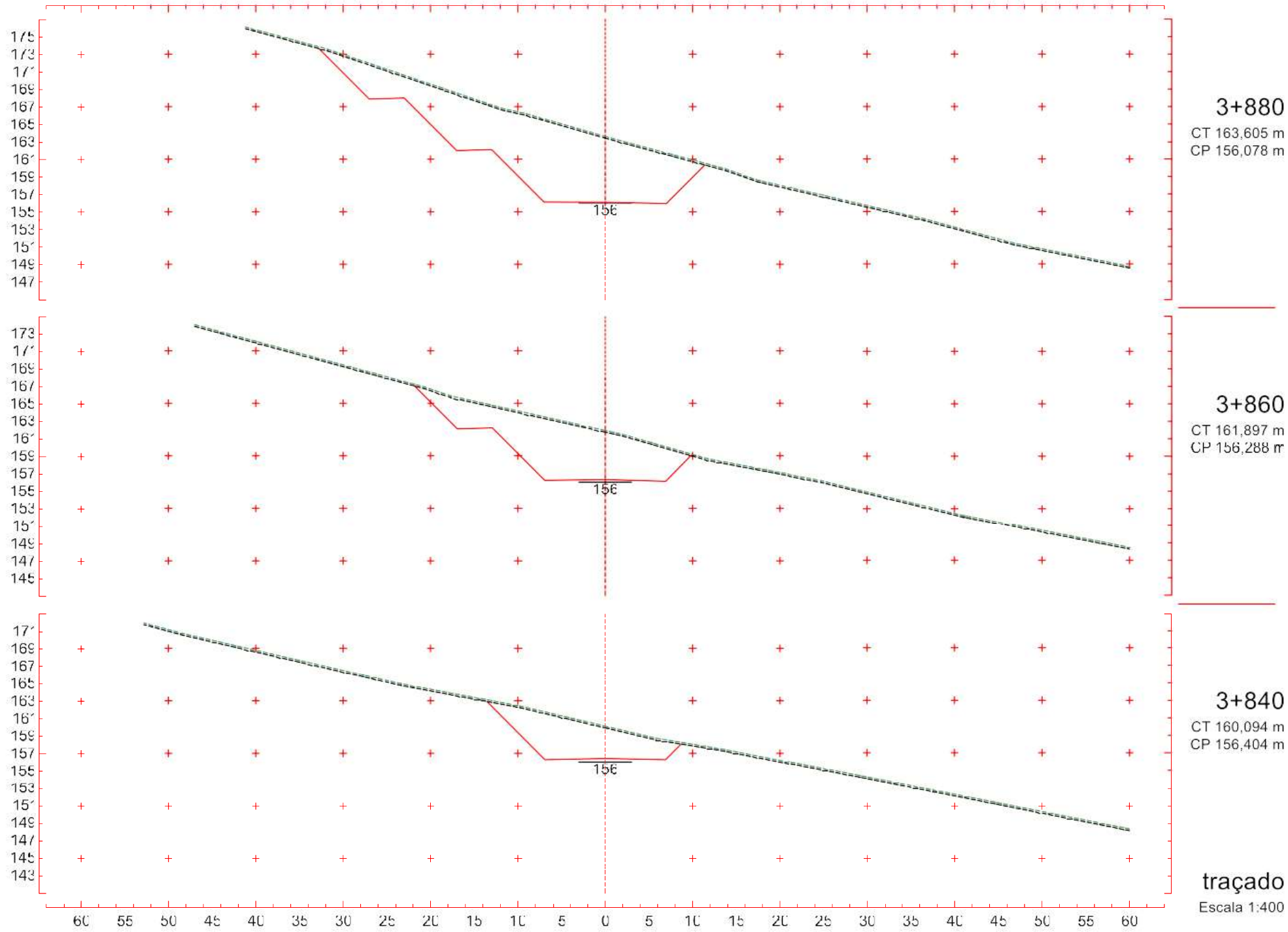

3+580
CT 146,355 m
CP 153,157 m
3+560
CT 147,240 m
CP 153,224 m
3+540
CT 148,186 m
CP 153,422 m
traçado
Escala 1:400
153
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

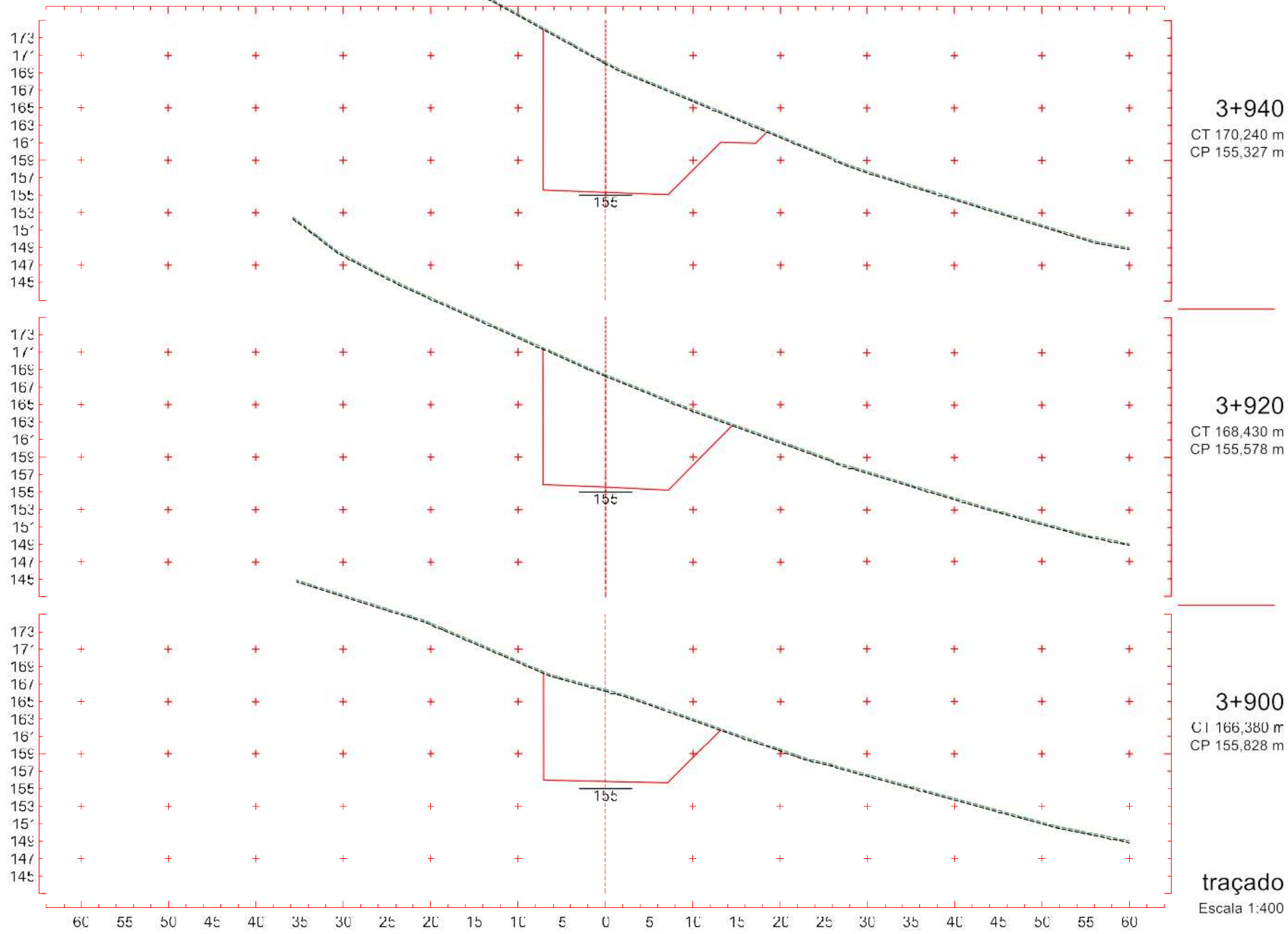

3+640
CT 147,552 m
CP 153,740 m
3+620
CT 145,867 m
CP 153,417 m
3+600
CT 145,833 m
CP 153,222 m
traçado
Escala 1:400

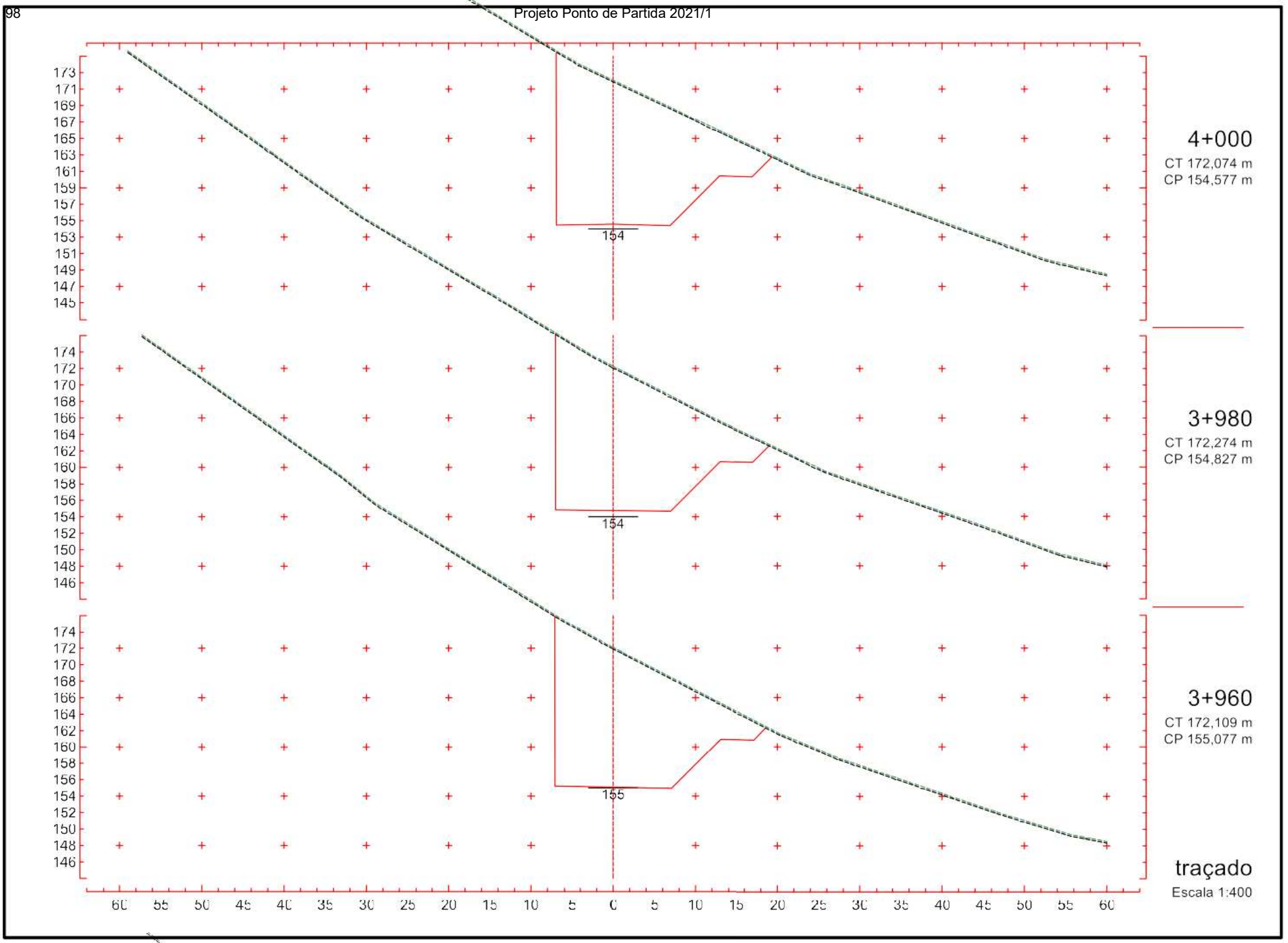

3+700
CT 151,630 m
CP 154,834 m
154
3+680
CT 151,239 m
CP 154,469 m
154
3+660
CT 149,265 m
CP 154,105 m
154
traçado
Escala 1:400

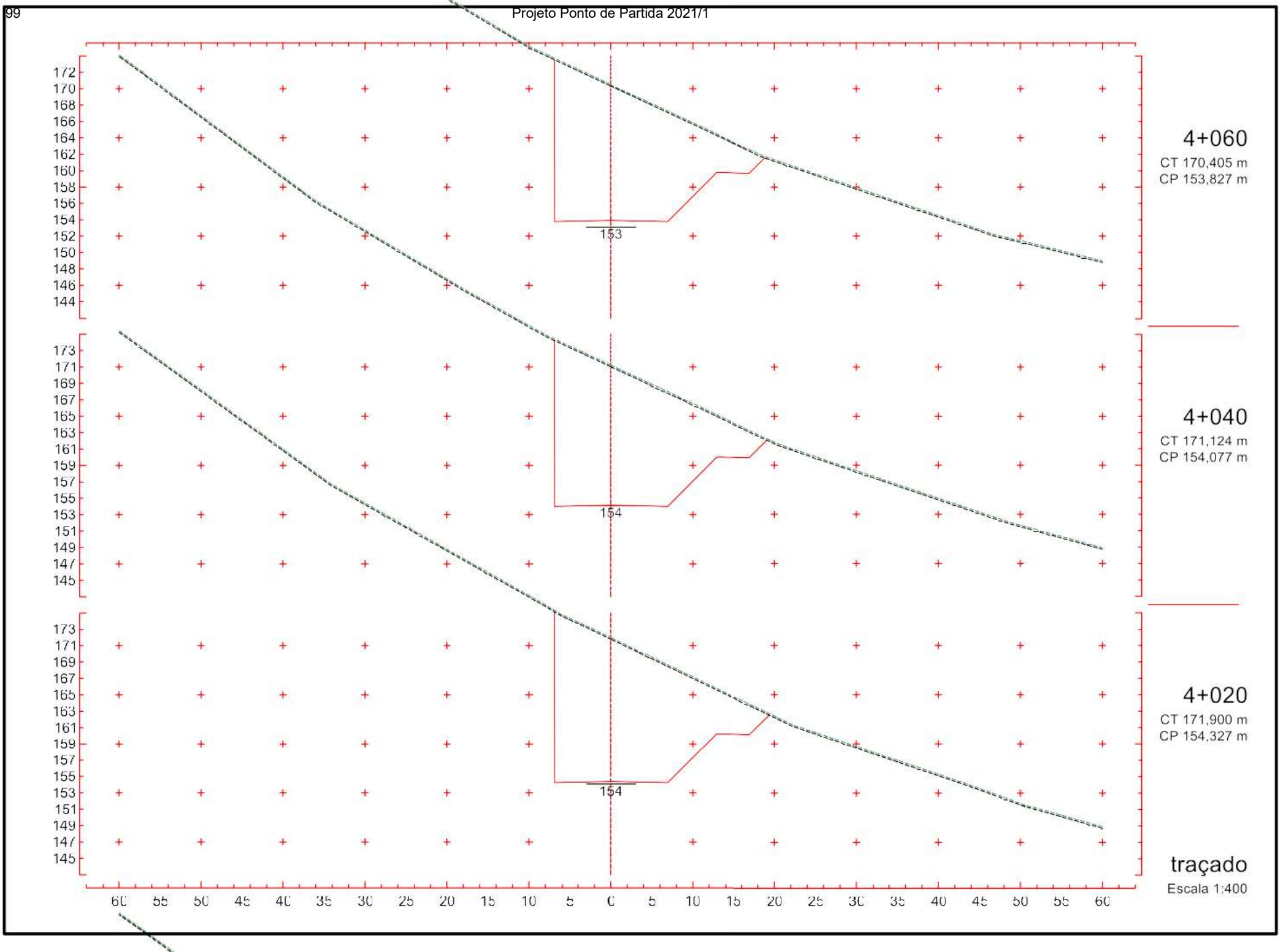

3+760
CT 155,551 m
CP 155,914 m
3+740
CT 154,170 m
CP 155,563 m
3+720
CT 152,666 m
CP 155,199 m
traçado
Escala 1:400


3+820
CT 158,672 m
CP 156,424 m
3+800
CT 157,576 m
CP 156,349 m
3+780
CT 156,726 m
CP 156,179 m
traçado
Escala 1:400

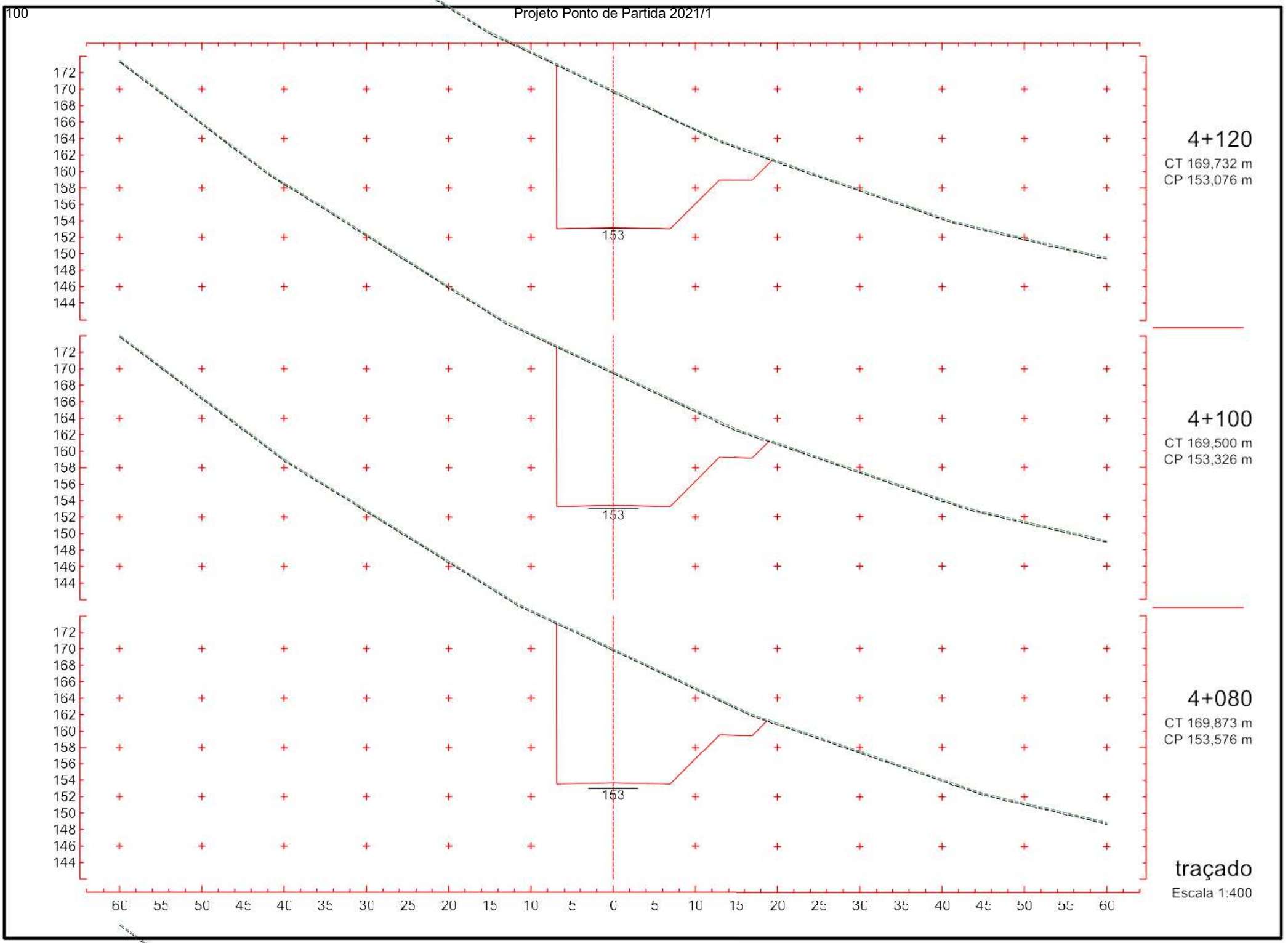

3+880
CT 163,605 m
CP 156,078 m
3+860
CT 161,897 m
CP 156,288 m
3+840
CT 160,094 m
CP 156,404 m
traçado
Escala 1:400

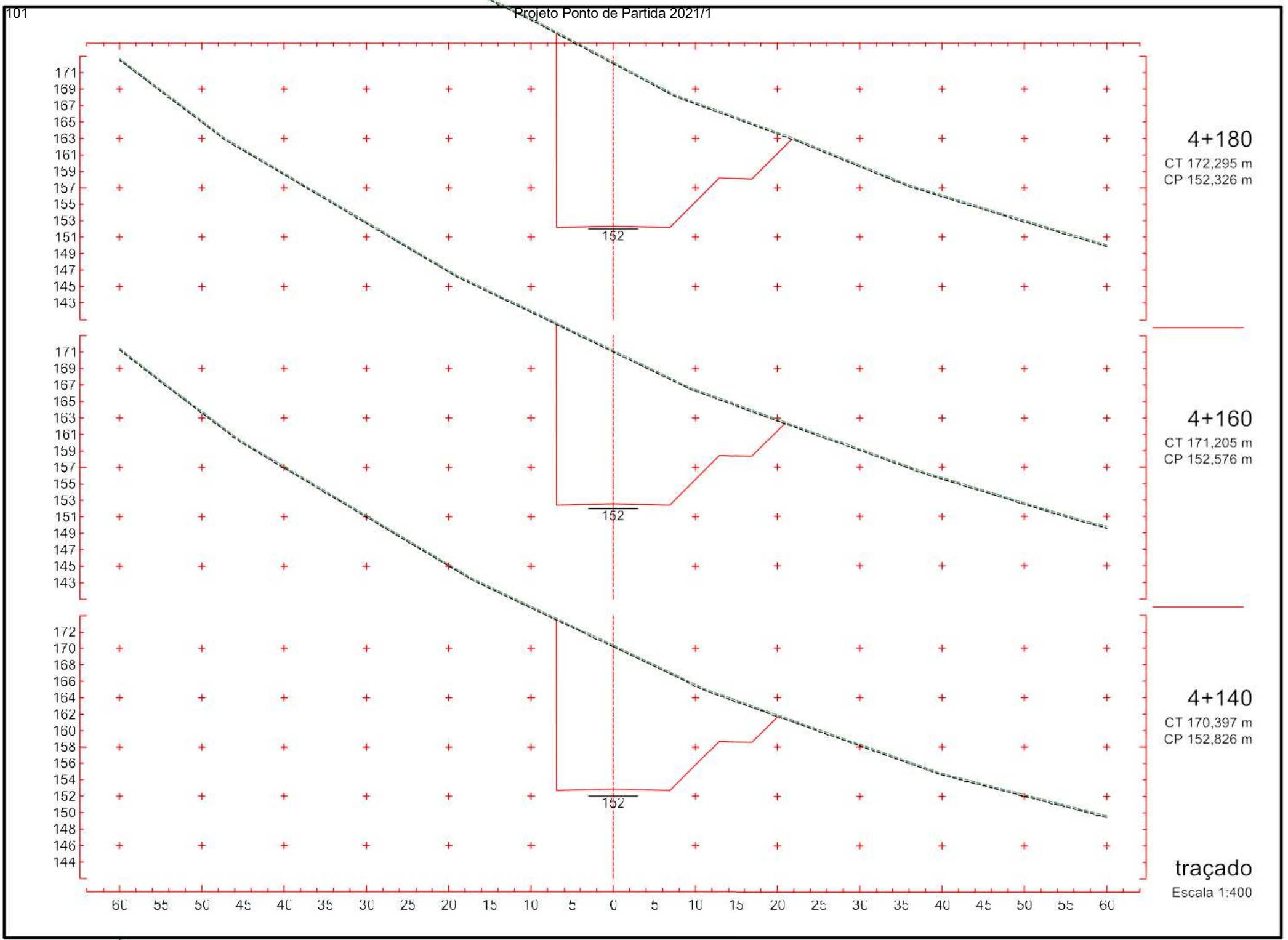

3+940
CT 170,240 m
CP 155,327 m
3+920
CT 168,430 m
CP 155,578 m
3+900
CT 166,380 m
CP 155,828 m
traçado
Escala 1:400
155
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

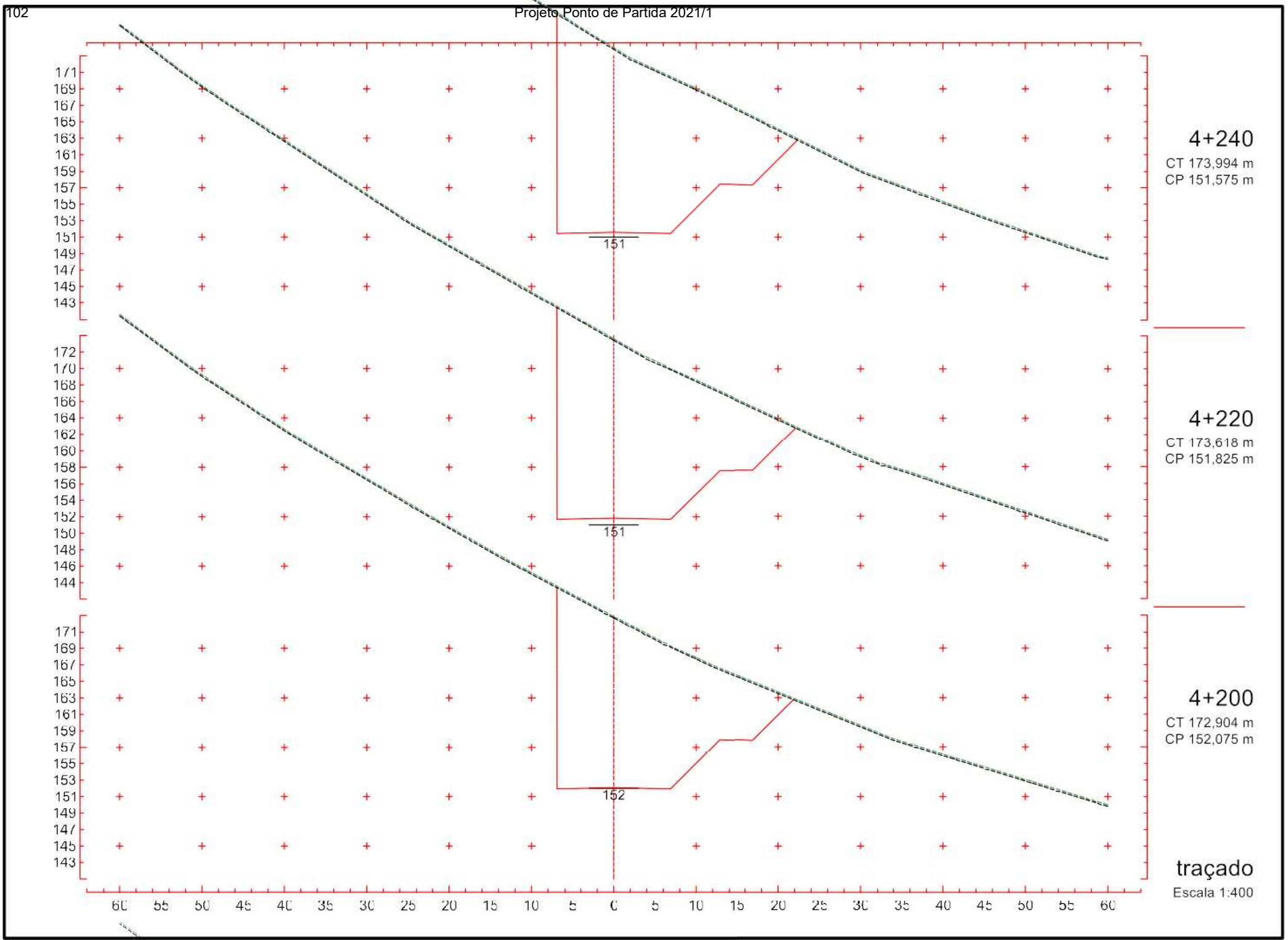

4+000
CT 172,074 m
CP 154,577 m
154
3+980
CT 172,274 m
CP 154,827 m
154
3+960
CT 172,109 m
CP 155,077 m
155
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

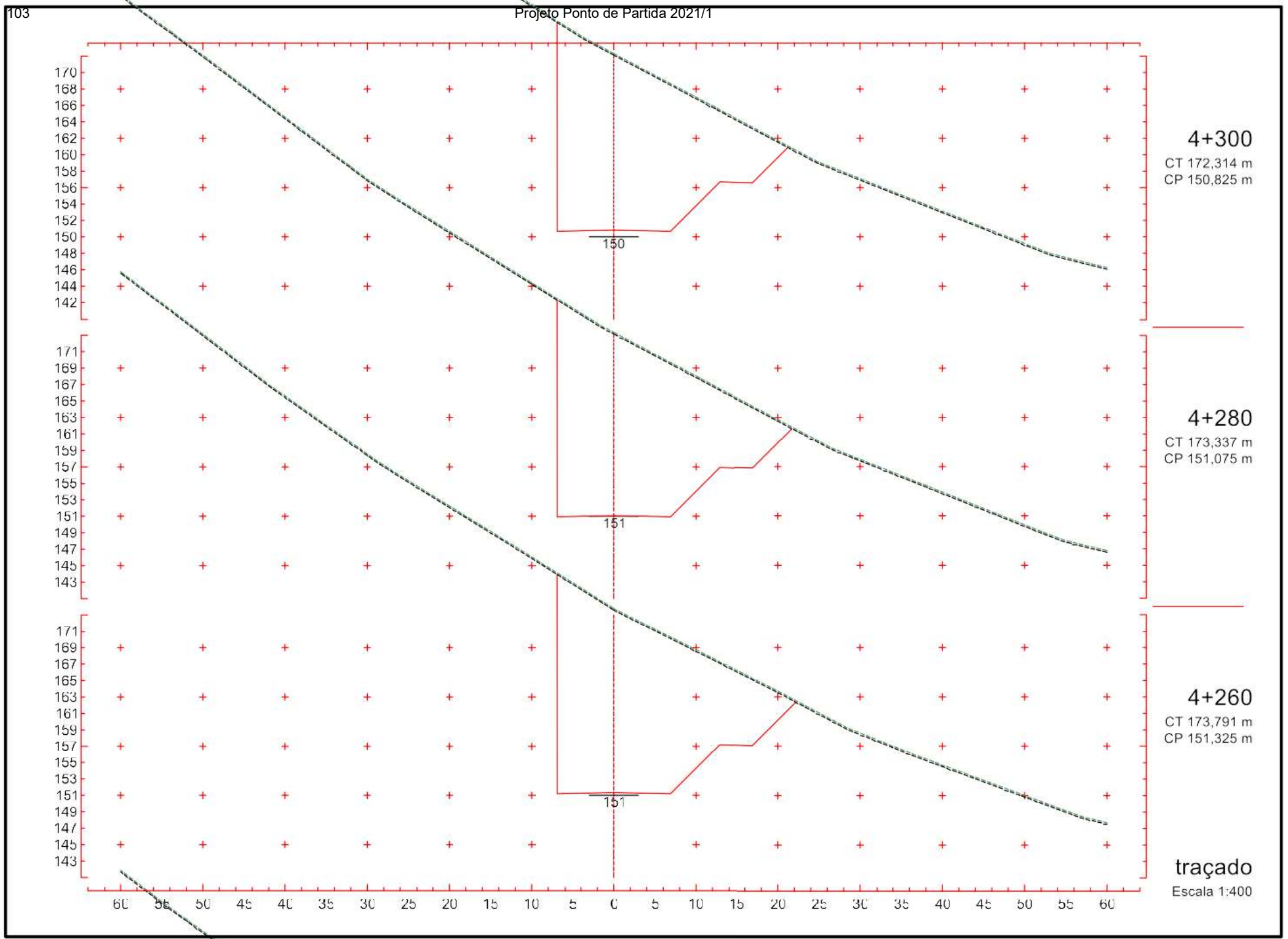

4+060
CT 170,405 m
CP 153,827 m
153
4+040
CT 171,124 m
CP 154,077 m
154
4+020
CT 171,900 m
CP 154,327 m
154
traçado
Escala 1:400

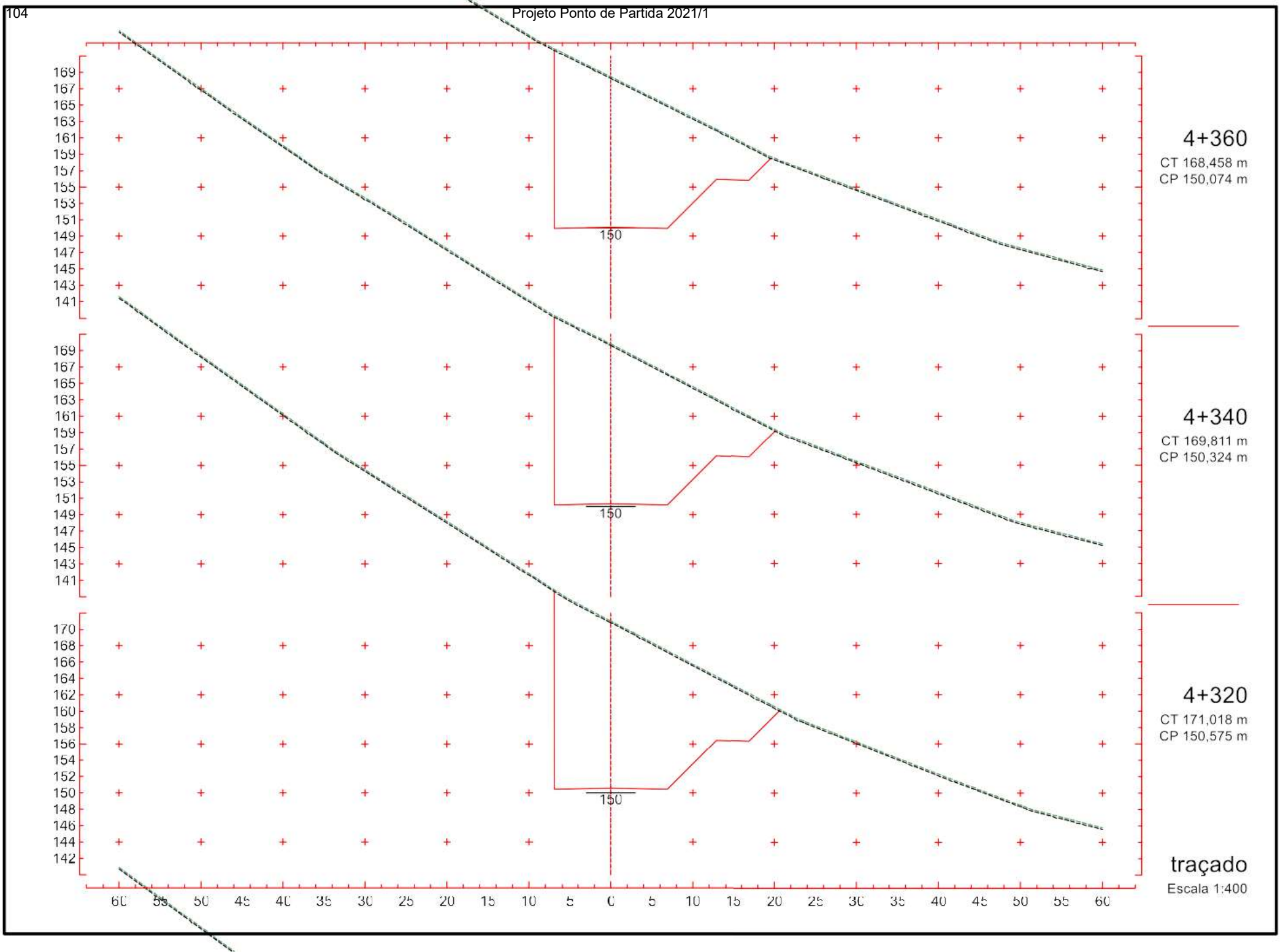
Projeto Ponto de Partida 2021/1

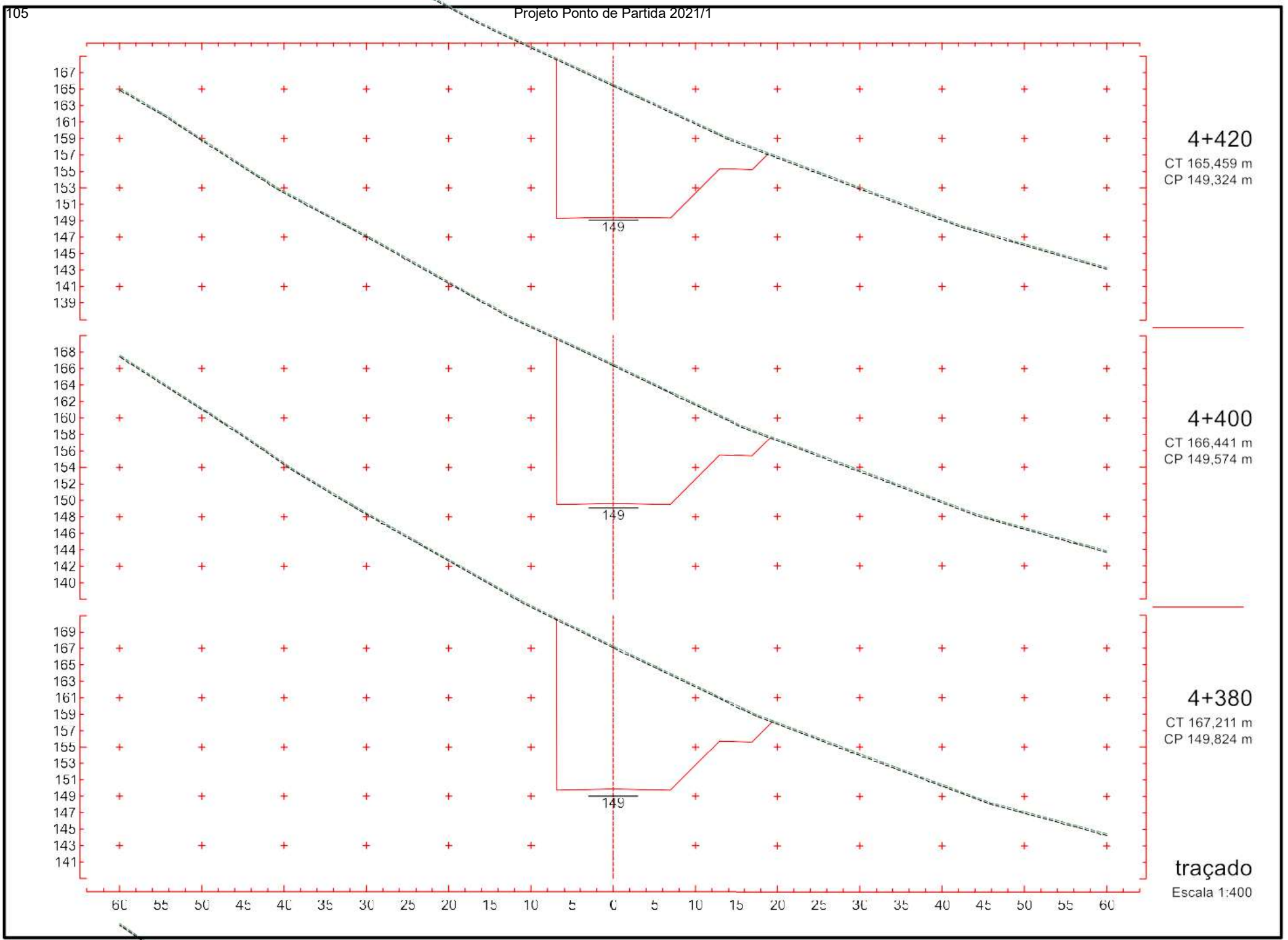



4+180
CT 172,295 m
CP 152,326 m
4+160
CT 171,205 m
CP 152,576 m
4+140
CT 170,397 m
CP 152,826 m
152
152
152
traçado
Escala 1:400

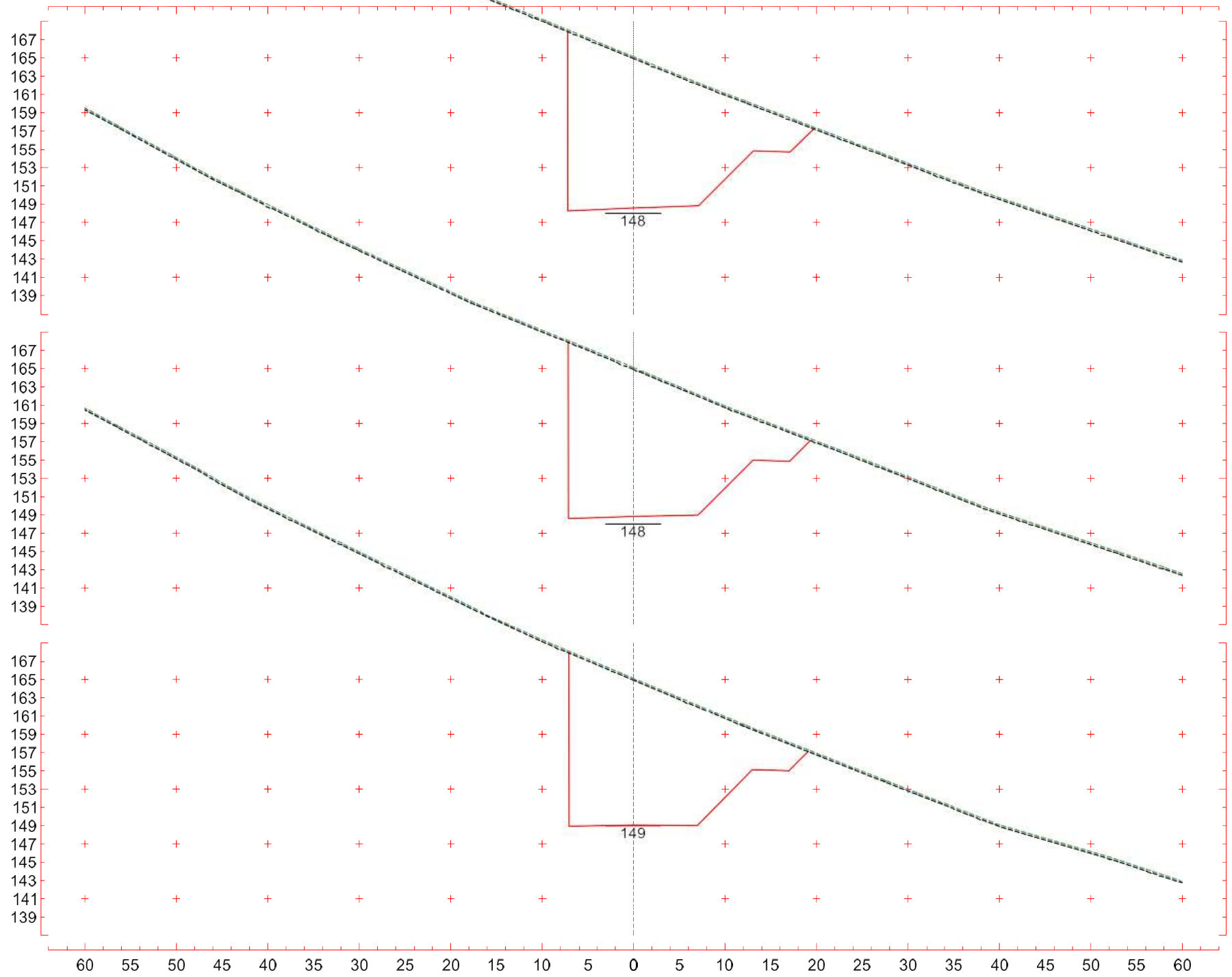

171
169
167
165
163
161
159
157
155
153
151
149
147
145
143
151
4+240
CT 173,994 m
CP 151,575 m
172
170
168
166
164
162
160
158
156
154
152
150
148
146
144
151
4+220
CT 173,618 m
CP 151,825 m
171
169
167
165
163
161
159
157
155
153
151
149
147
145
143
152
4+200
CT 172,904 m
CP 152,075 m
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60
traçado
Escala 1:400


4+300
CT 172,314 m
CP 150,825 m
150
4+280
CT 173,337 m
CP 151,075 m
151
4+260
CT 173,791 m
CP 151,325 m
151
traçado
Escala 1:400


4+360
CT 168,458 m
CP 150,074 m
4+340
CT 169,811 m
CP 150,324 m
4+320
CT 171,018 m
CP 150,575 m
traçado
Escala 1:400
150
150
150


4+420
CT 165,459 m
CP 149,324 m
4+400
CT 166,441 m
CP 149,574 m
4+380
CT 167,211 m
CP 149,824 m
traçado
Escala 1:400
149
149
149

Projeto Ponto de Partida 2021/1



4+480

CT 165,105 m
CP 148,573 m

4+460

CT 165,124 m
CP 148,824 m

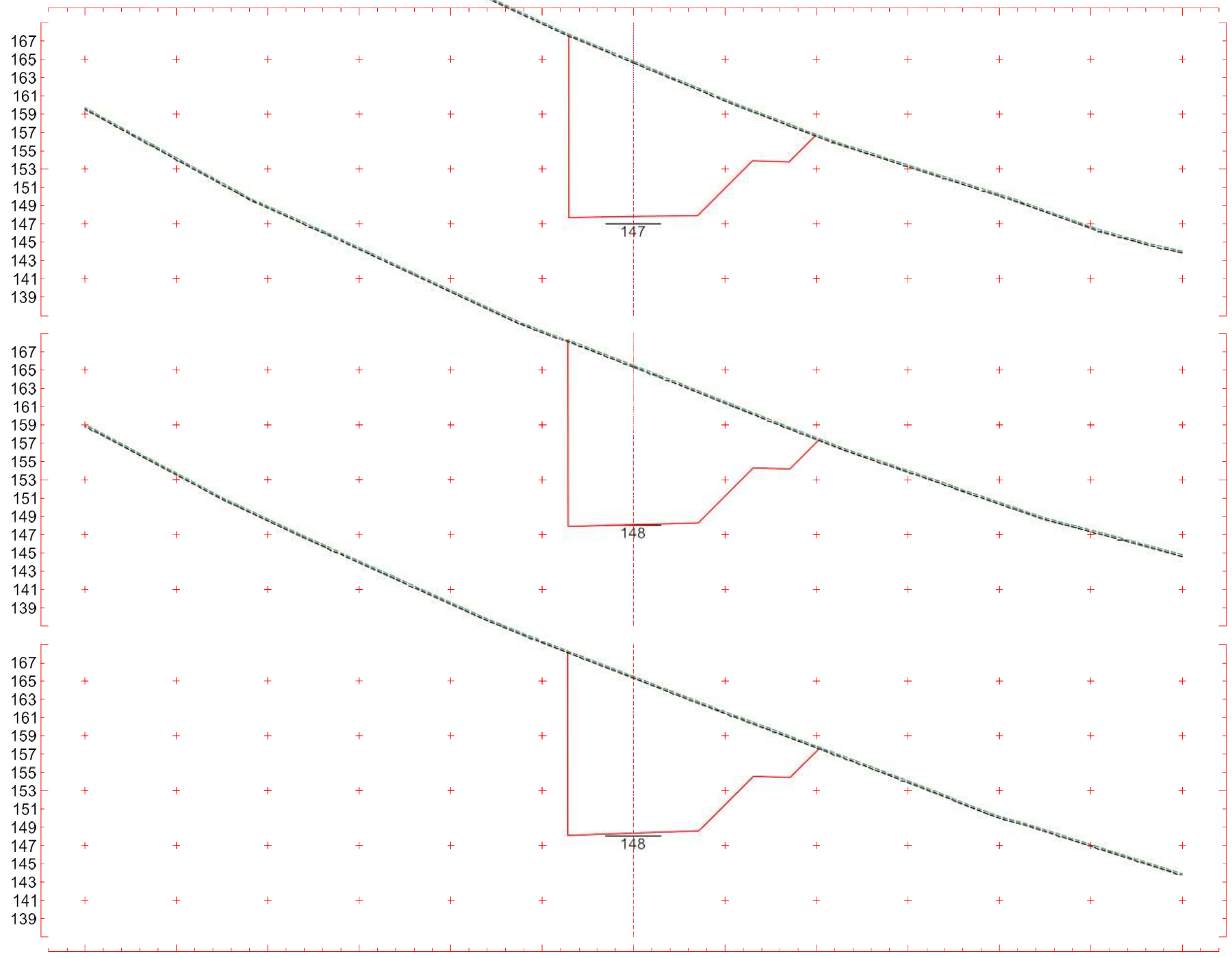
4+440

CT 165,135 m
CP 149,074 m

traçado

Escala 1:400

Projeto Ponto de Partida 2021/1



4+540

CT 164,785 m
CP 147,823 m

4+520

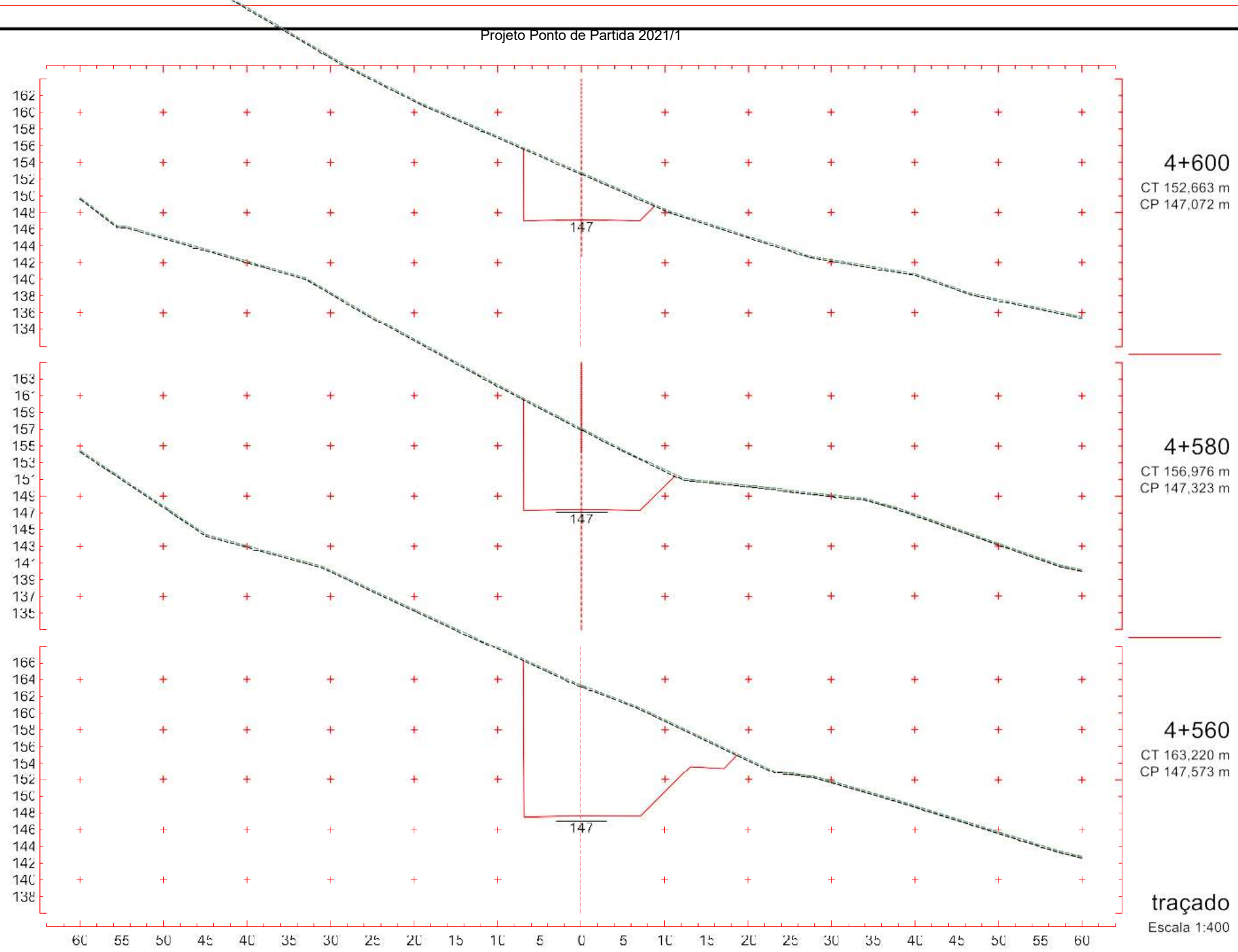
CT 165,474 m
CP 148,073 m

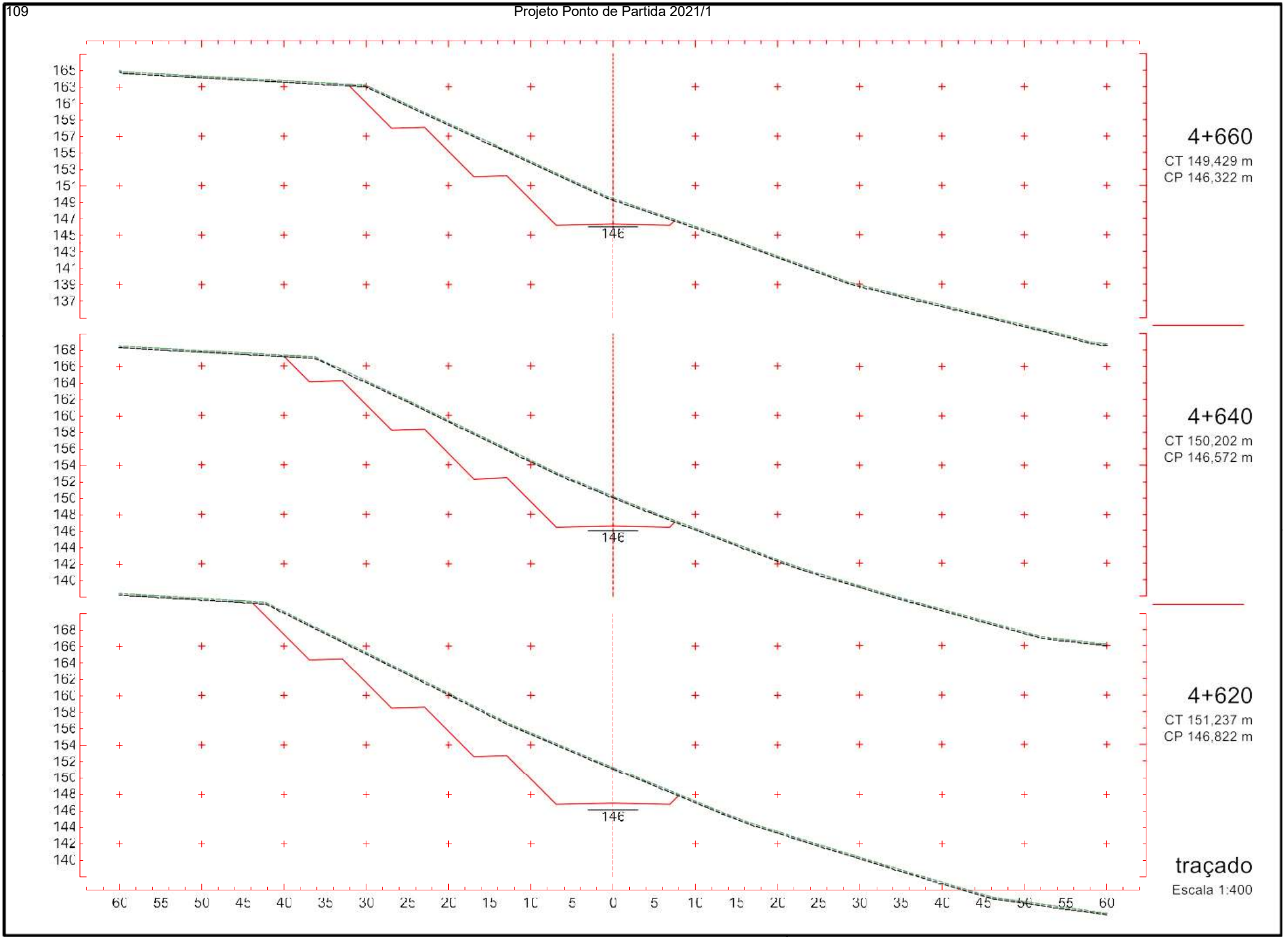
4+500

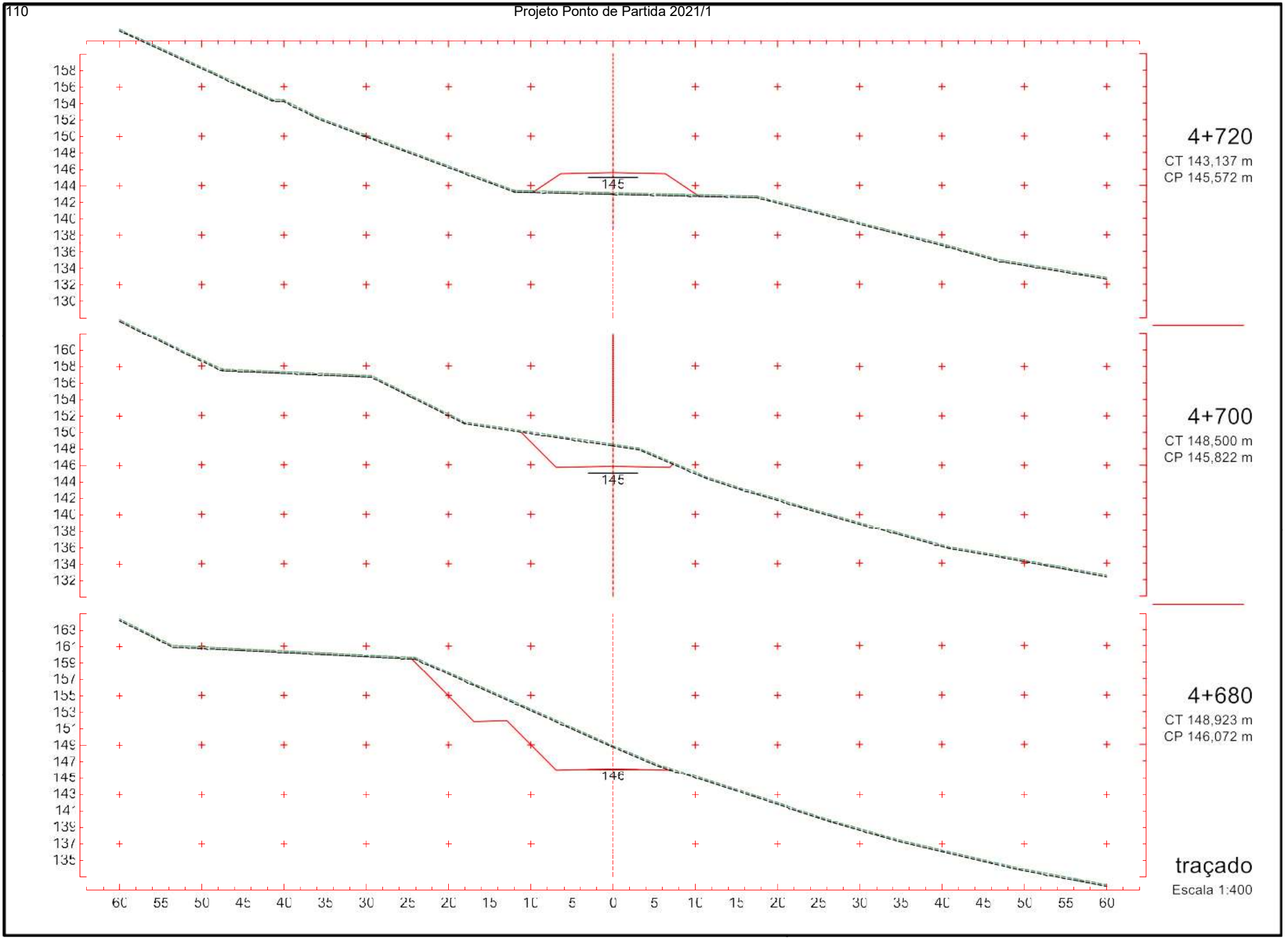
CT 165,535 m
CP 148,323 m

traçado

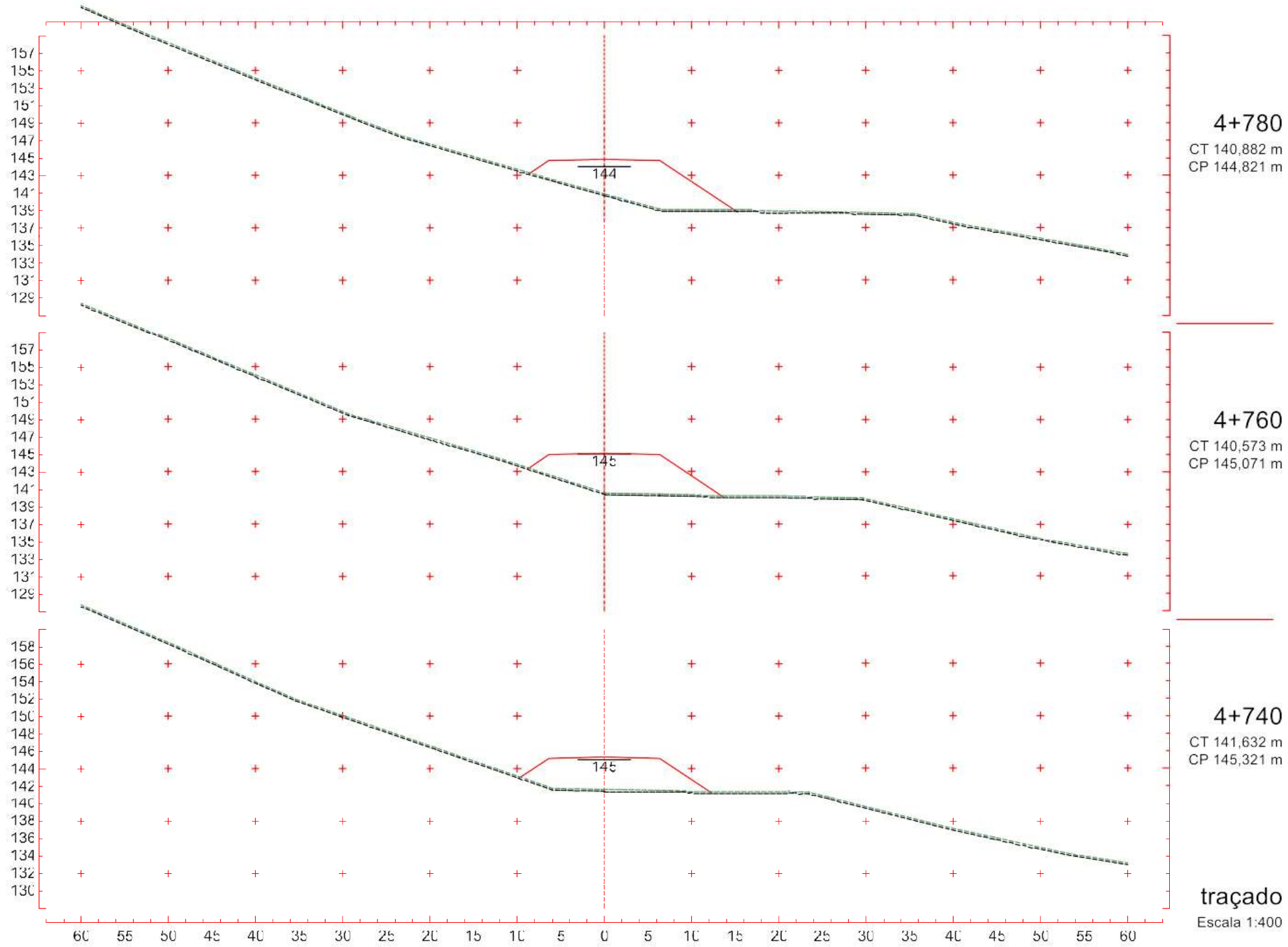
Escala 1:400

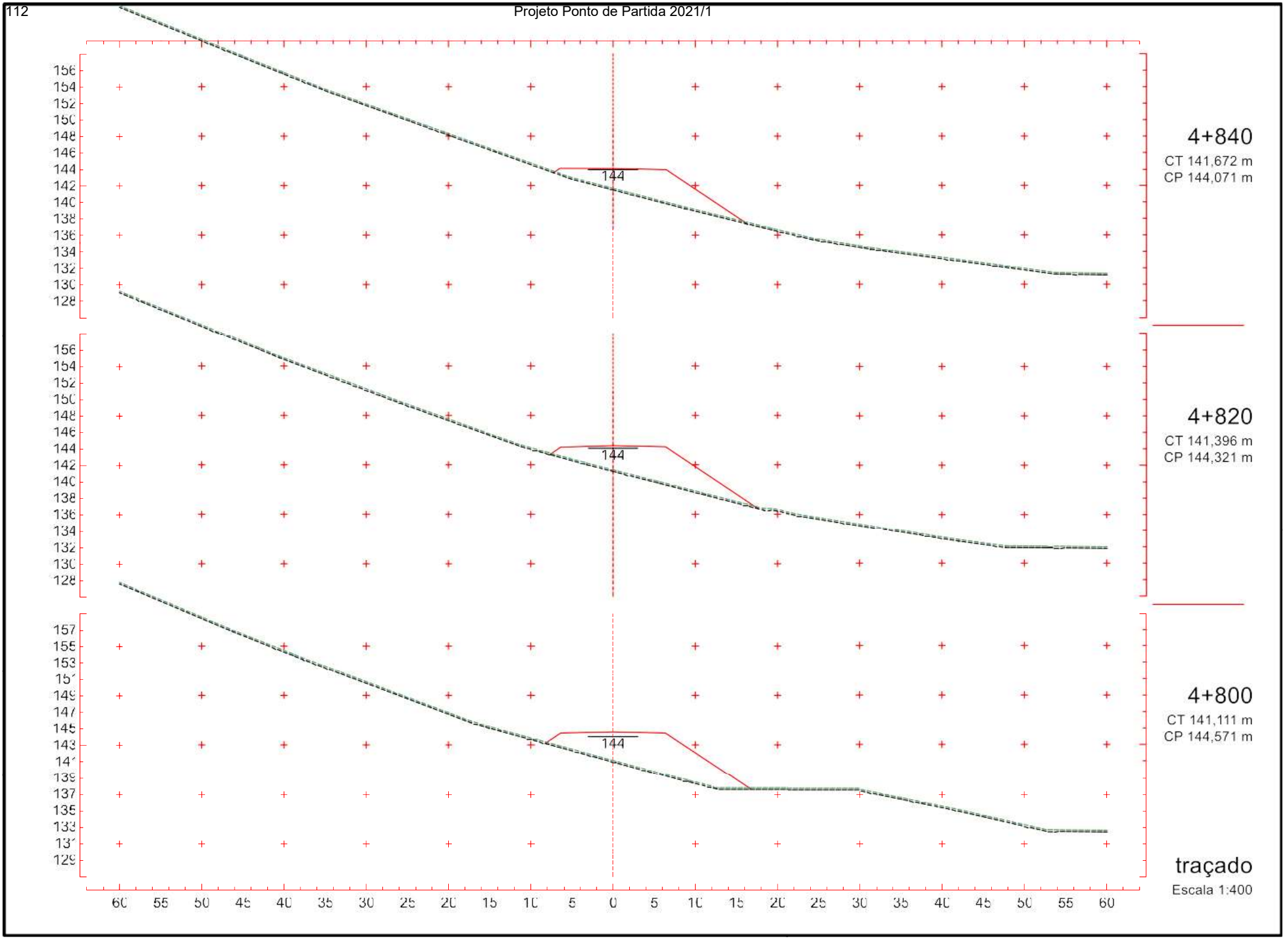

4+600
CT 152,663 m
CP 147,072 m
147
4+580
CT 156,976 m
CP 147,323 m
147
4+560
CT 163,220 m
CP 147,573 m
147
traçado
Escala 1:400


4+660
CT 149,429 m
CP 146,322 m
4+640
CT 150,202 m
CP 146,572 m
4+620
CT 151,237 m
CP 146,822 m
traçado
Escala 1:400

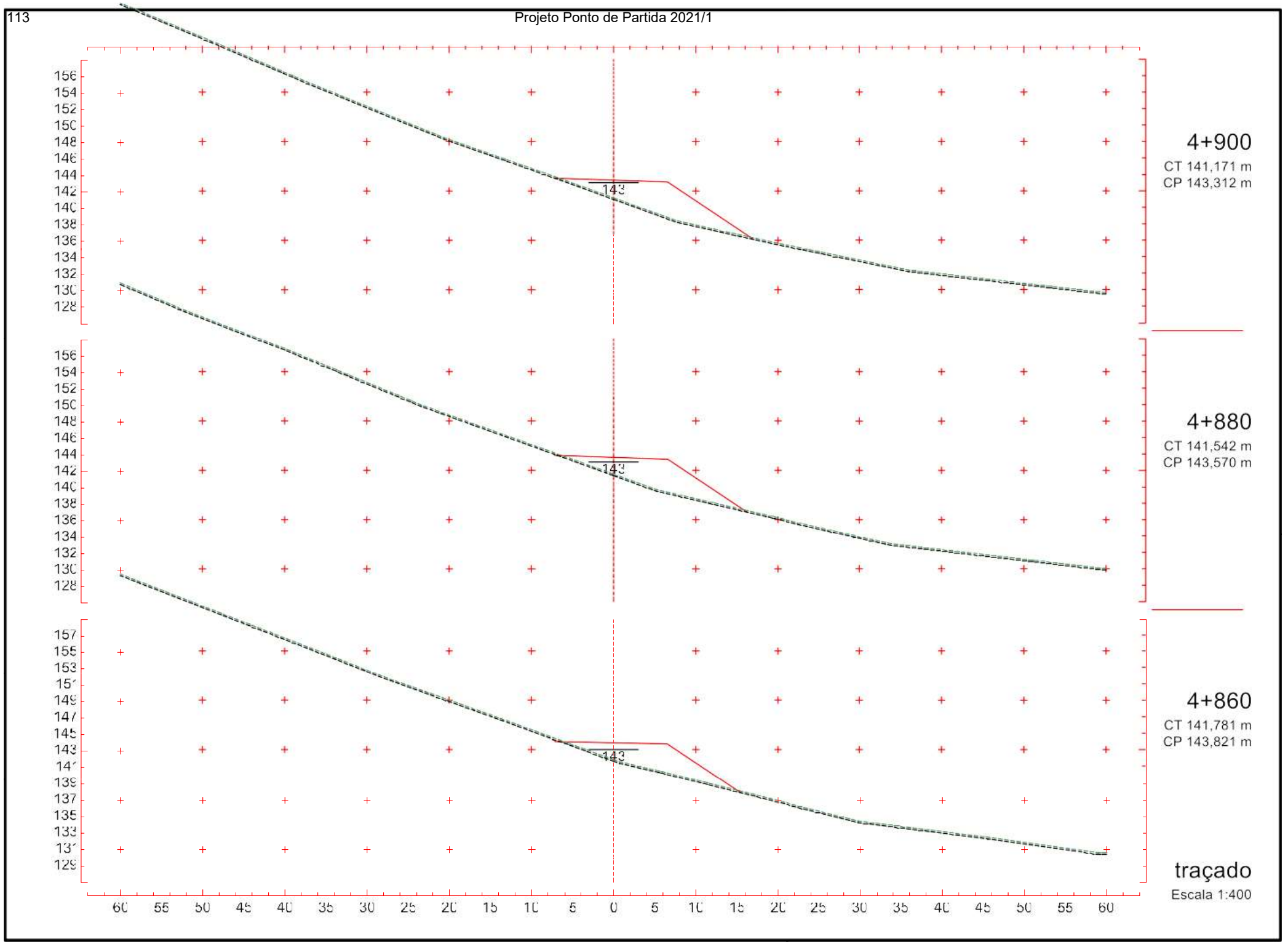

4+720
CT 143,137 m
CP 145,572 m
4+700
CT 148,500 m
CP 145,822 m
4+680
CT 148,923 m
CP 146,072 m
traçado
Escala 1:400

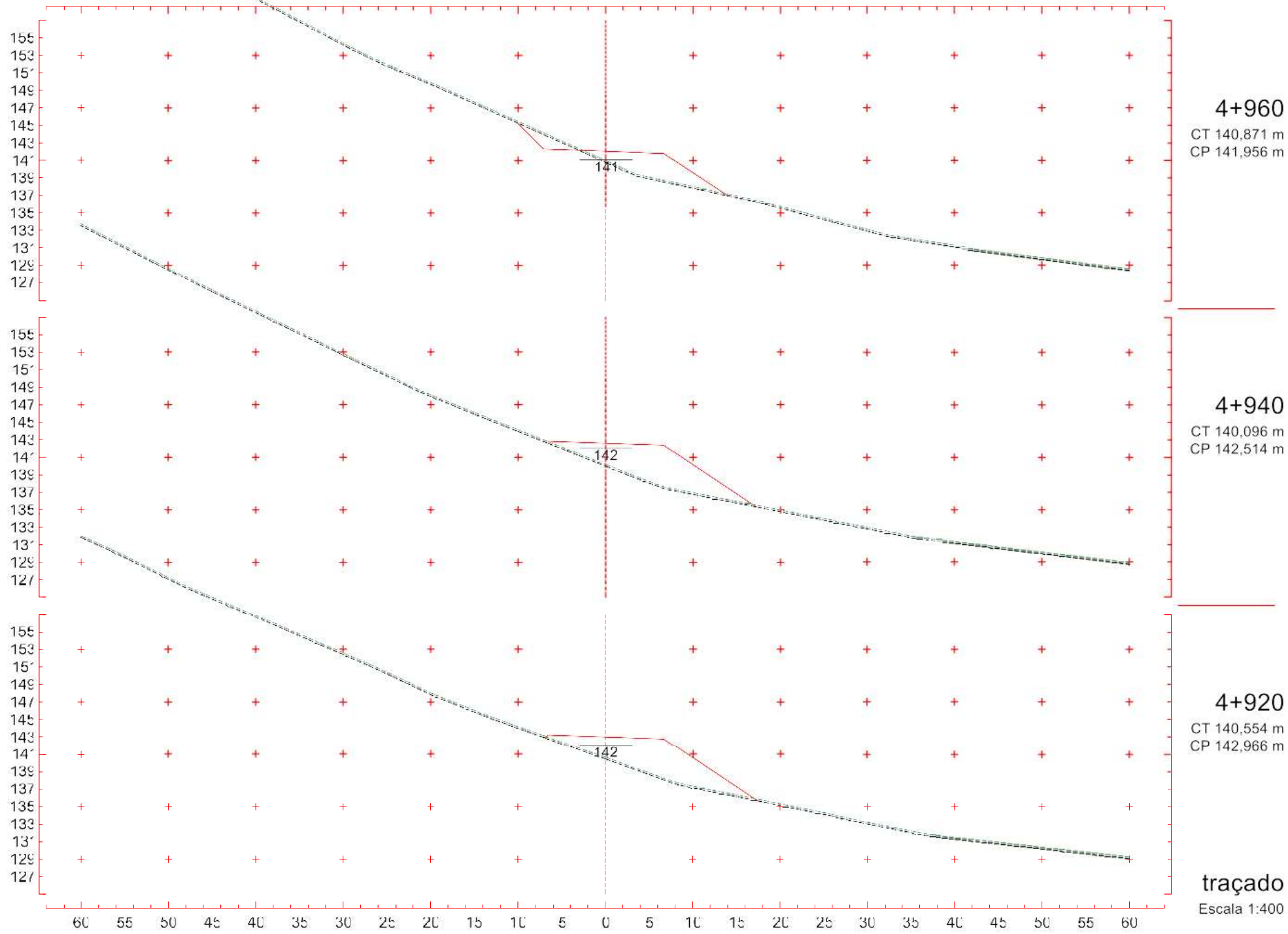
Projeto Ponto de Partida 2021/1



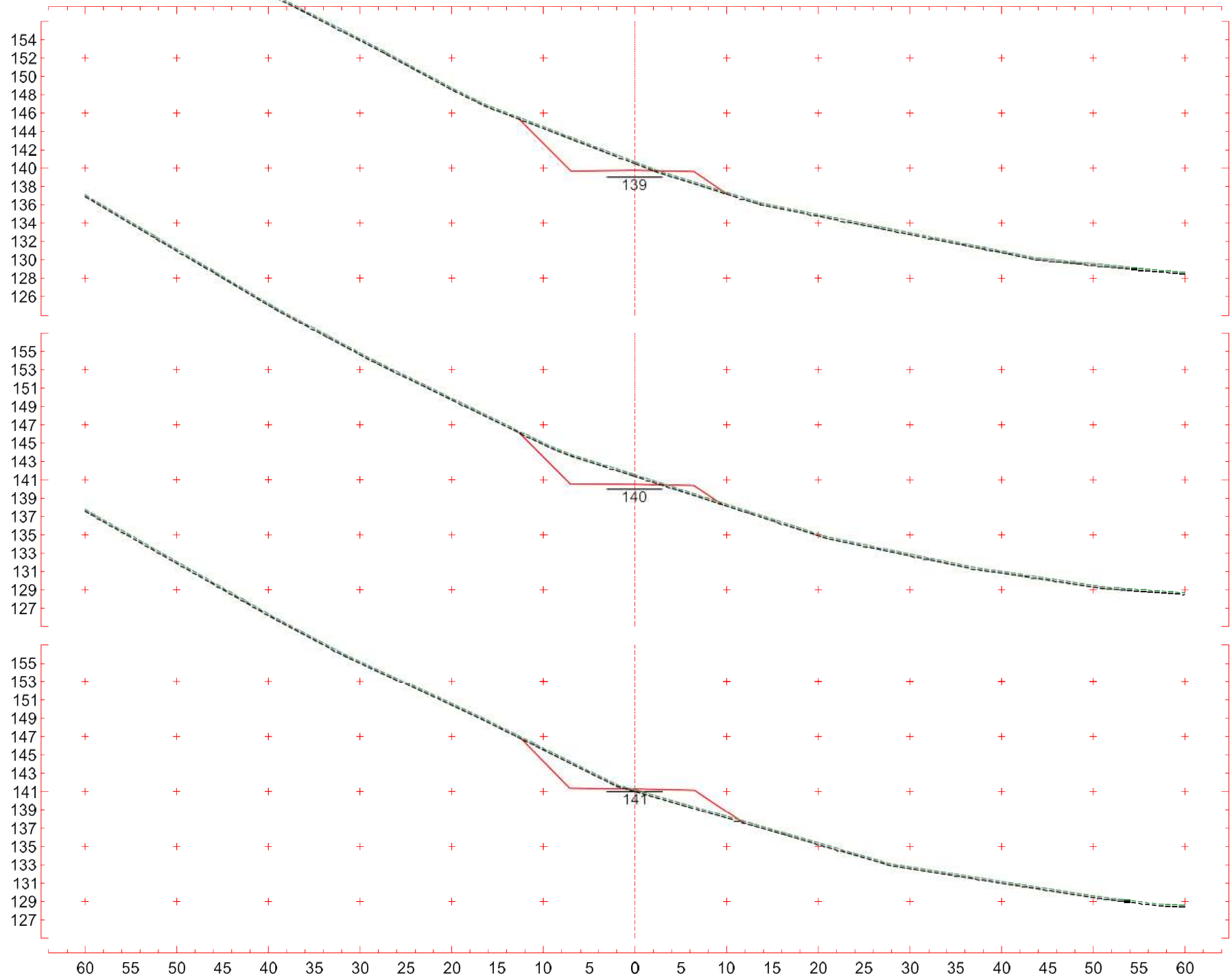

4+840
CT 141,672 m
CP 144,071 m
4+820
CT 141,396 m
CP 144,321 m
4+800
CT 141,111 m
CP 144,571 m
144
traçado
Escala 1:400

Projeto Ponto de Partida 2021/1




4+960
CT 140,871 m
CP 141,956 m
4+940
CT 140,096 m
CP 142,514 m
4+920
CT 140,554 m
CP 142,966 m
traçado
Escala 1:400

Projeto Ponto de Partida 2021/1



5+020

CT 140,687 m
CP 139,747 m

5+000

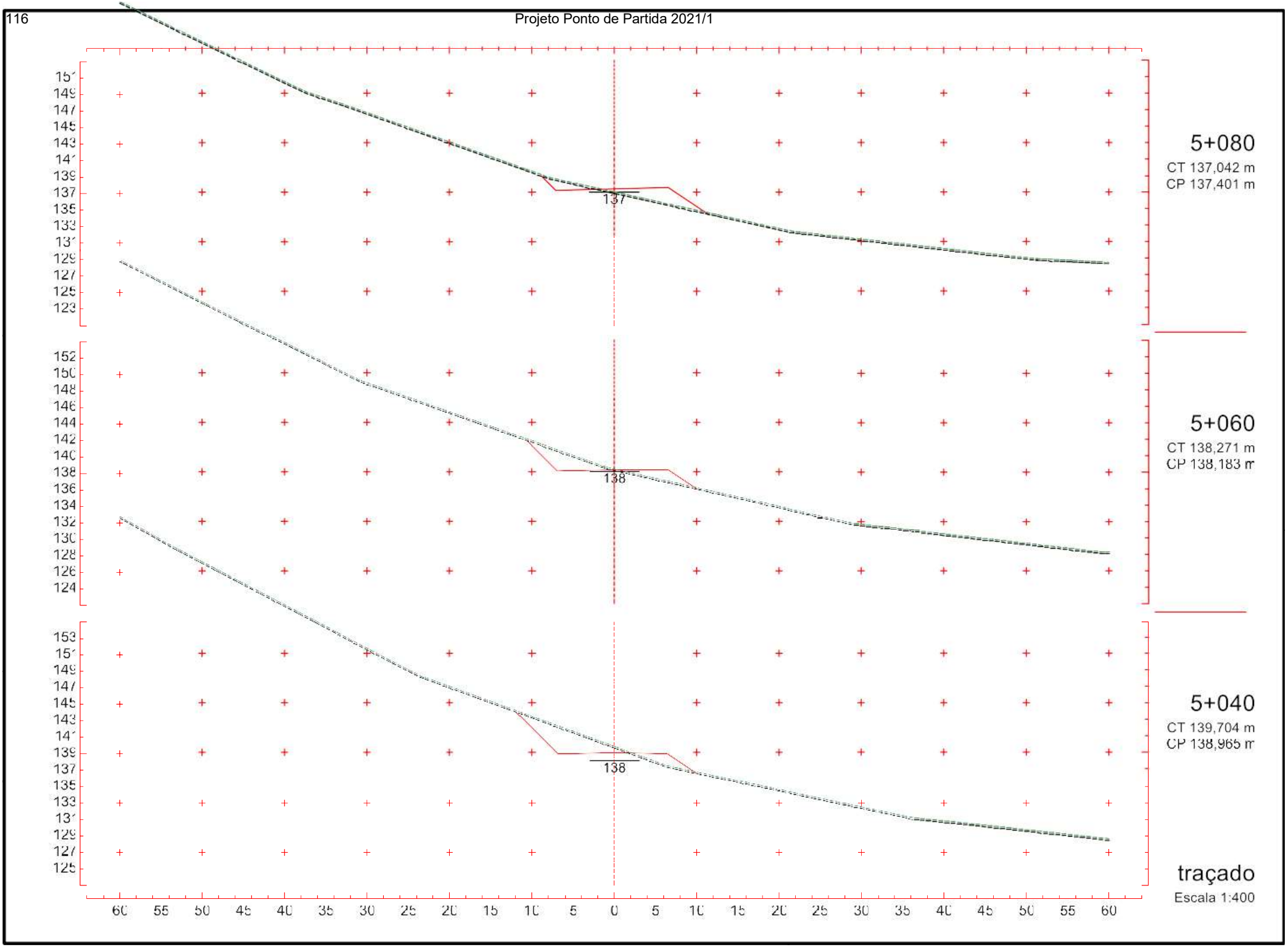
CT 141,607 m
CP 140,529 m

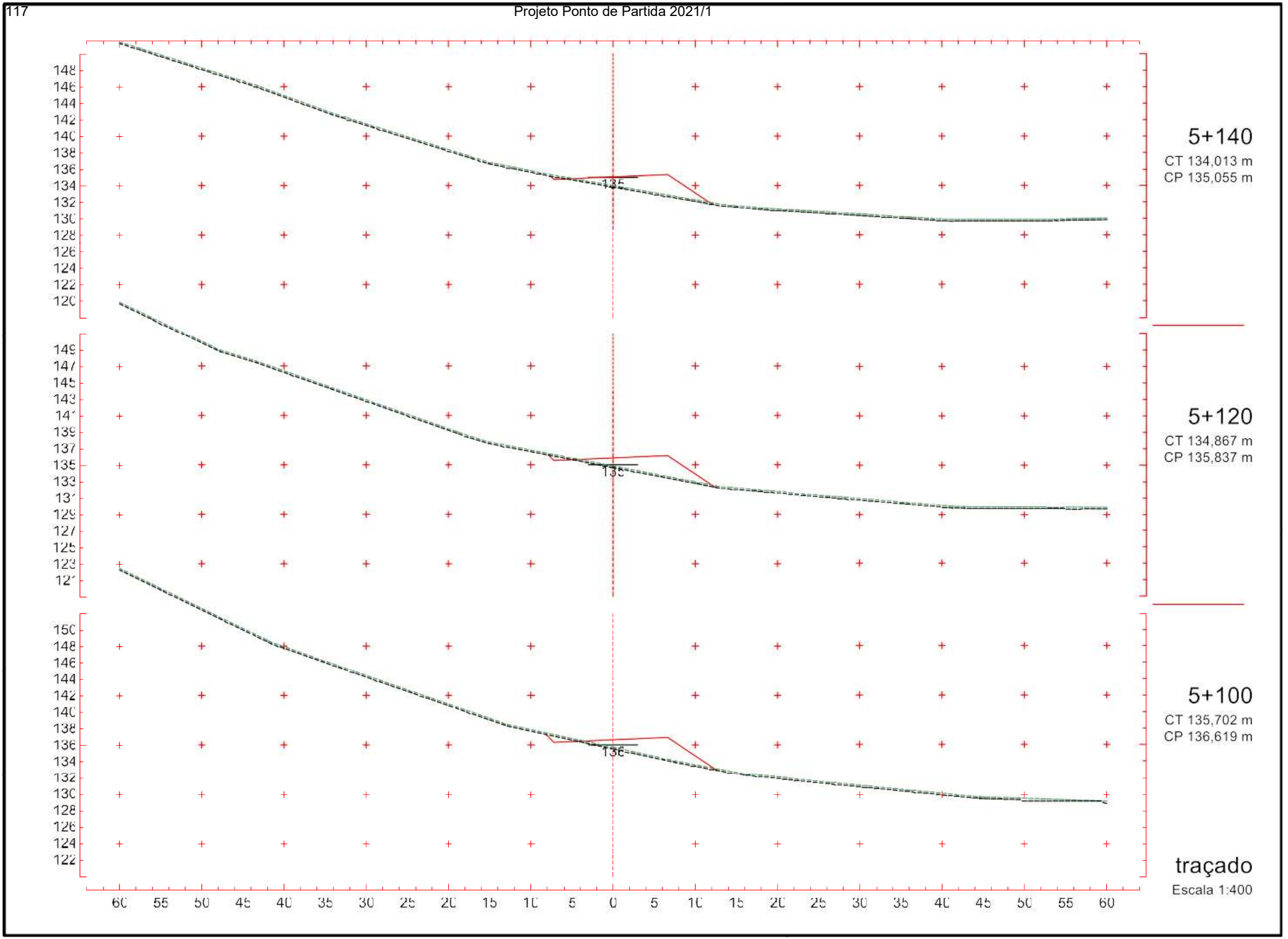
4+980

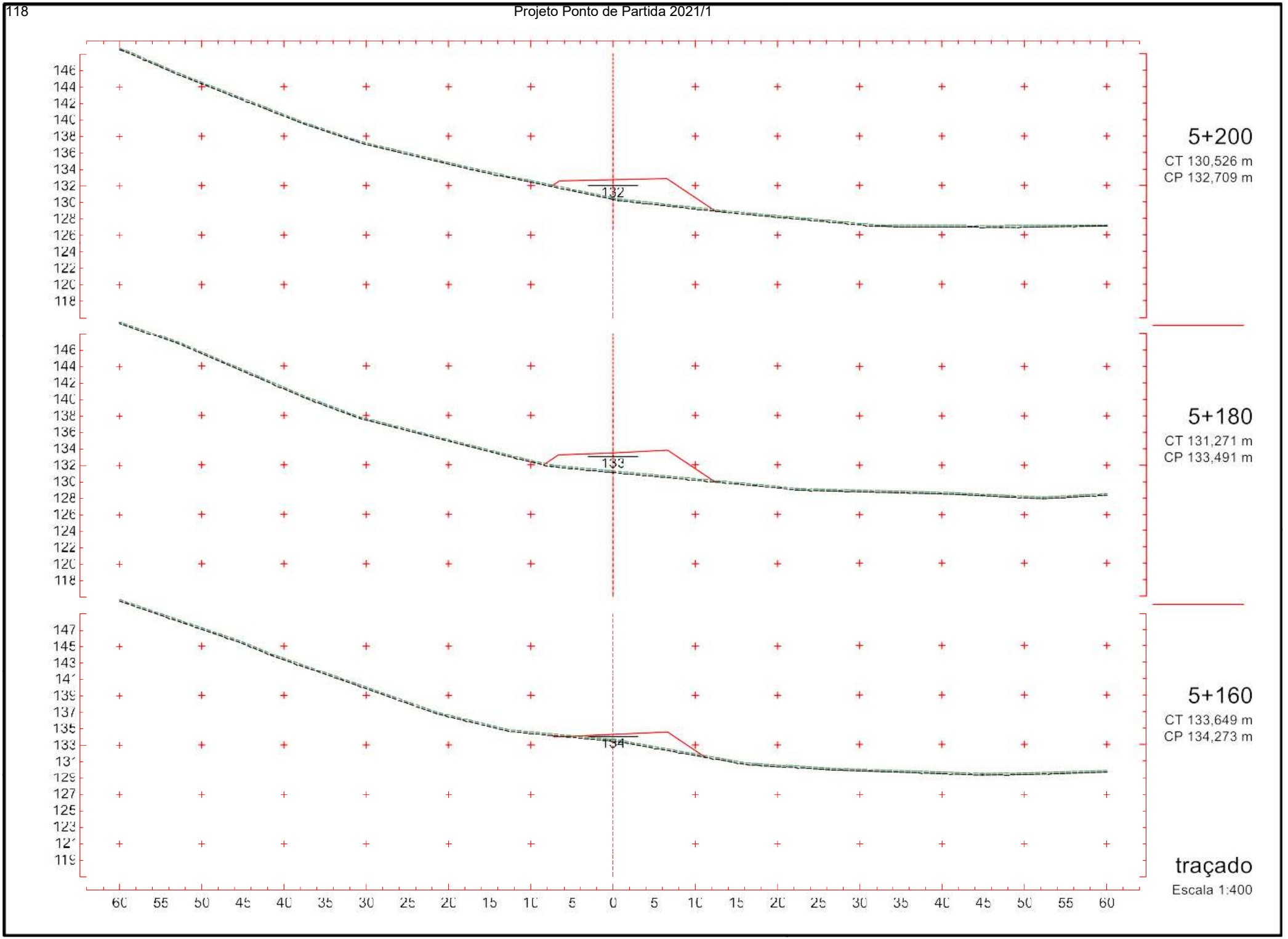
CT 141,214 m
CP 141,292 m

traçado

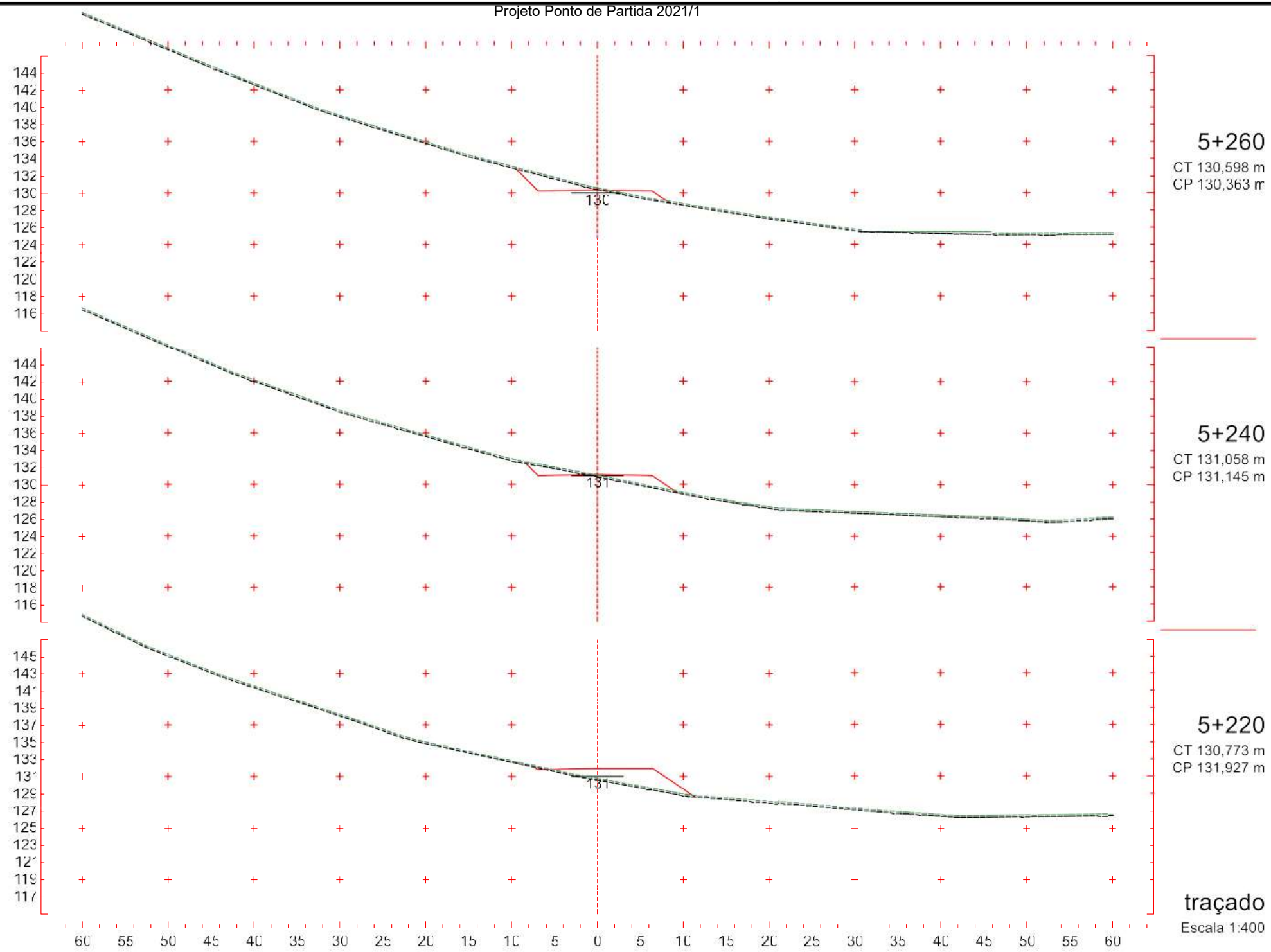
Escala 1:400


5+080
CT 137,042 m
CP 137,401 m
5+060
CT 138,271 m
CP 138,183 m
5+040
CT 139,704 m
CP 138,965 m
traçado
Escala 1:400

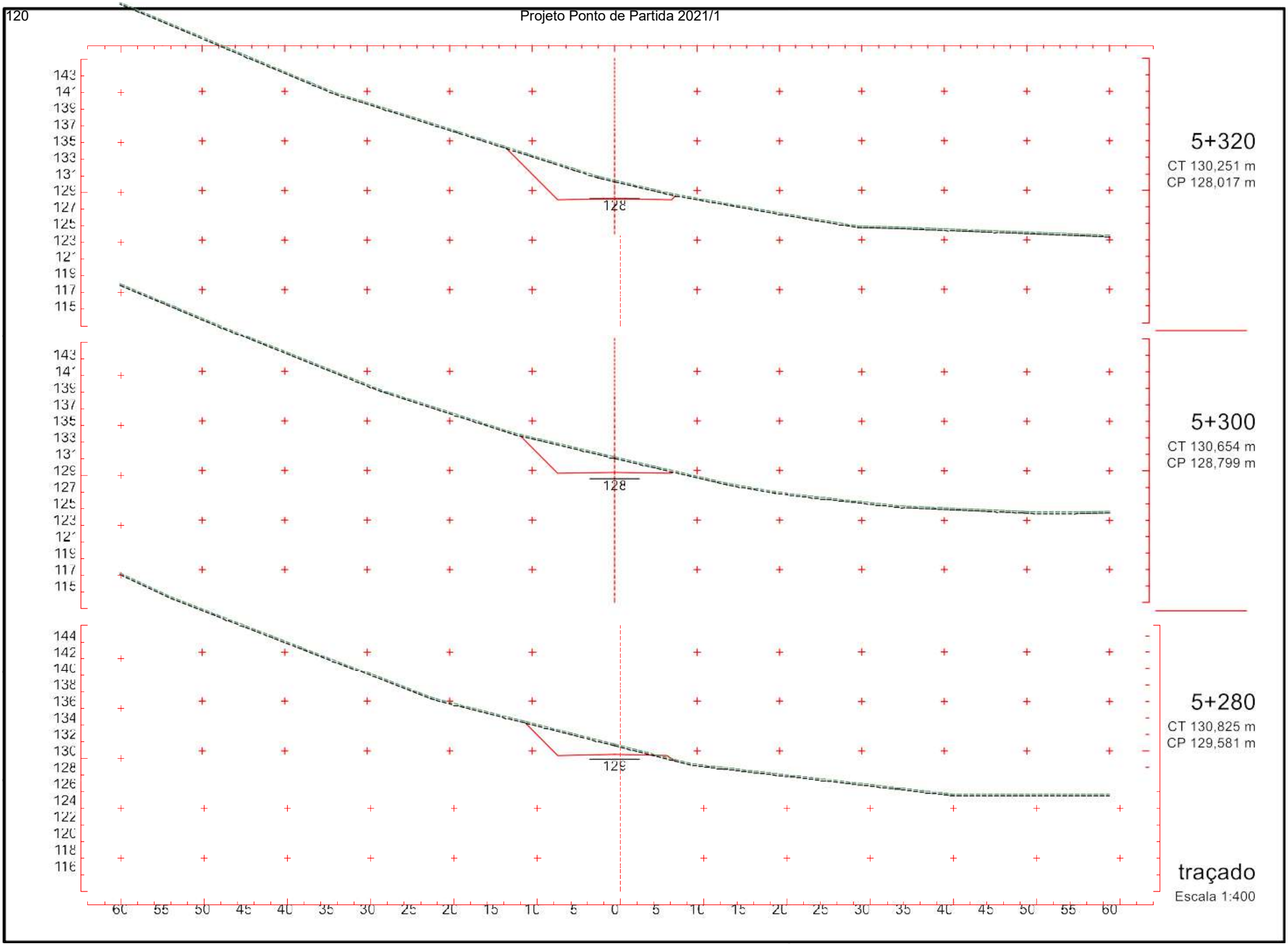

5+140
CT 134,013 m
CP 135,055 m
5+120
CT 134,867 m
CP 135,837 m
5+100
CT 135,702 m
CP 136,619 m
traçado
Escala 1:400


5+200
CT 130,526 m
CP 132,709 m
132
5+180
CT 131,271 m
CP 133,491 m
133
5+160
CT 133,649 m
CP 134,273 m
134
traçado
Escala 1:400

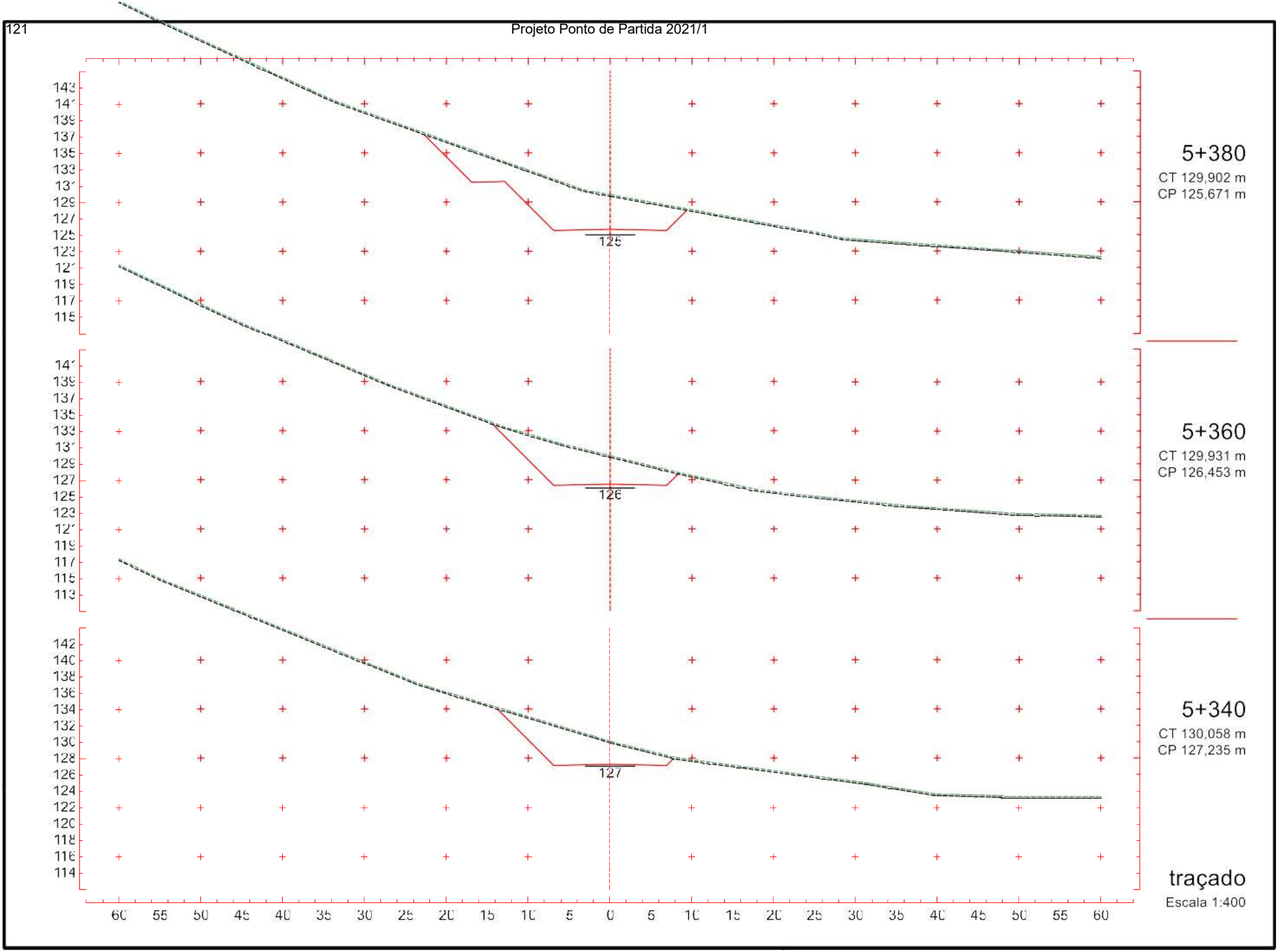
Projeto Ponto de Partida 2021/1



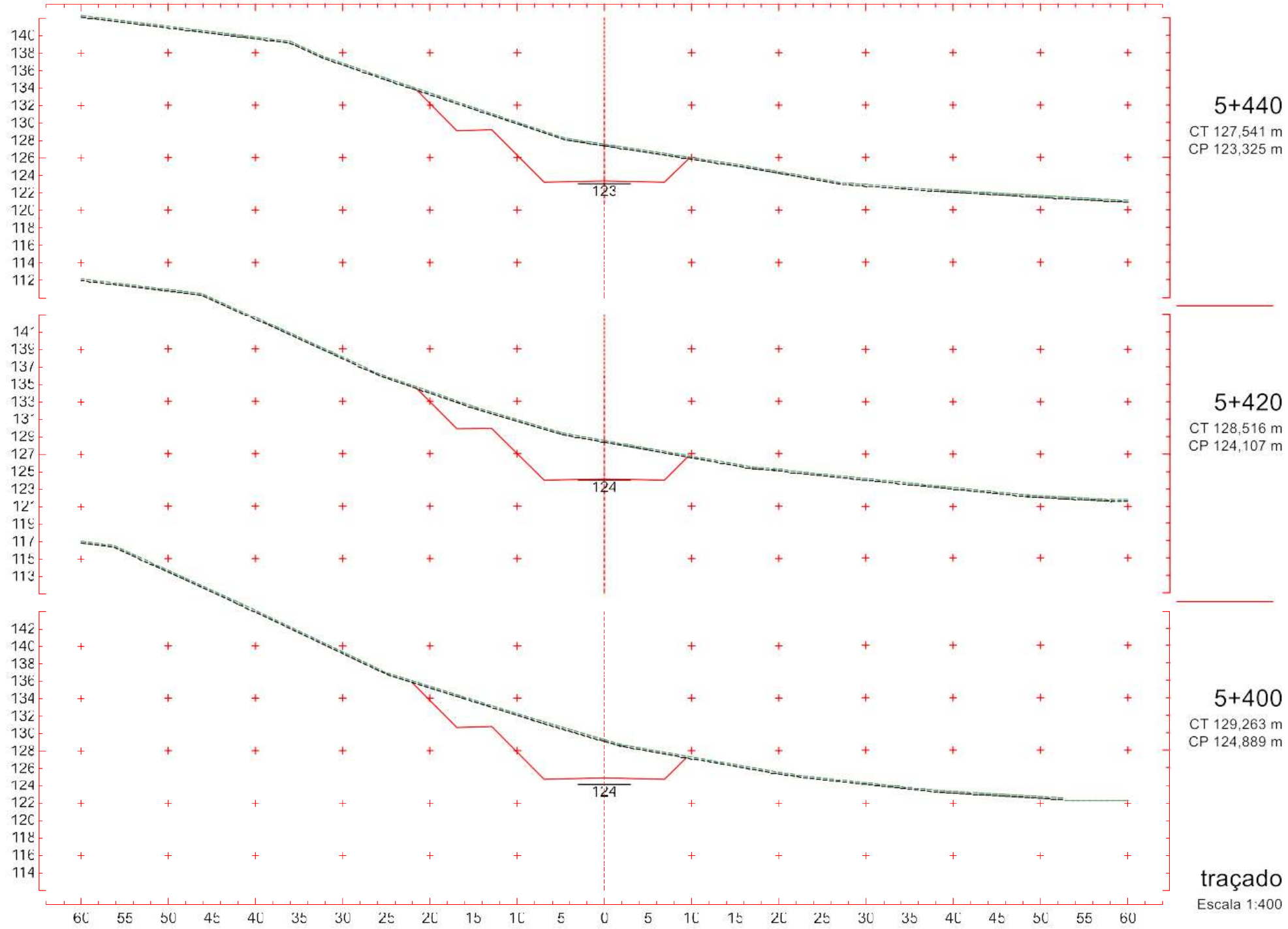
Projeto Ponto de Partida 2021/1



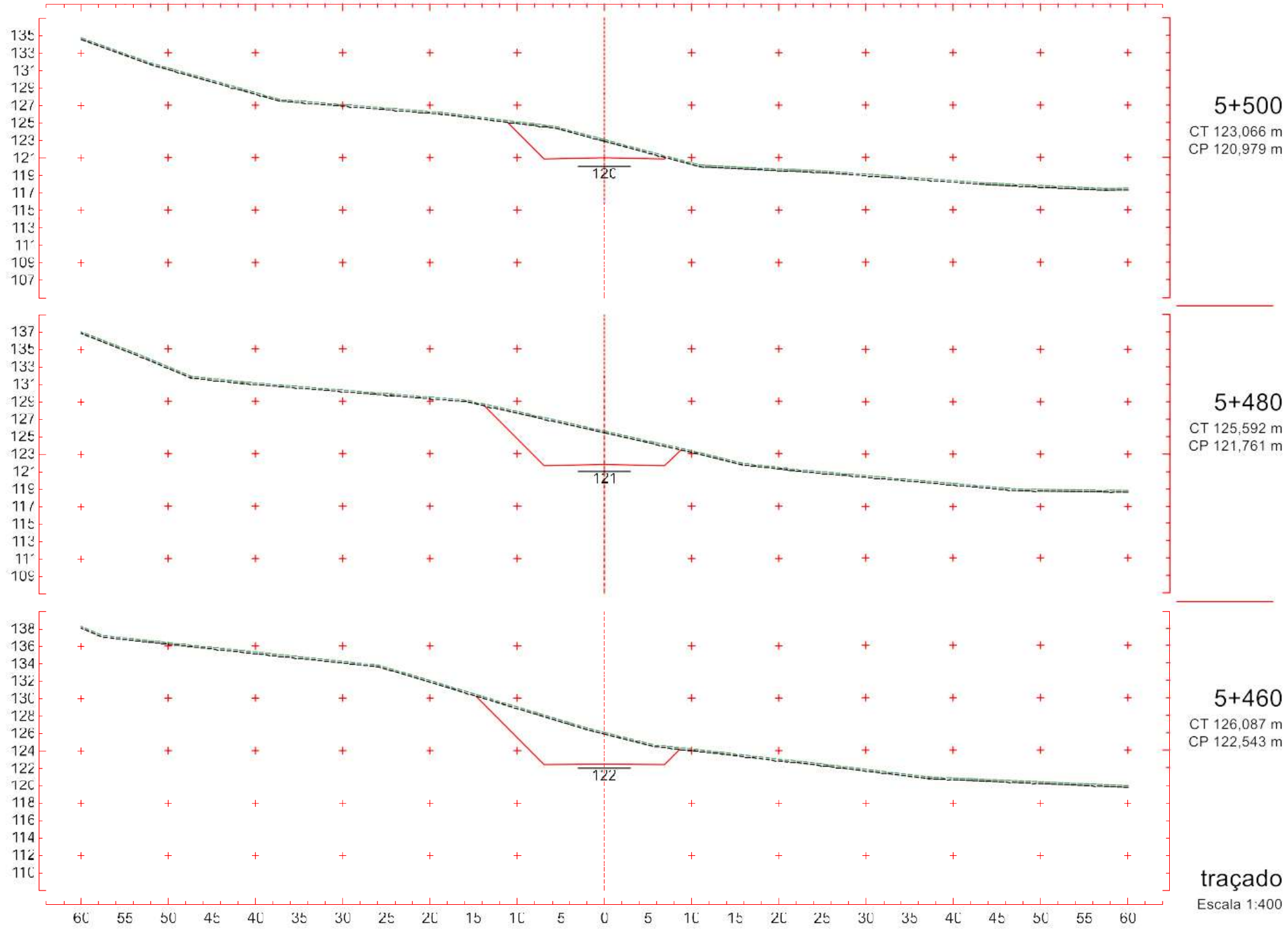
Projeto Ponto de Partida 2021/1



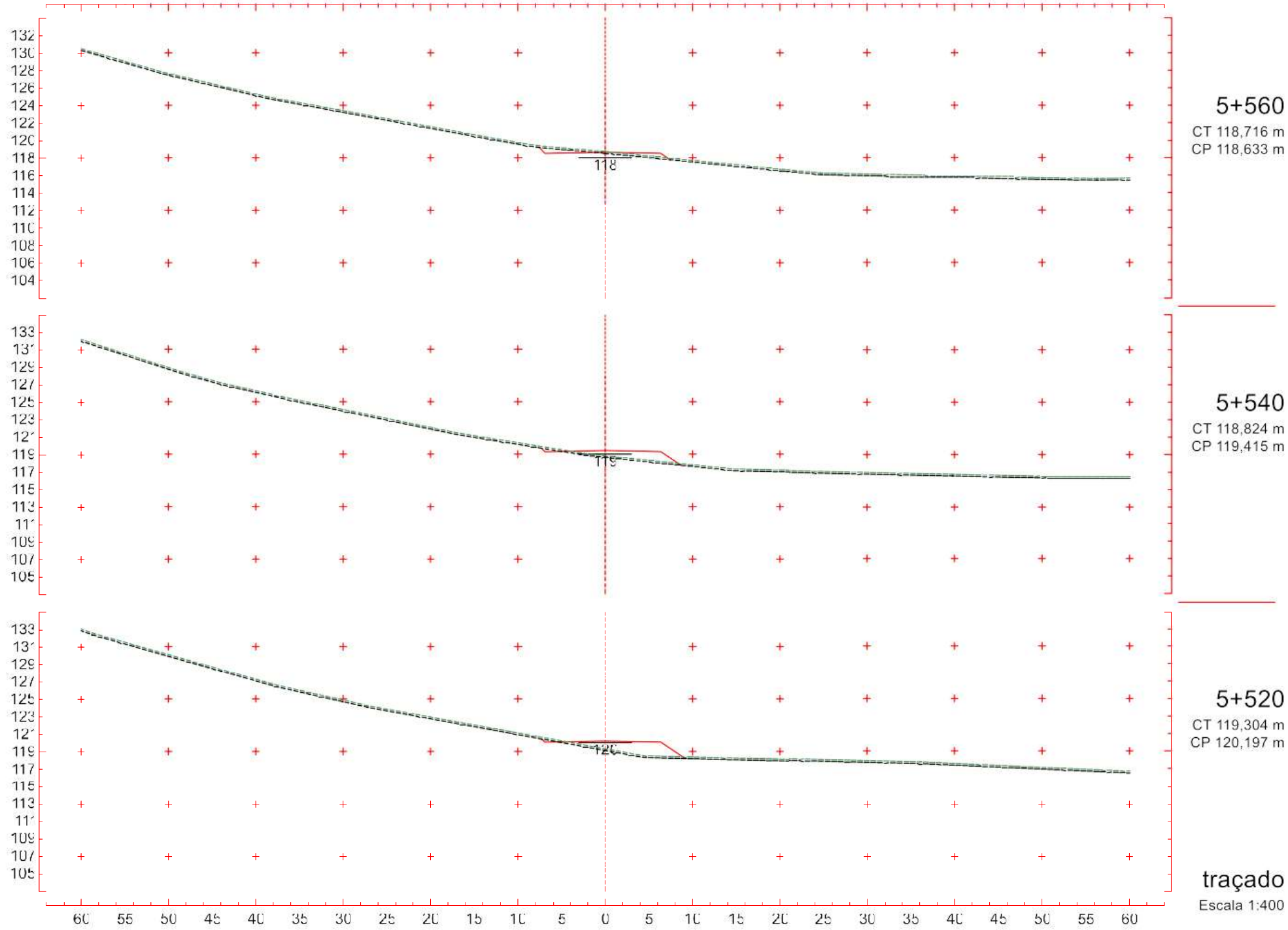
Projeto Ponto de Partida 2021/1



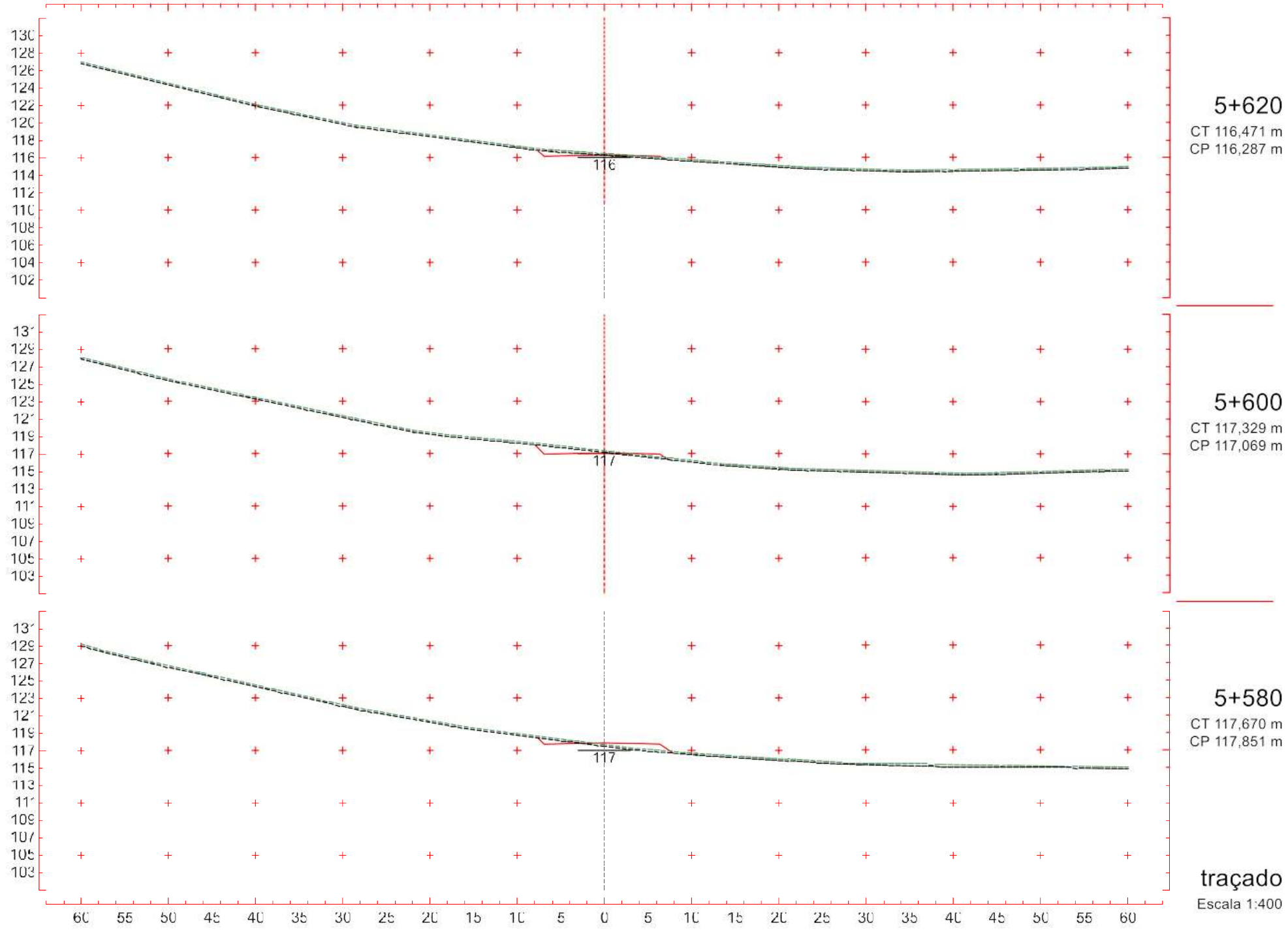
Projeto Ponto de Partida 2021/1

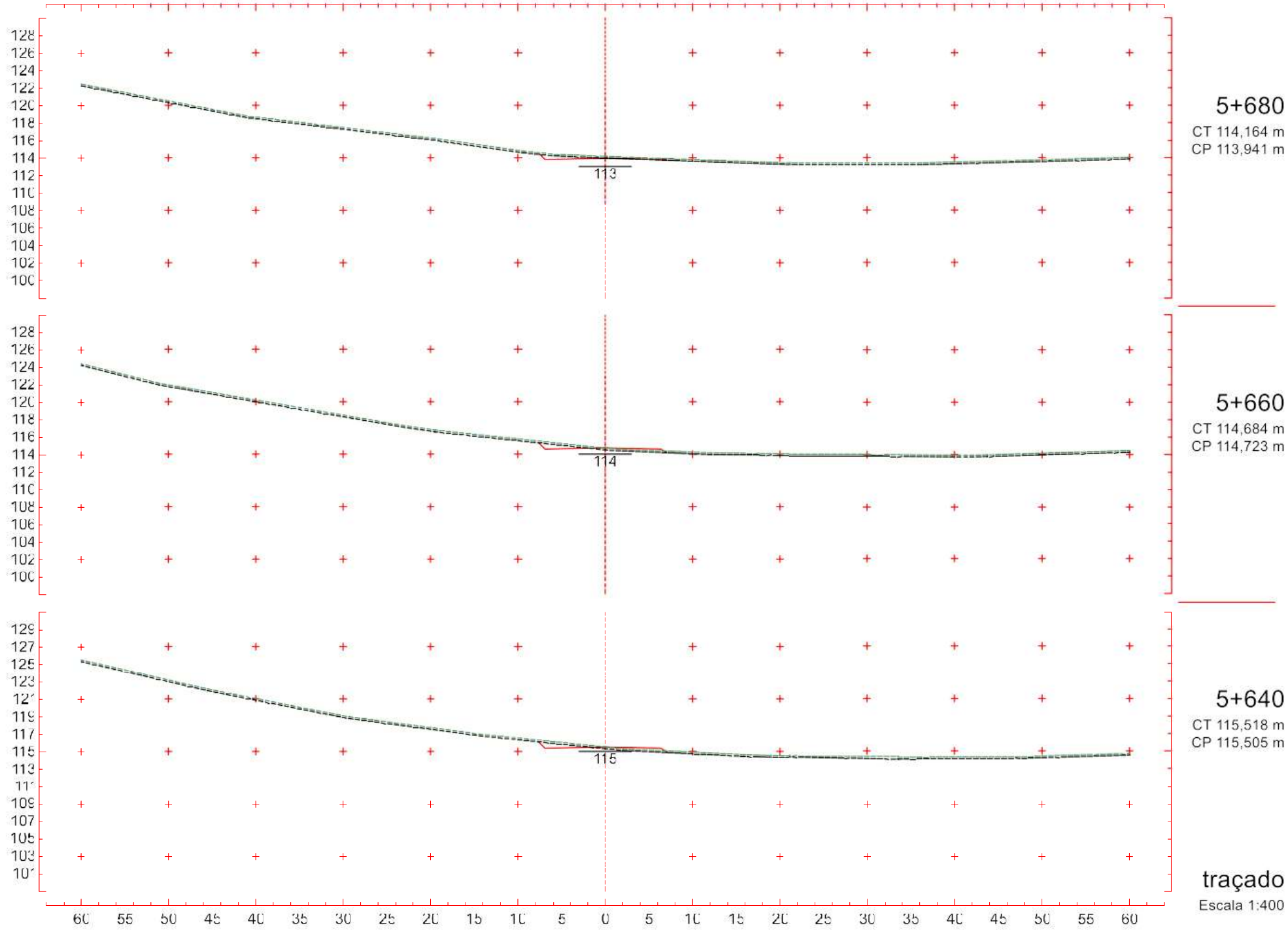


Projeto Ponto de Partida 2021/1

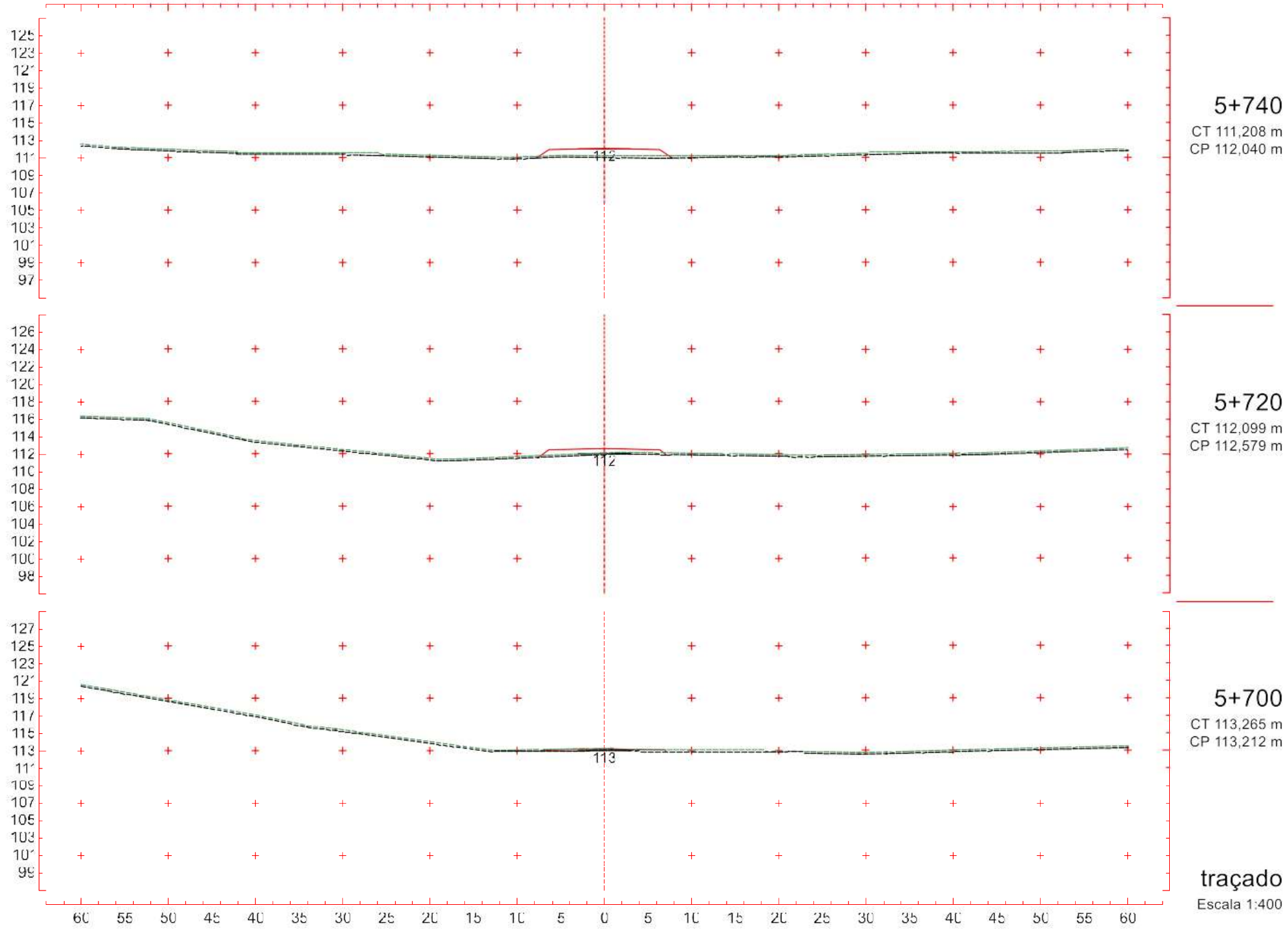


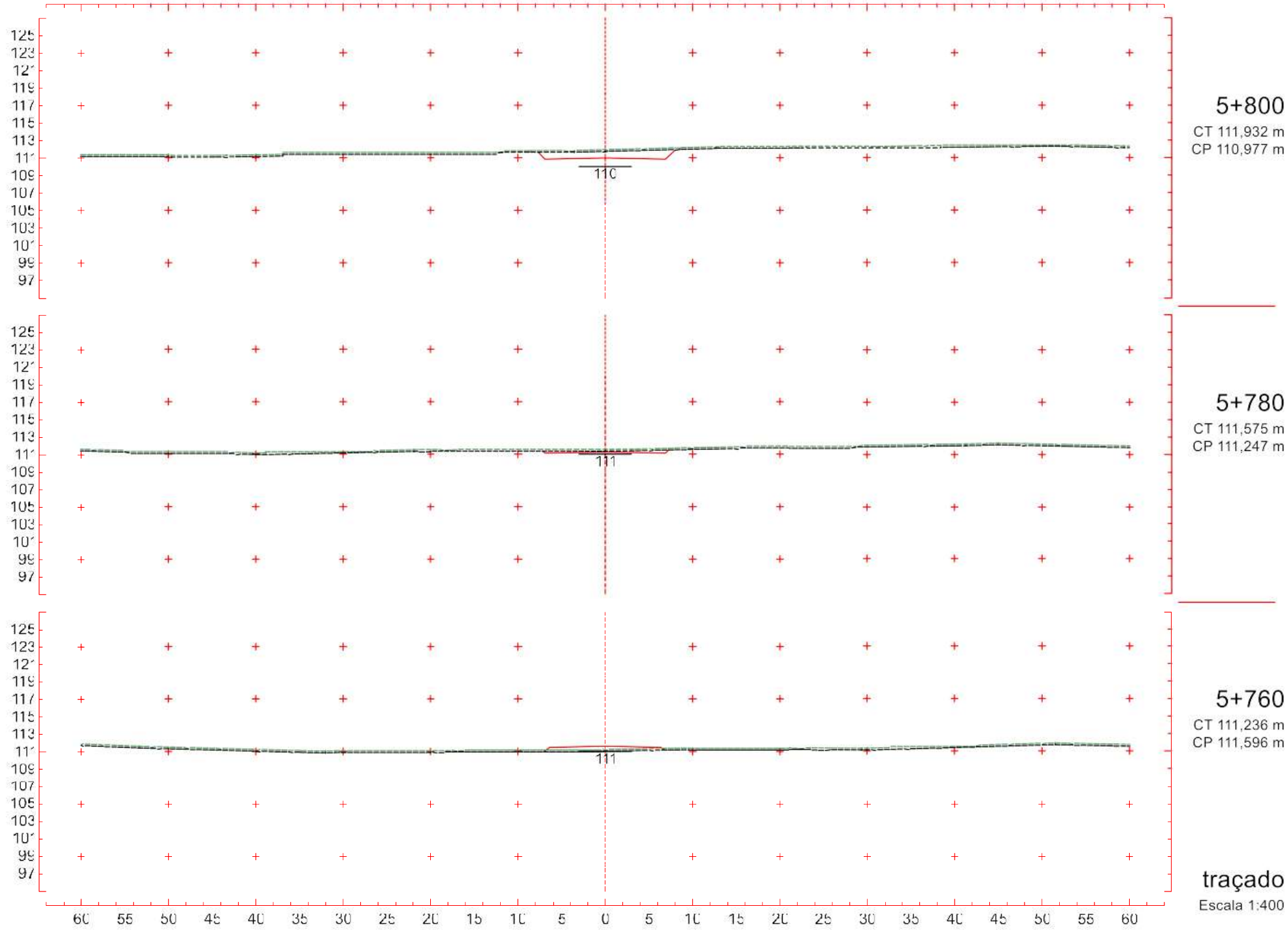
Projeto Ponto de Partida 2021/1

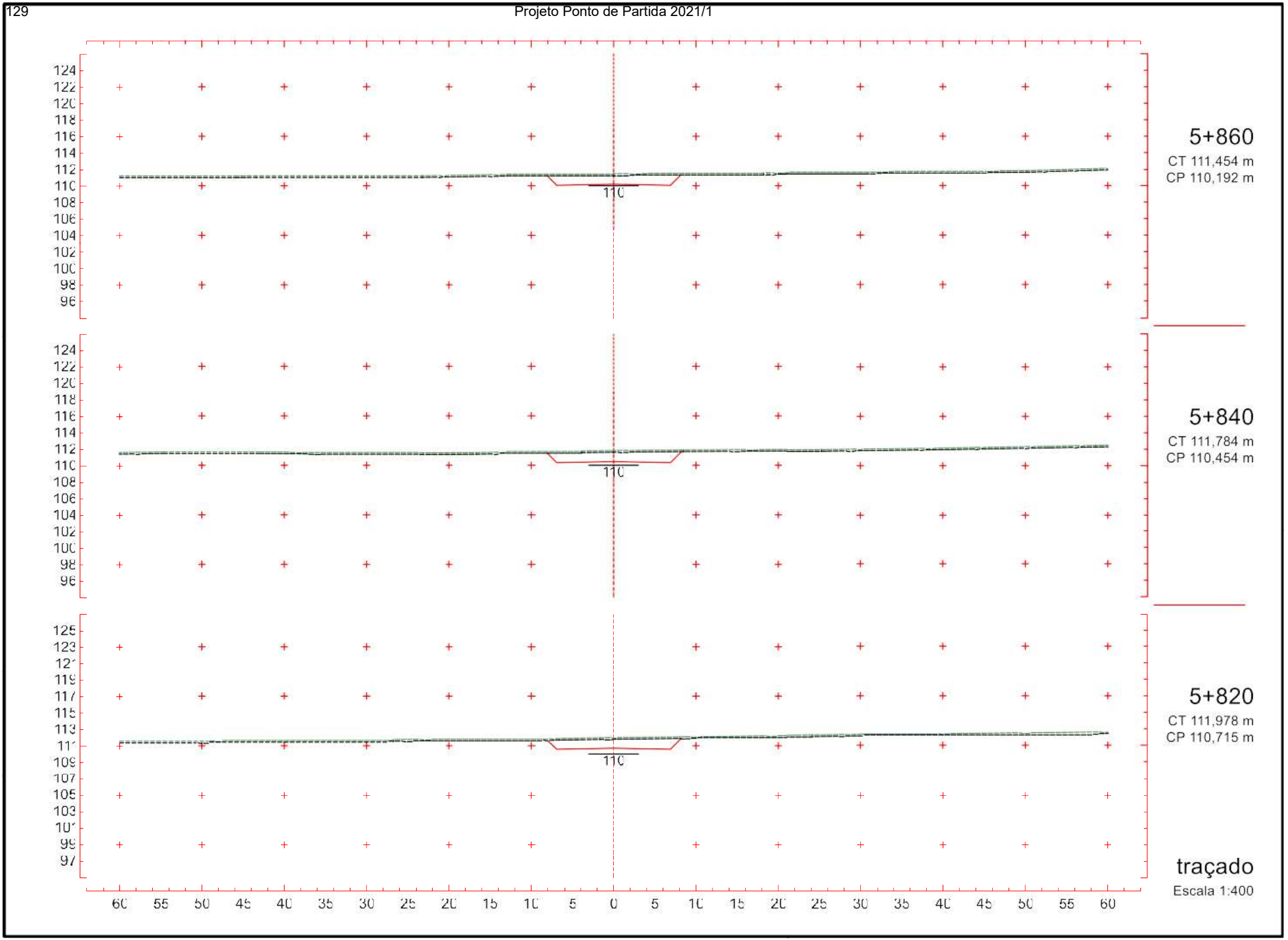


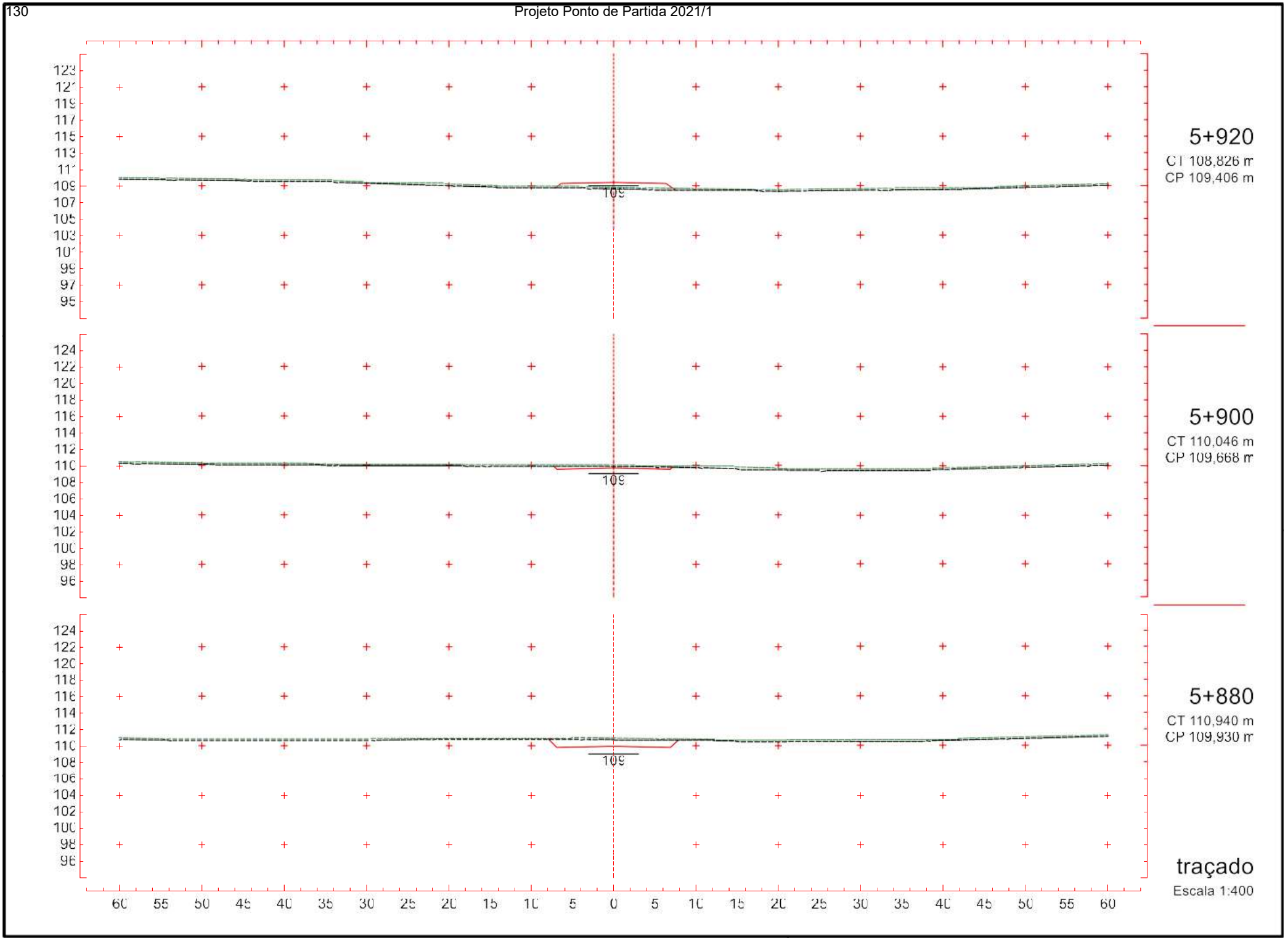

5+680
CT 114,164 m
CP 113,941 m
113
5+660
CT 114,684 m
CP 114,723 m
114
5+640
CT 115,518 m
CP 115,505 m
115
traçado
Escala 1:400

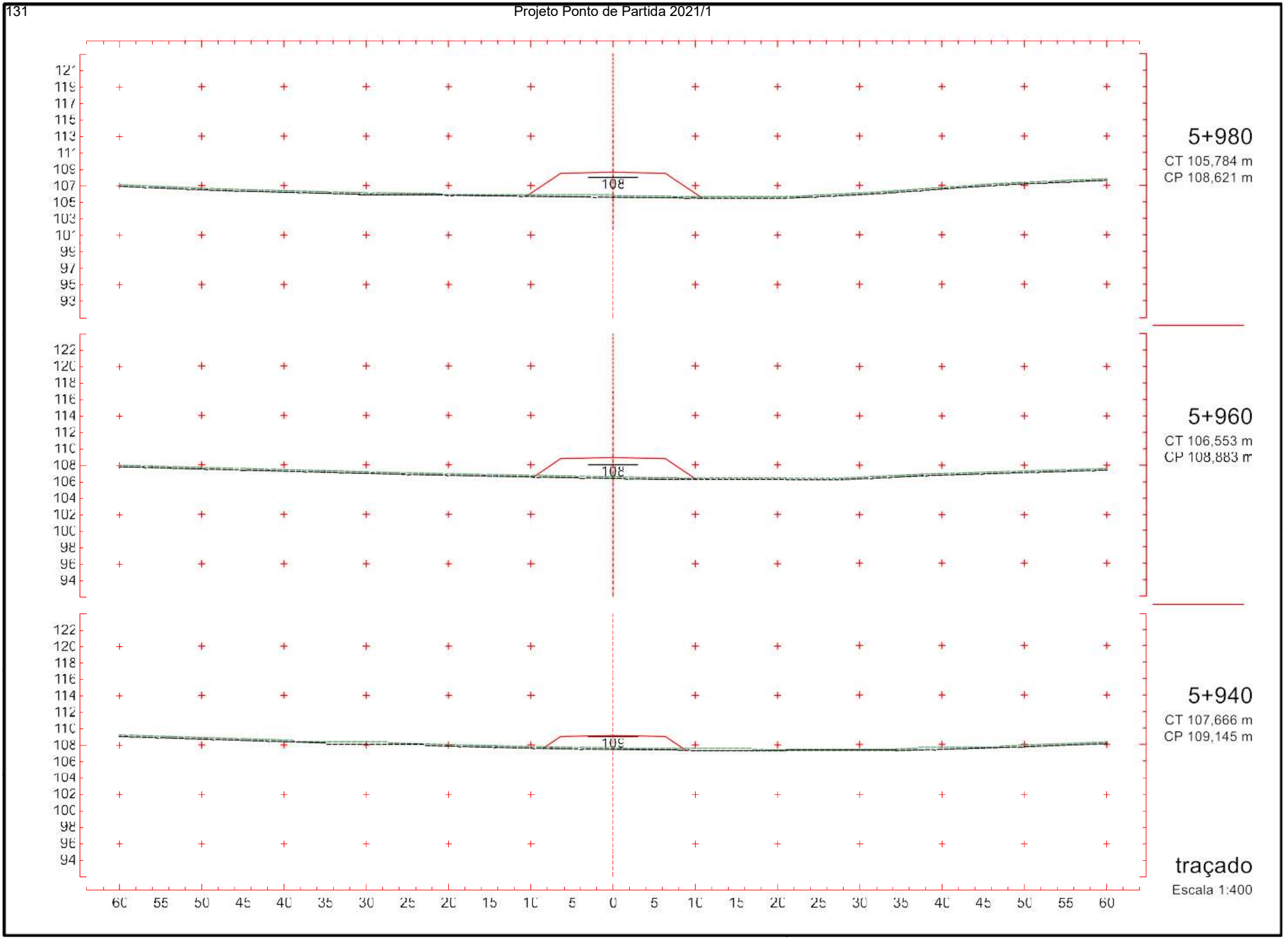
Projeto Ponto de Partida 2021/1

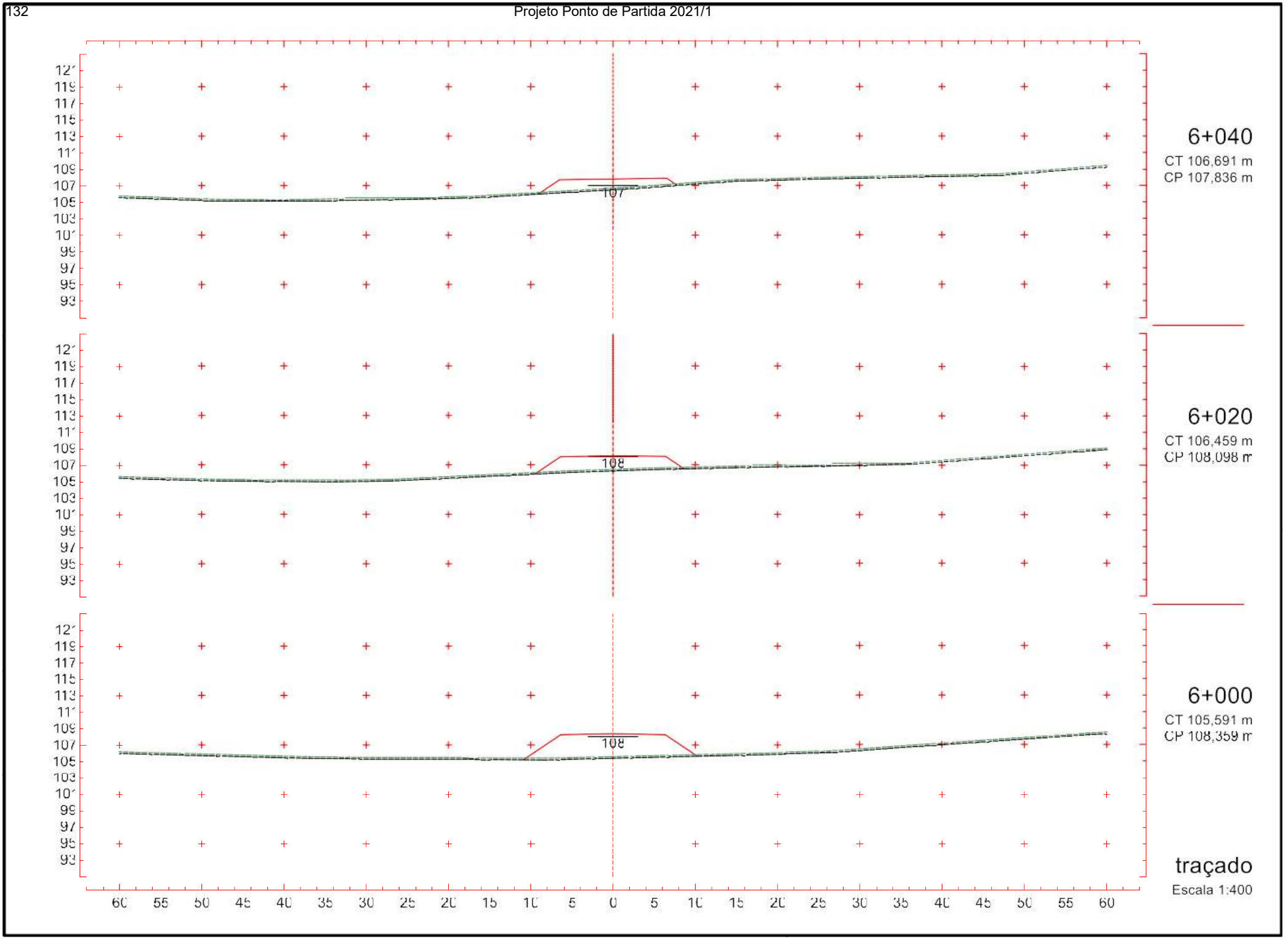


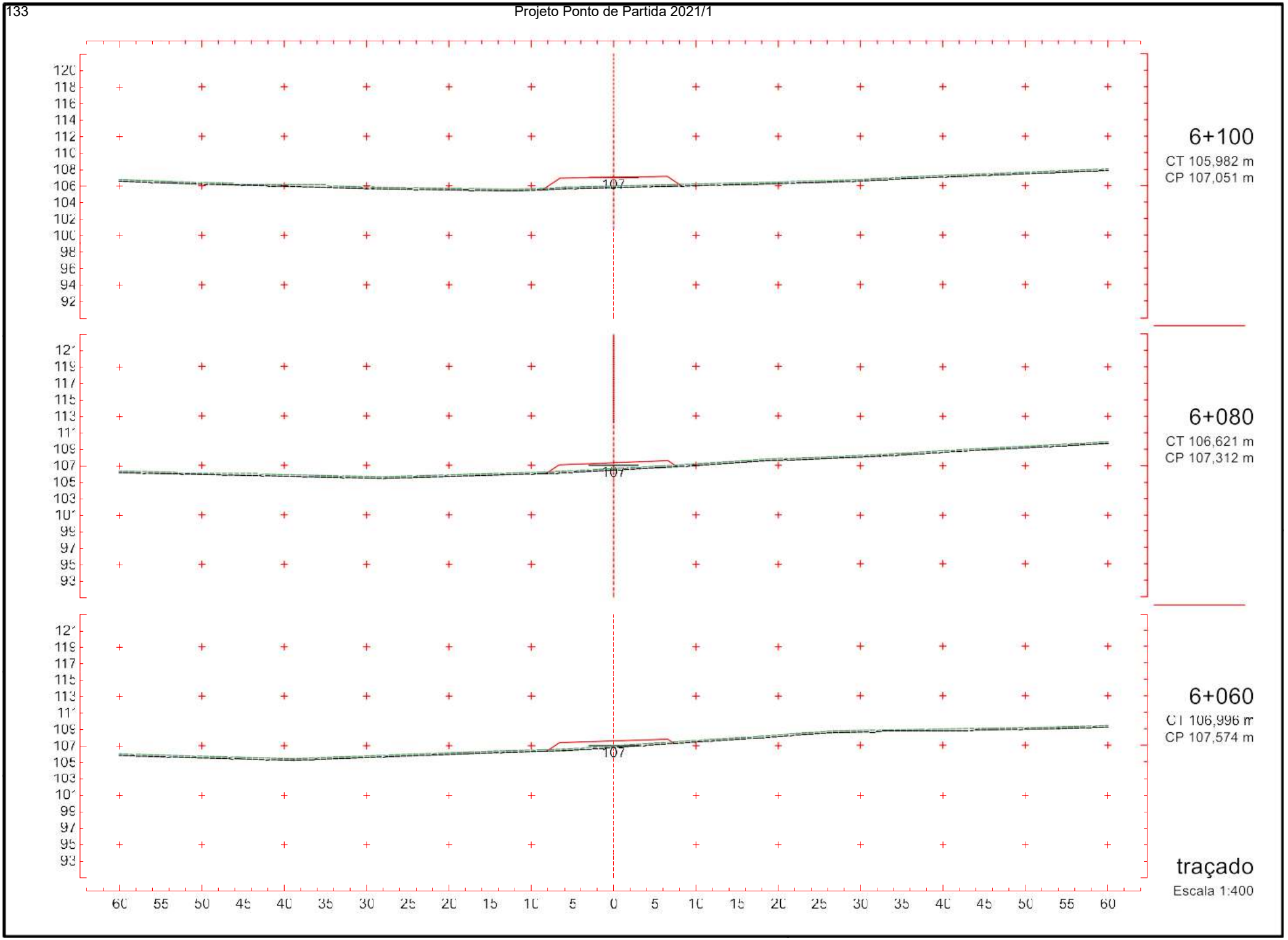

5+800
CT 111,932 m
CP 110,977 m
5+780
CT 111,575 m
CP 111,247 m
5+760
CT 111,236 m
CP 111,596 m
traçado
Escala 1:400

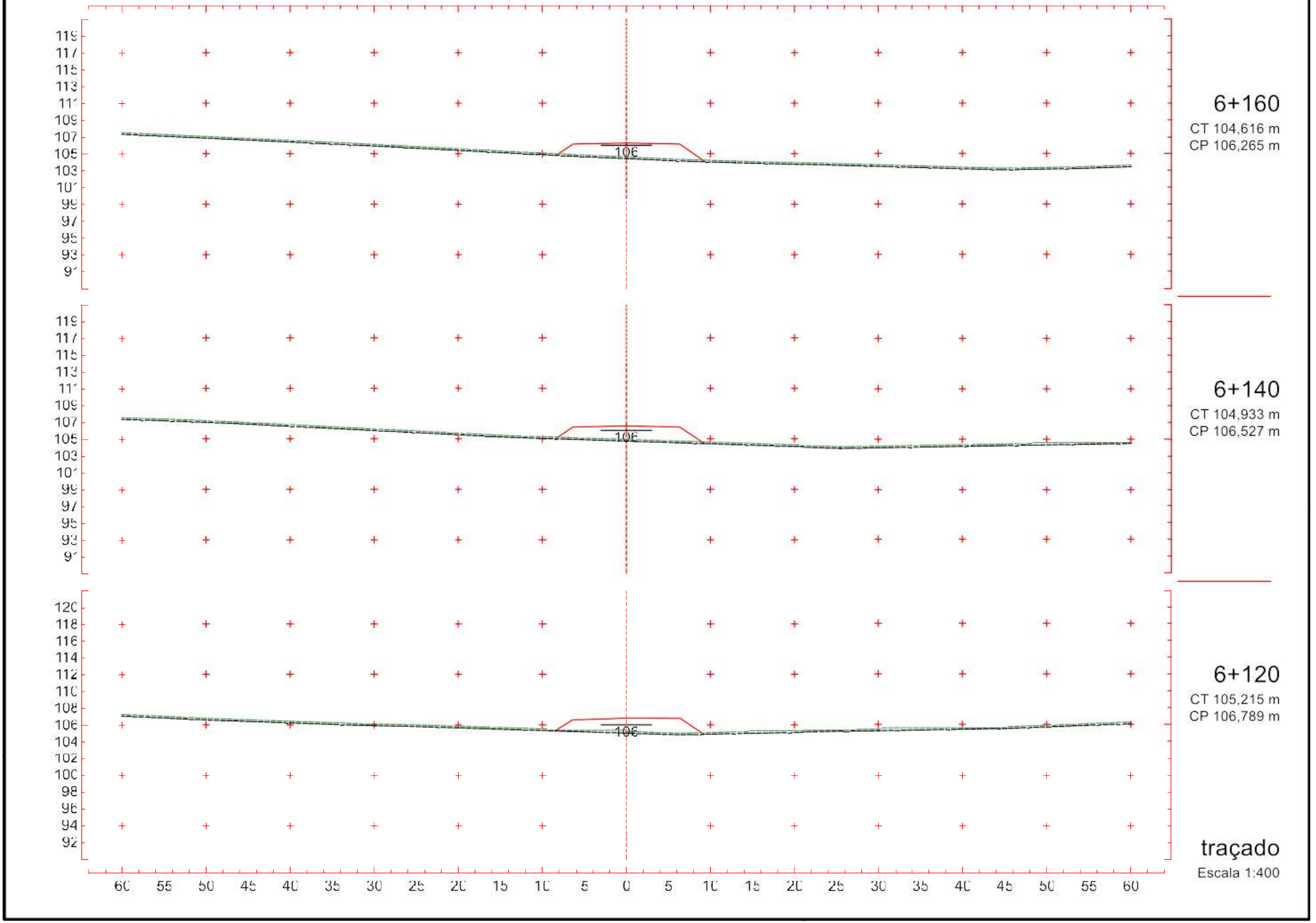

5+860
CT 111,454 m
CP 110,192 m
5+840
CT 111,784 m
CP 110,454 m
5+820
CT 111,978 m
CP 110,715 m
traçado
Escala 1:400


5+920
CT 108,826 m
CP 109,406 m
5+900
CT 110,046 m
CP 109,668 m
5+880
CT 110,940 m
CP 109,930 m
traçado
Escala 1:400

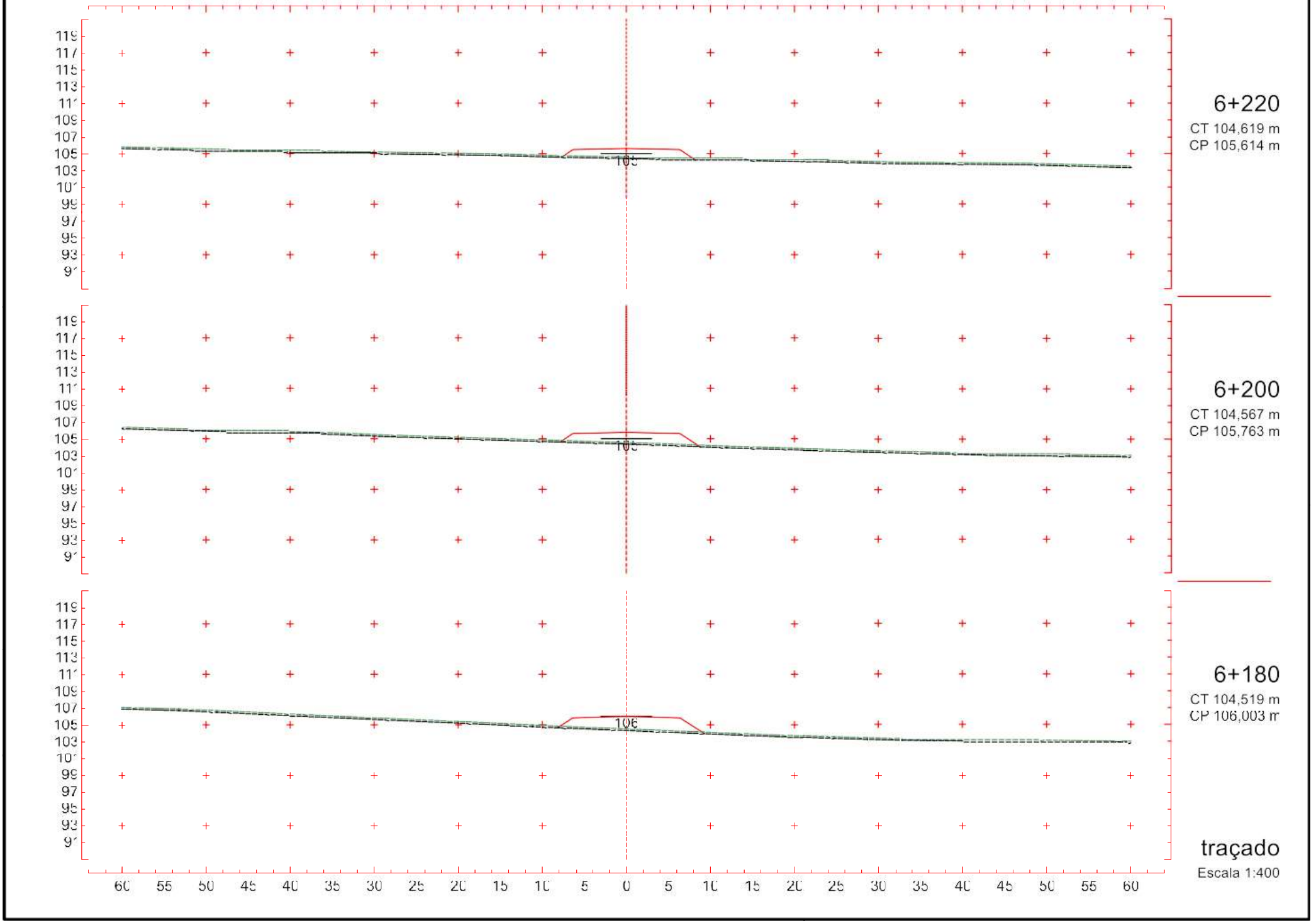

5+980
CT 105,784 m
CP 108,621 m
108
5+960
CT 106,553 m
CP 108,883 m
108
5+940
CT 107,666 m
CP 109,145 m
109
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60

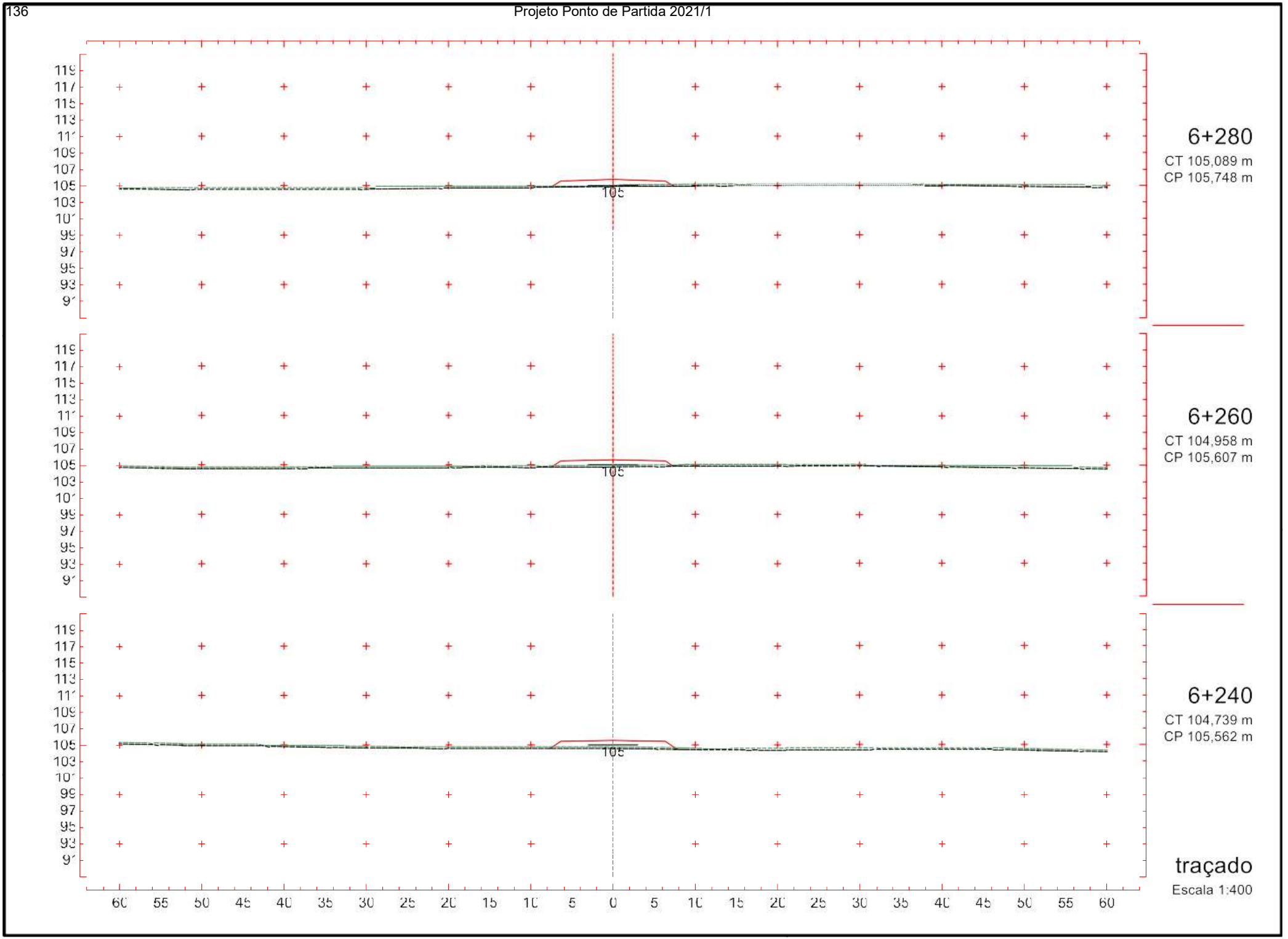

6+040
CT 106,691 m
CP 107,836 m
6+020
CT 106,459 m
CP 108,098 m
6+000
CT 105,591 m
CP 108,359 m
traçado
Escala 1:400

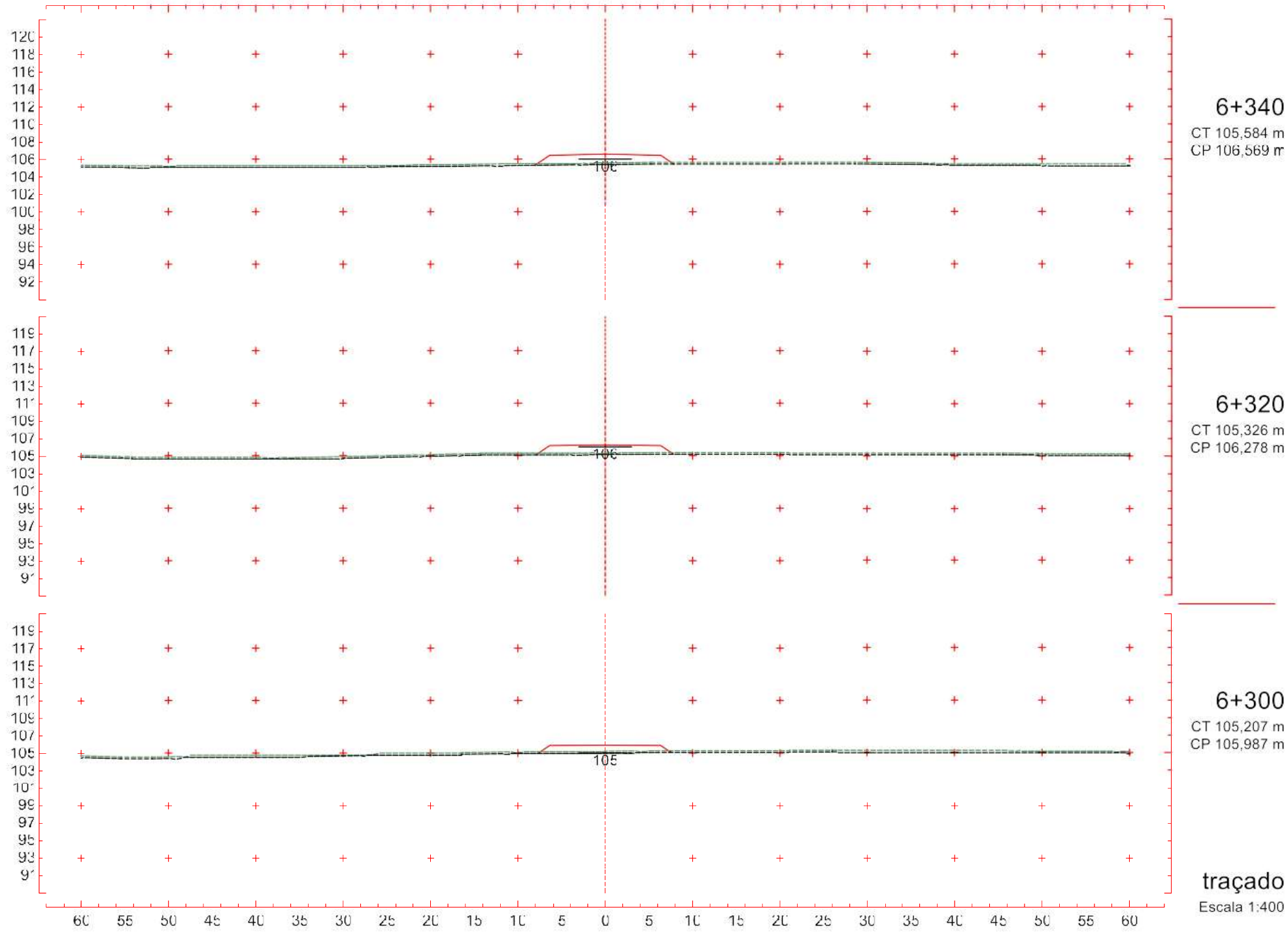

6+100
CT 105,982 m
CP 107,051 m
6+080
CT 106,621 m
CP 107,312 m
6+060
CT 106,996 m
CP 107,574 m
traçado
Escala 1:400

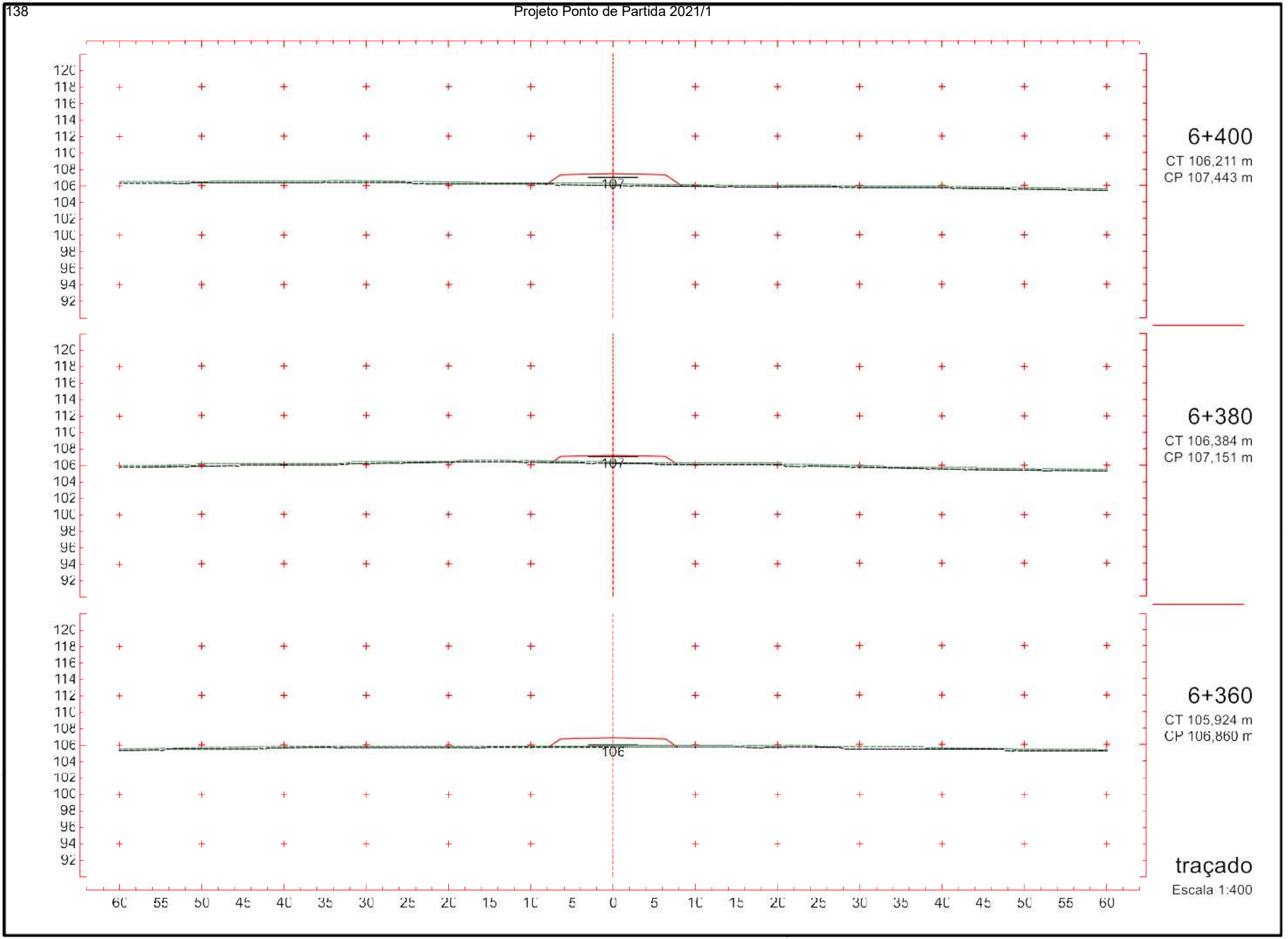

6+160
CT 104,616 m
CP 106,265 m
6+140
CT 104,933 m
CP 106,527 m
6+120
CT 105,215 m
CP 106,789 m
traçado
Escala 1:400

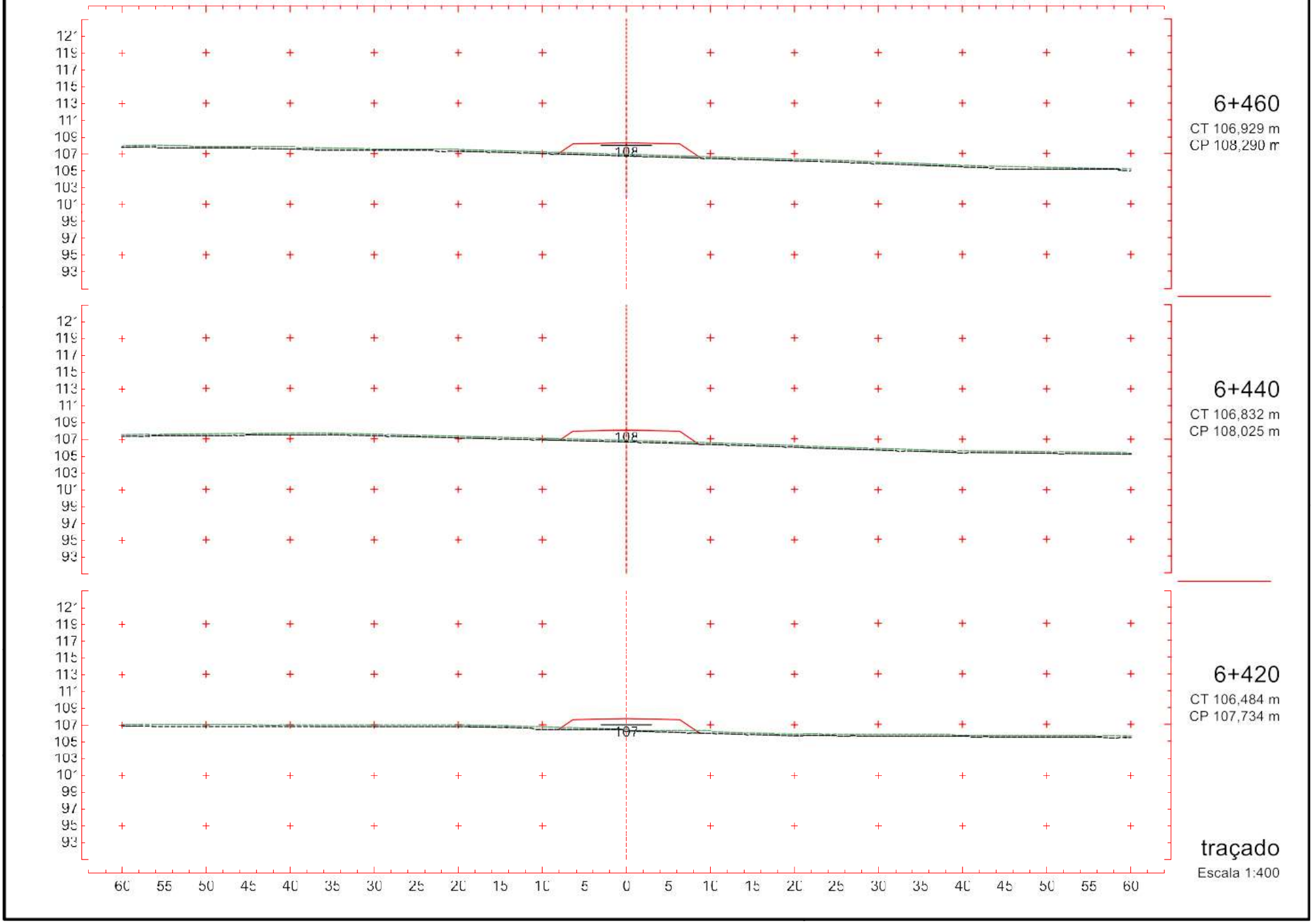
Projeto Ponto de Partida 2021/1

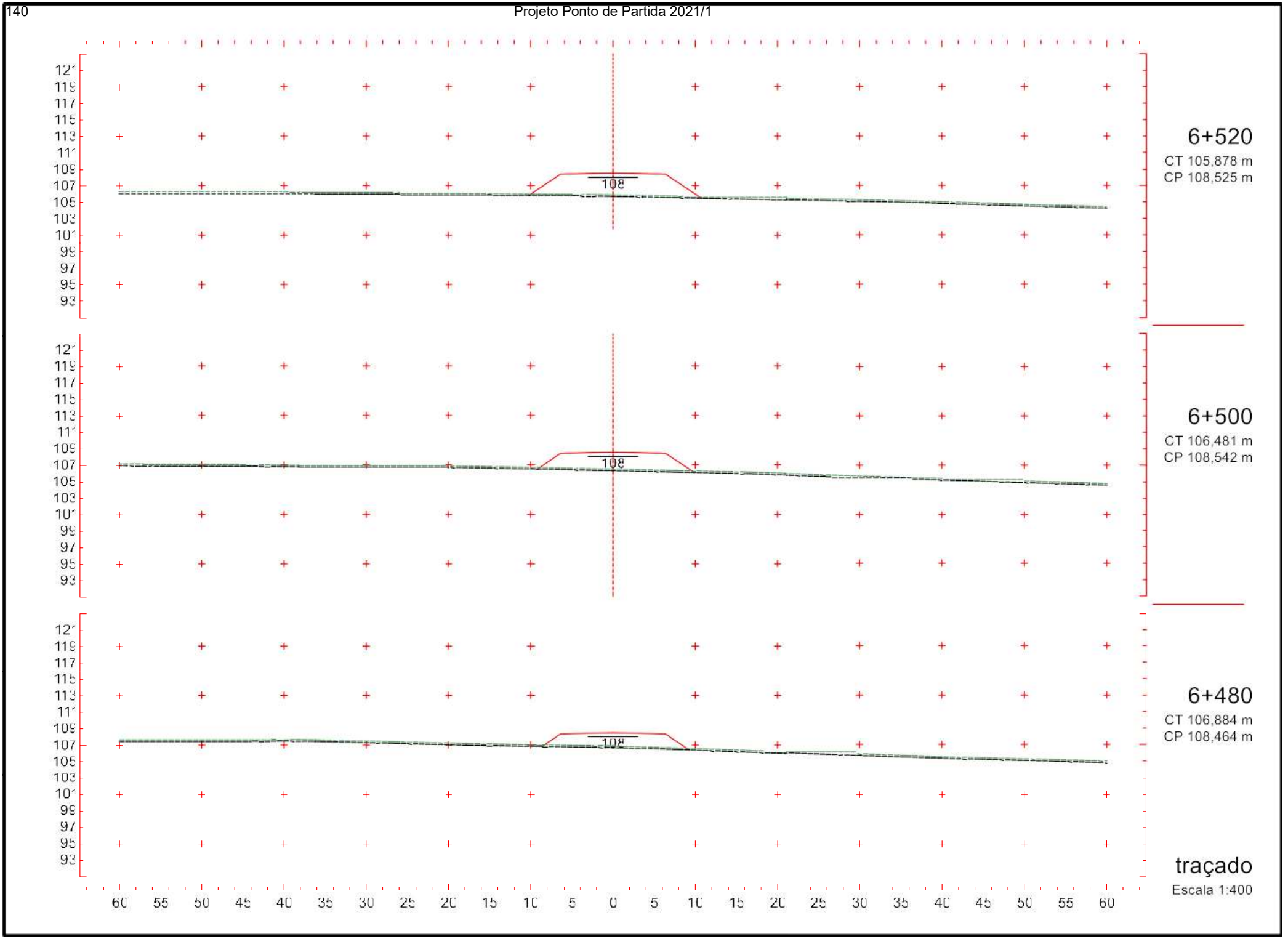


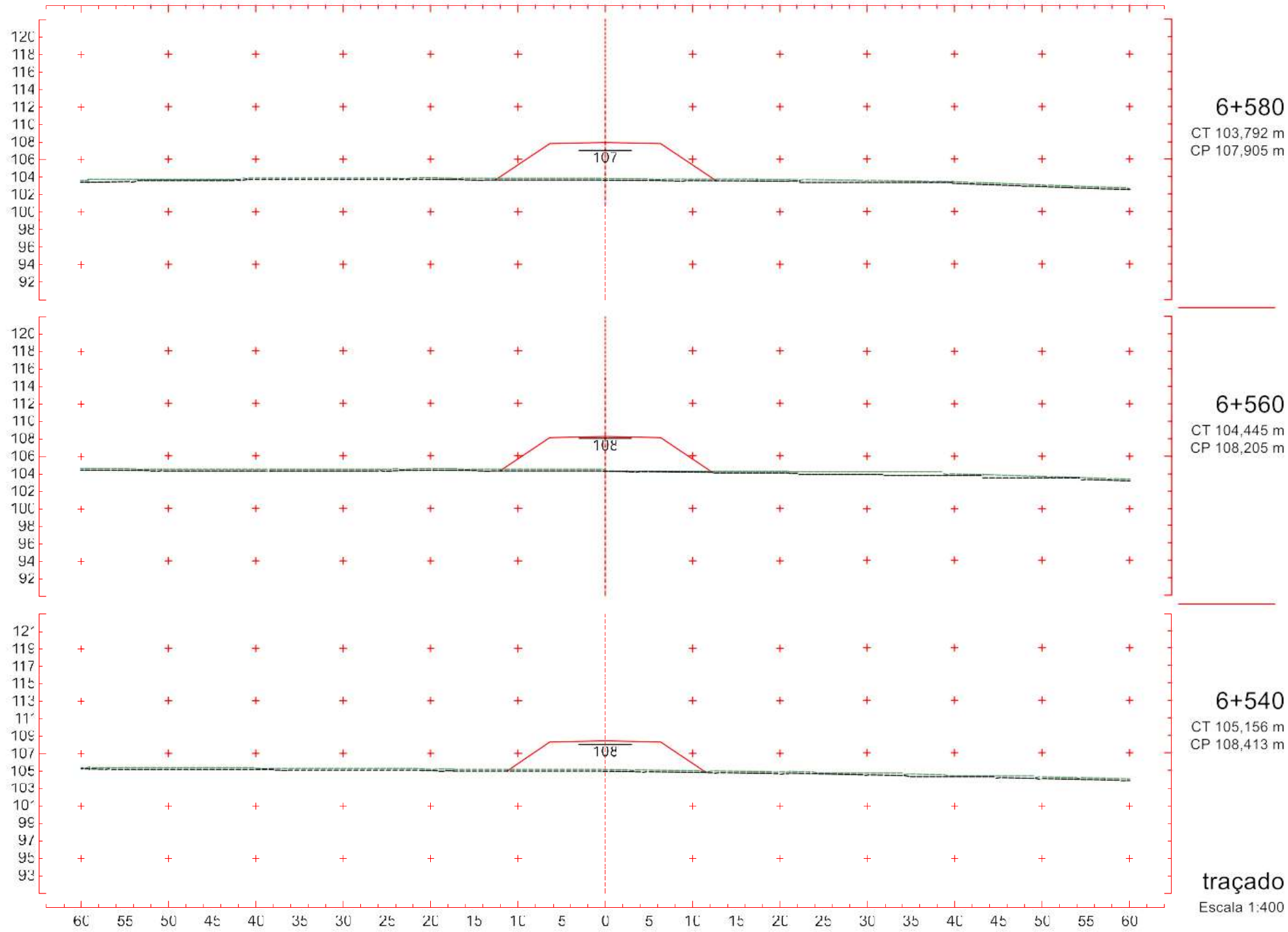

6+280
CT 105,089 m
CP 105,748 m
6+260
CT 104,958 m
CP 105,607 m
6+240
CT 104,739 m
CP 105,562 m
traçado
Escala 1:400

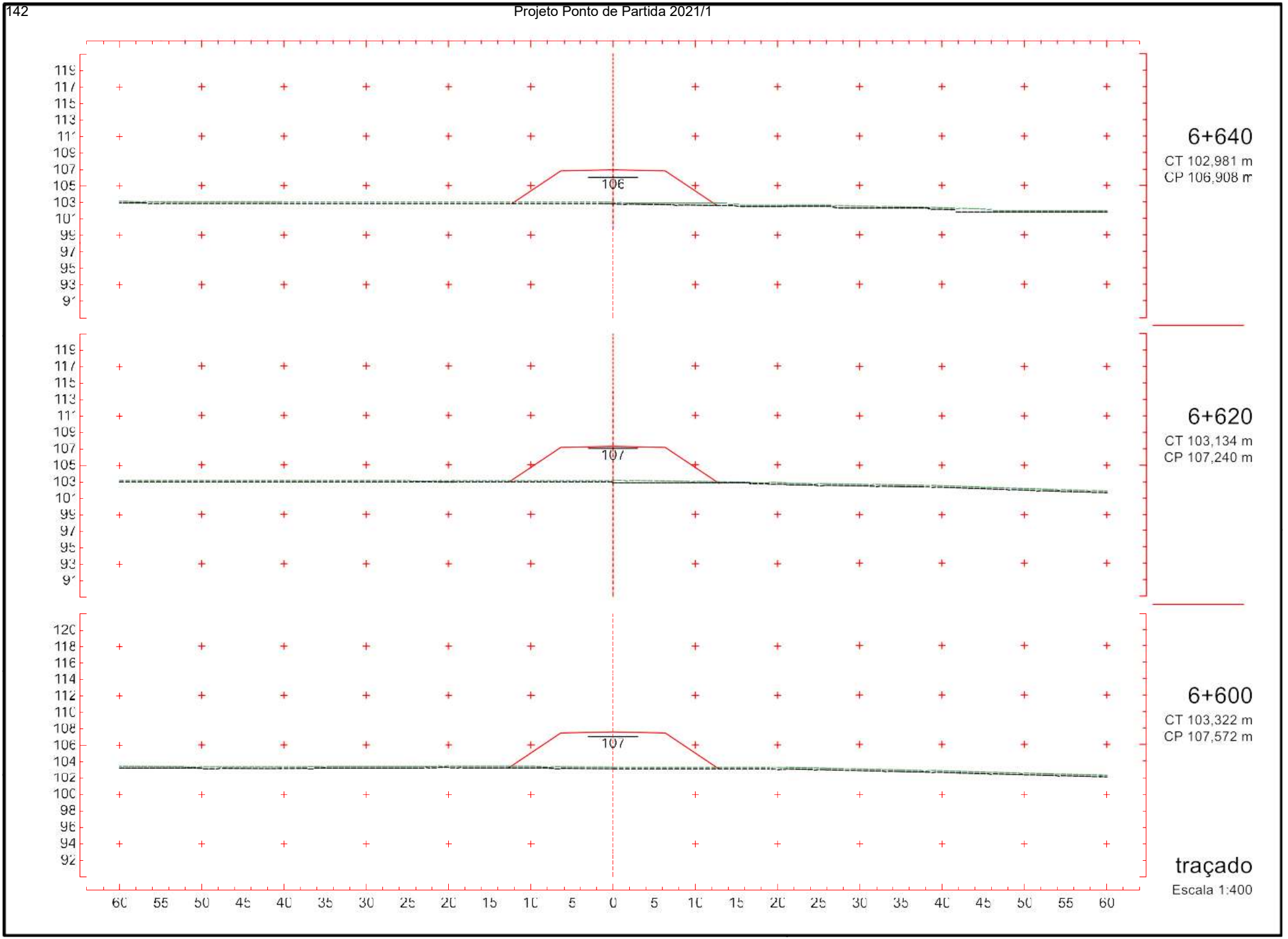

6+340
CT 105,584 m
CP 106,569 m
6+320
CT 105,326 m
CP 106,278 m
6+300
CT 105,207 m
CP 105,987 m
traçado
Escala 1:400

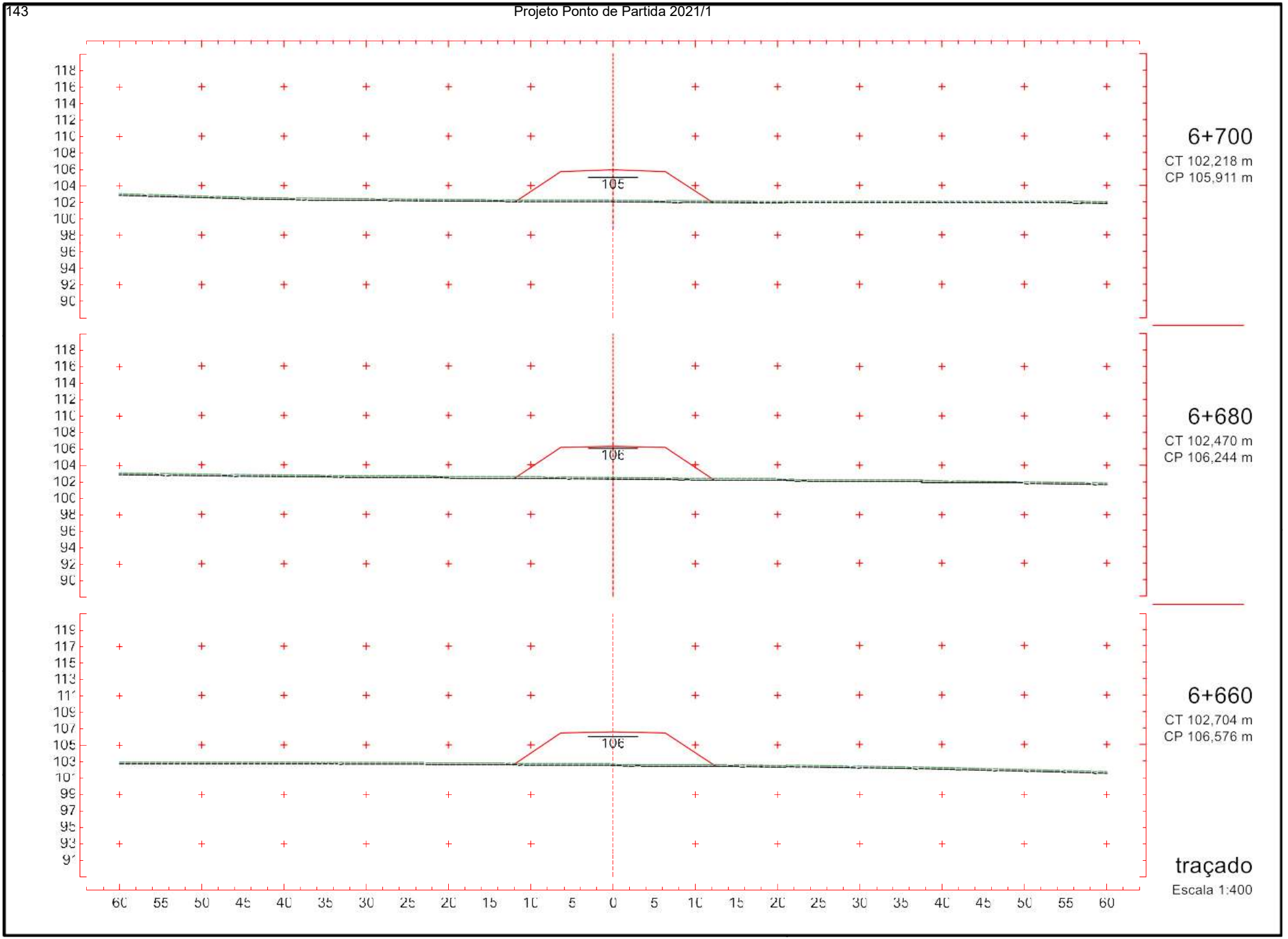

6+400
CT 106,211 m
CP 107,443 m
6+380
CT 106,384 m
CP 107,151 m
6+360
CT 105,924 m
CP 106,860 m
traçado
Escala 1:400

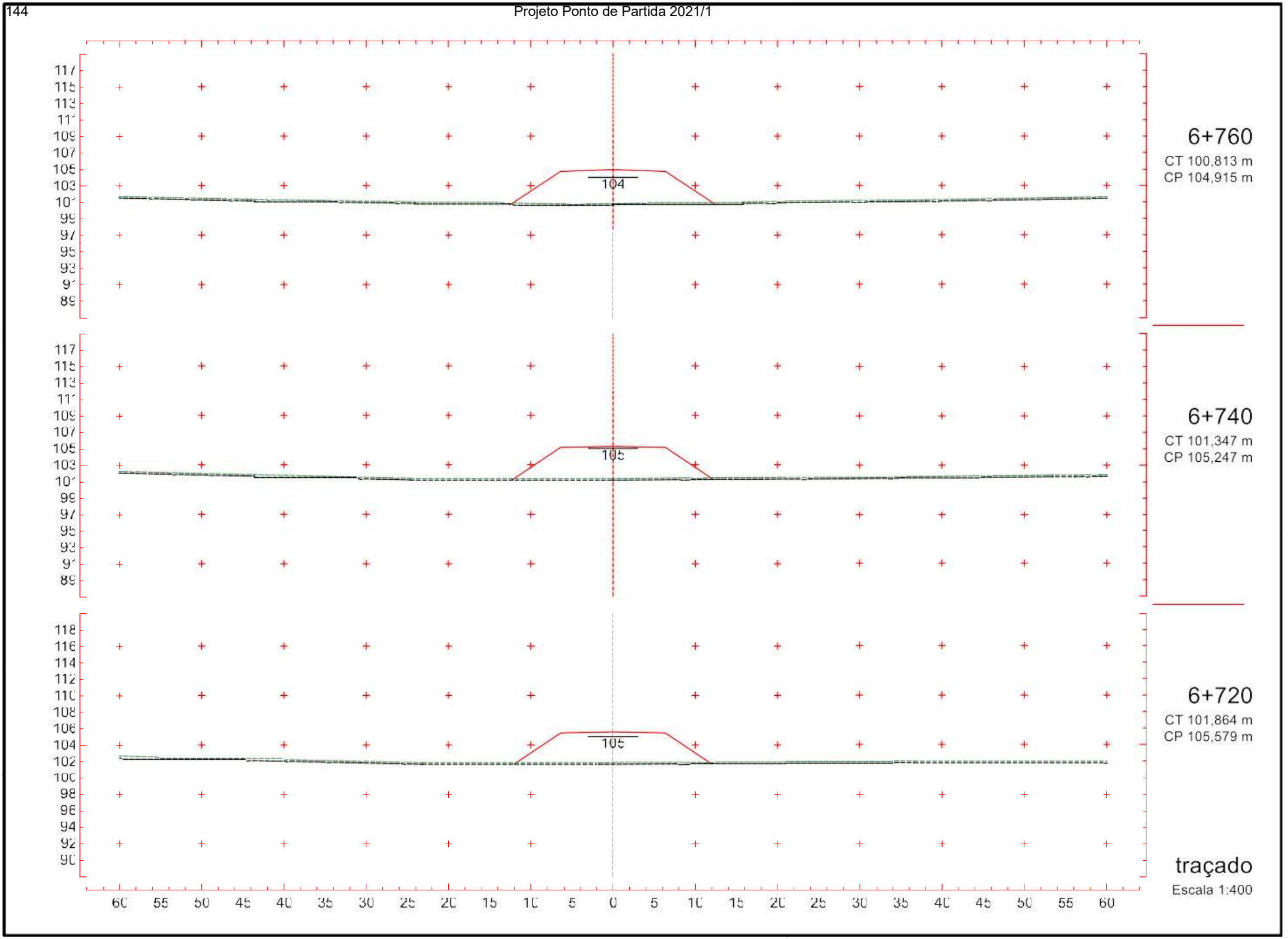

6+460
CT 106,929 m
CP 108,290 m
6+440
CT 106,832 m
CP 108,025 m
6+420
CT 106,484 m
CP 107,734 m
traçado
Escala 1:400

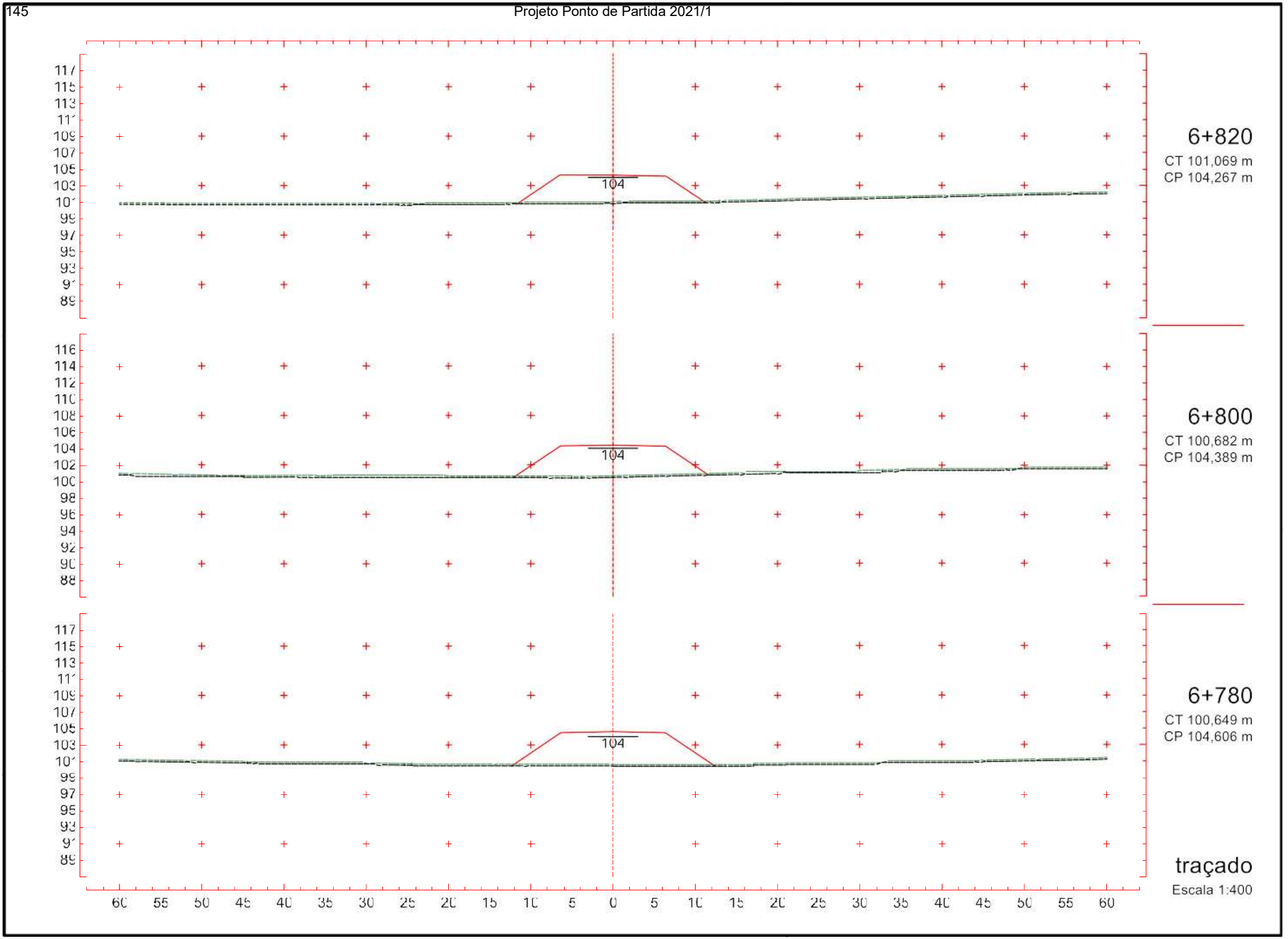

6+520
CT 105,878 m
CP 108,525 m
6+500
CT 106,481 m
CP 108,542 m
6+480
CT 106,884 m
CP 108,464 m
traçado
Escala 1:400

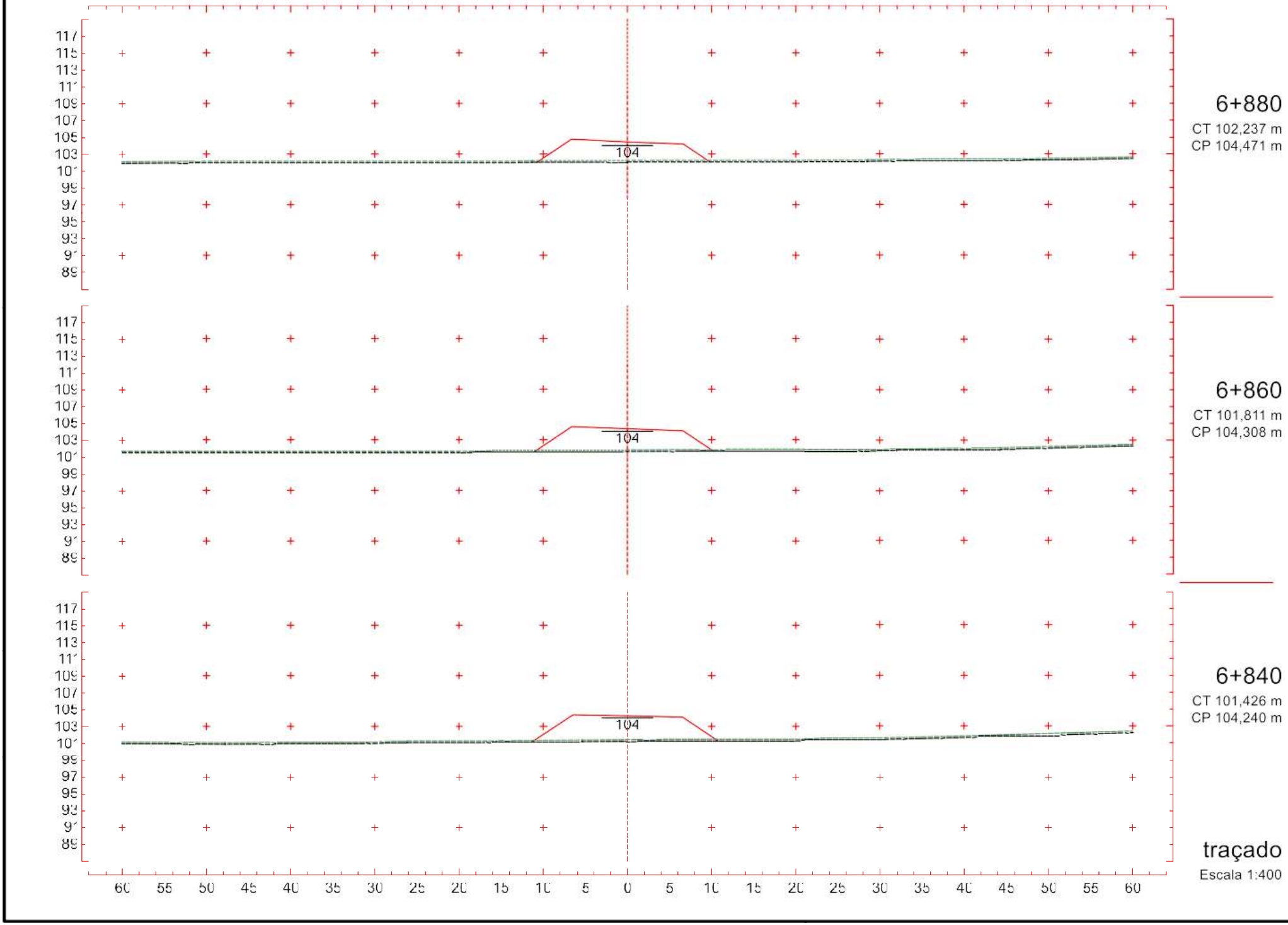

6+580
CT 103,792 m
CP 107,905 m
6+560
CT 104,445 m
CP 108,205 m
6+540
CT 105,156 m
CP 108,413 m
traçado
Escala 1:400

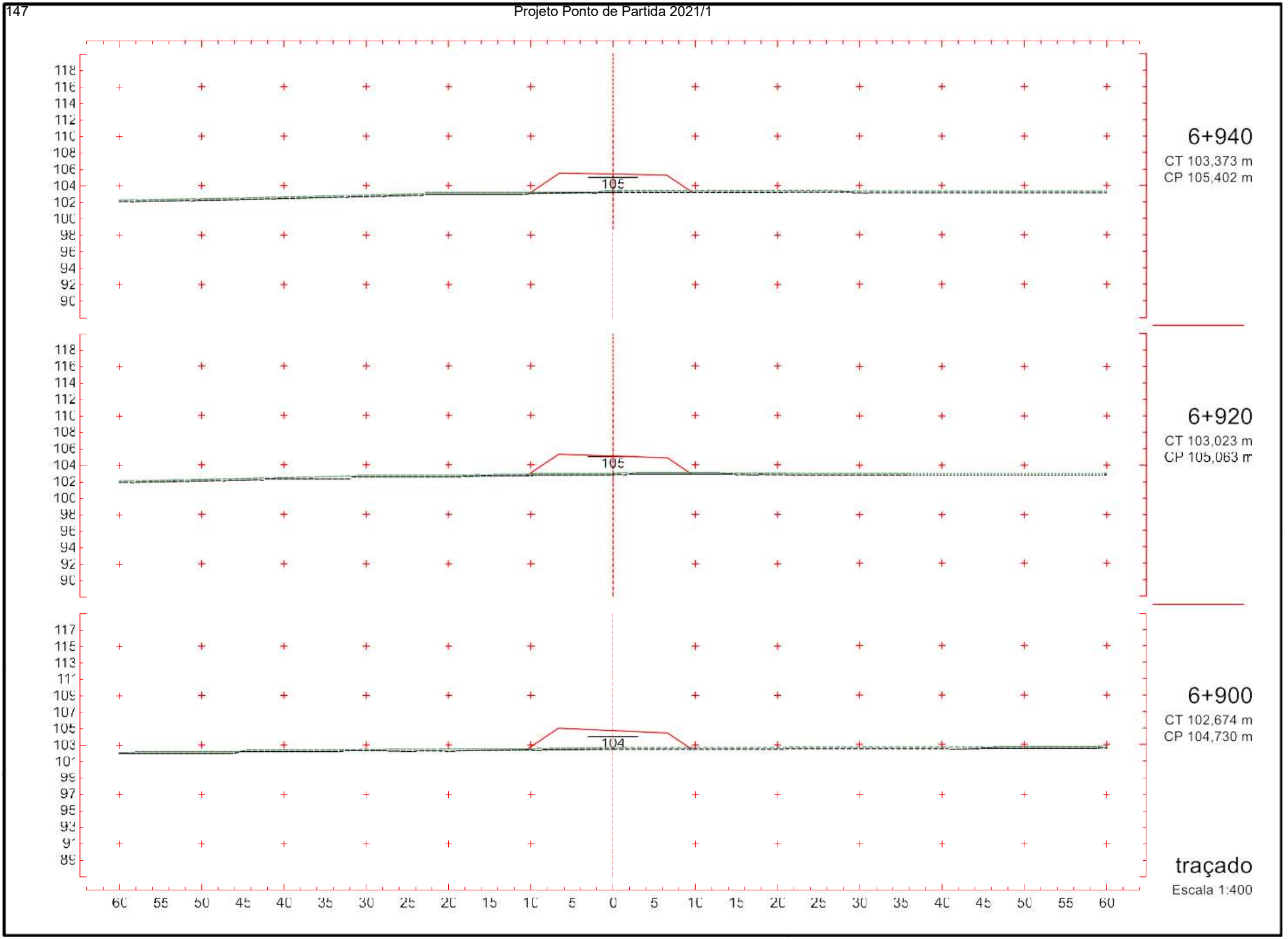

6+640
CT 102,981 m
CP 106,908 m
6+620
CT 103,134 m
CP 107,240 m
6+600
CT 103,322 m
CP 107,572 m
traçado
Escala 1:400

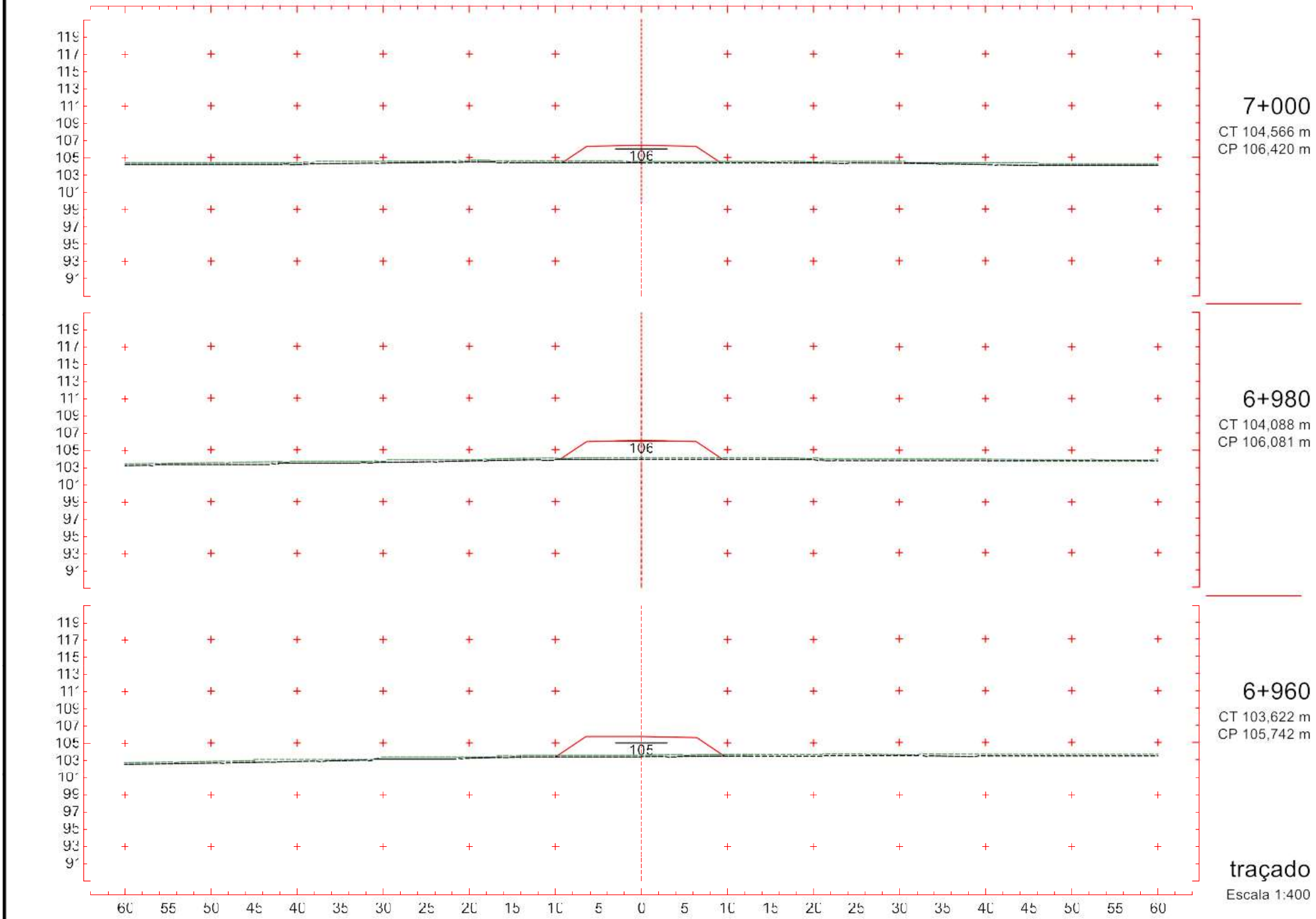

6+700
CT 102,218 m
CP 105,911 m
6+680
CT 102,470 m
CP 106,244 m
6+660
CT 102,704 m
CP 106,576 m
traçado
Escala 1:400

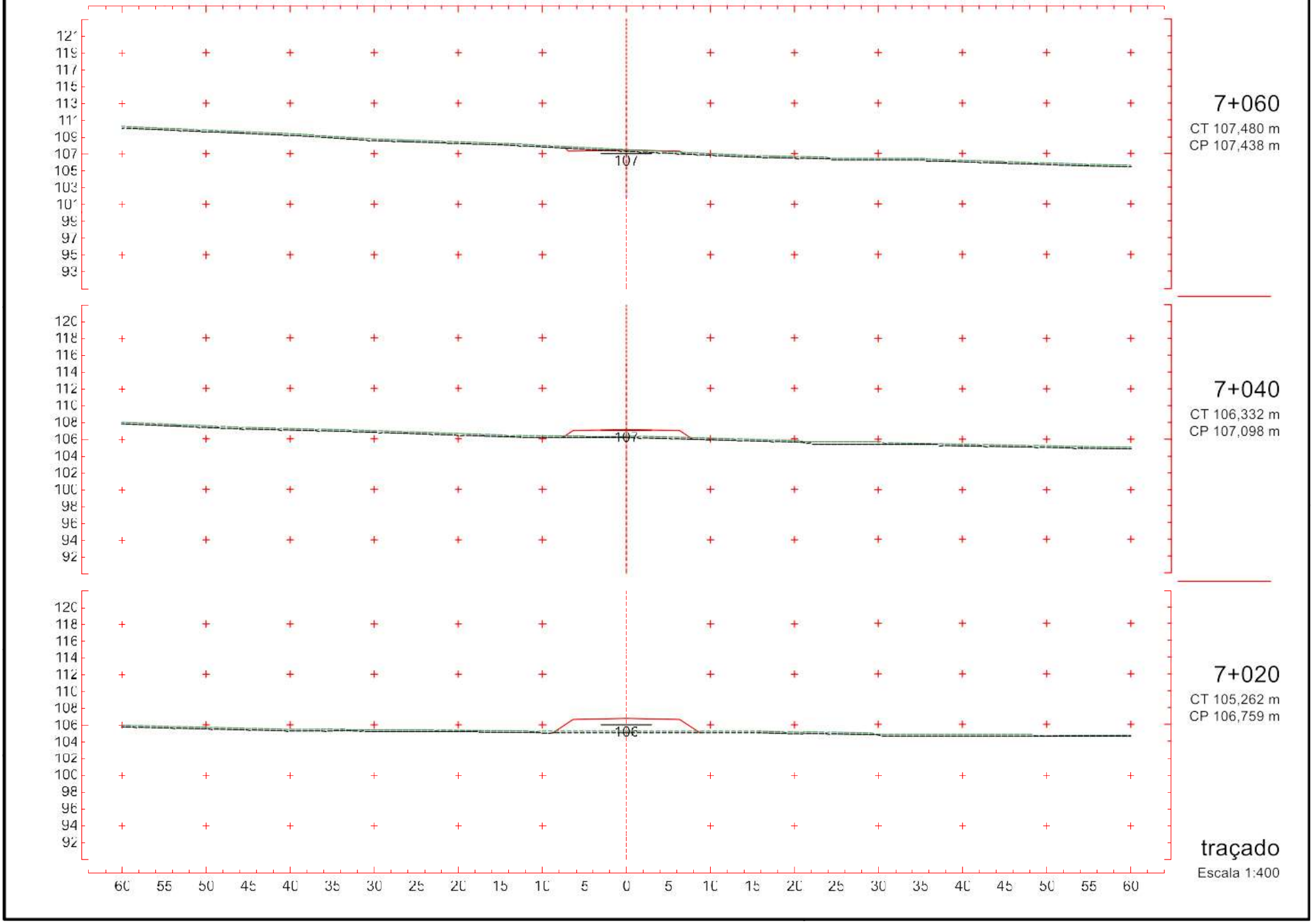

6+760
CT 100,813 m
CP 104,915 m
104
6+740
CT 101,347 m
CP 105,247 m
105
6+720
CT 101,864 m
CP 105,579 m
105
traçado
Escala 1:400
60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60


6+820
CT 101,069 m
CP 104,267 m
6+800
CT 100,682 m
CP 104,389 m
6+780
CT 100,649 m
CP 104,606 m
104
traçado
Escala 1:400

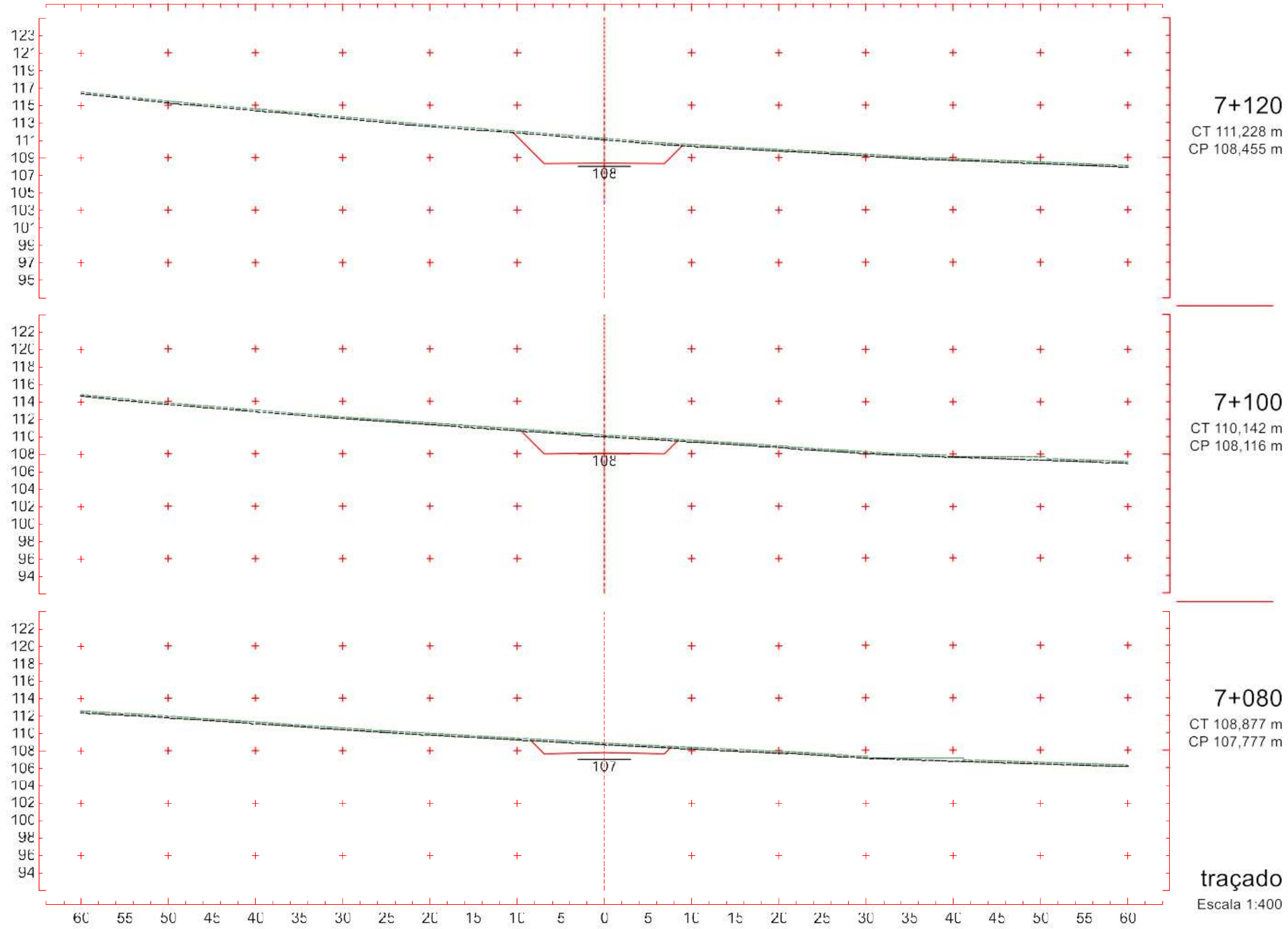

6+880
CT 102,237 m
CP 104,471 m
6+860
CT 101,811 m
CP 104,308 m
6+840
CT 101,426 m
CP 104,240 m
104
traçado
Escala 1:400

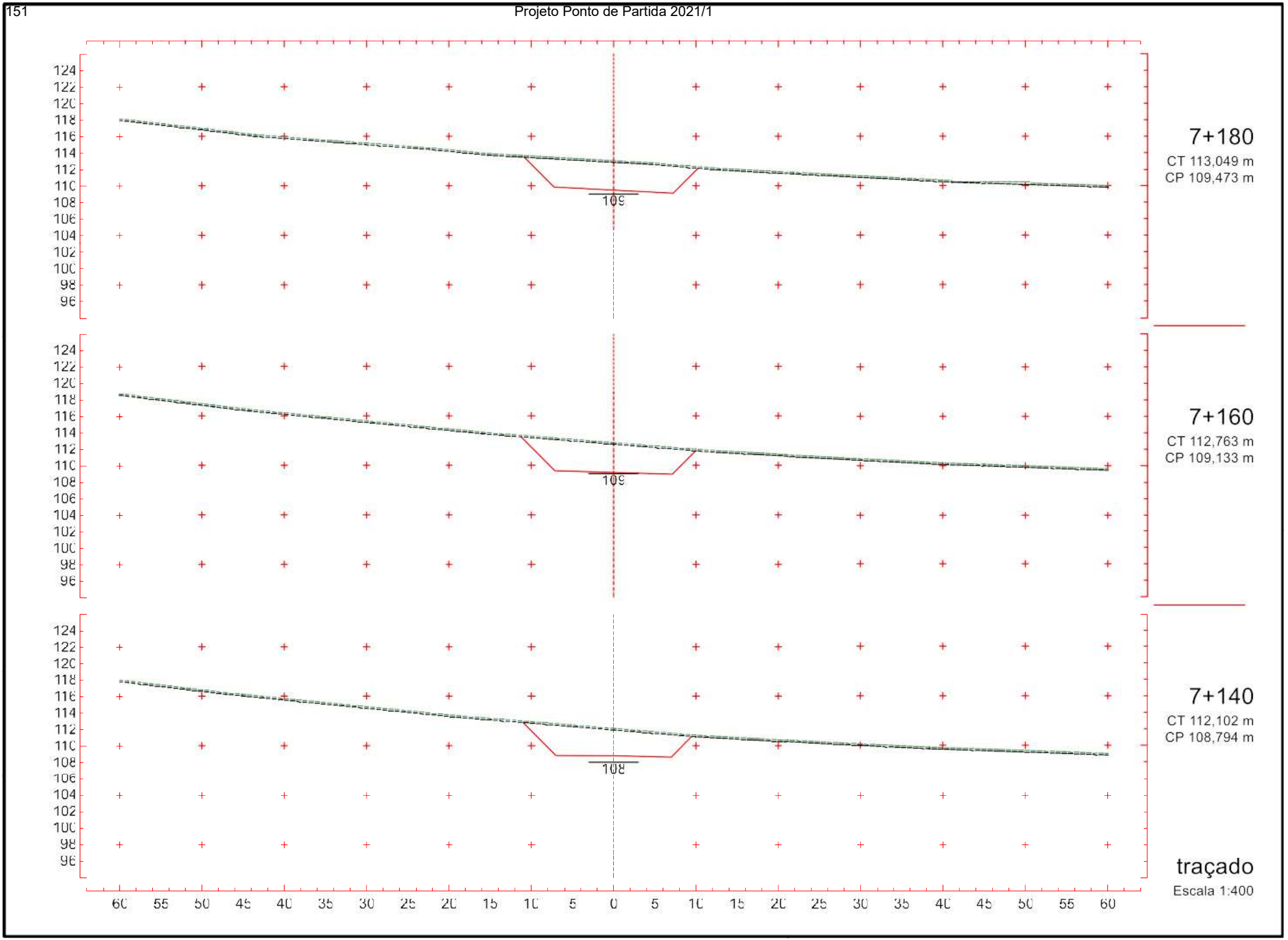

6+940
CT 103,373 m
CP 105,402 m
105
6+920
CT 103,023 m
CP 105,063 m
105
6+900
CT 102,674 m
CP 104,730 m
104
traçado
Escala 1:400

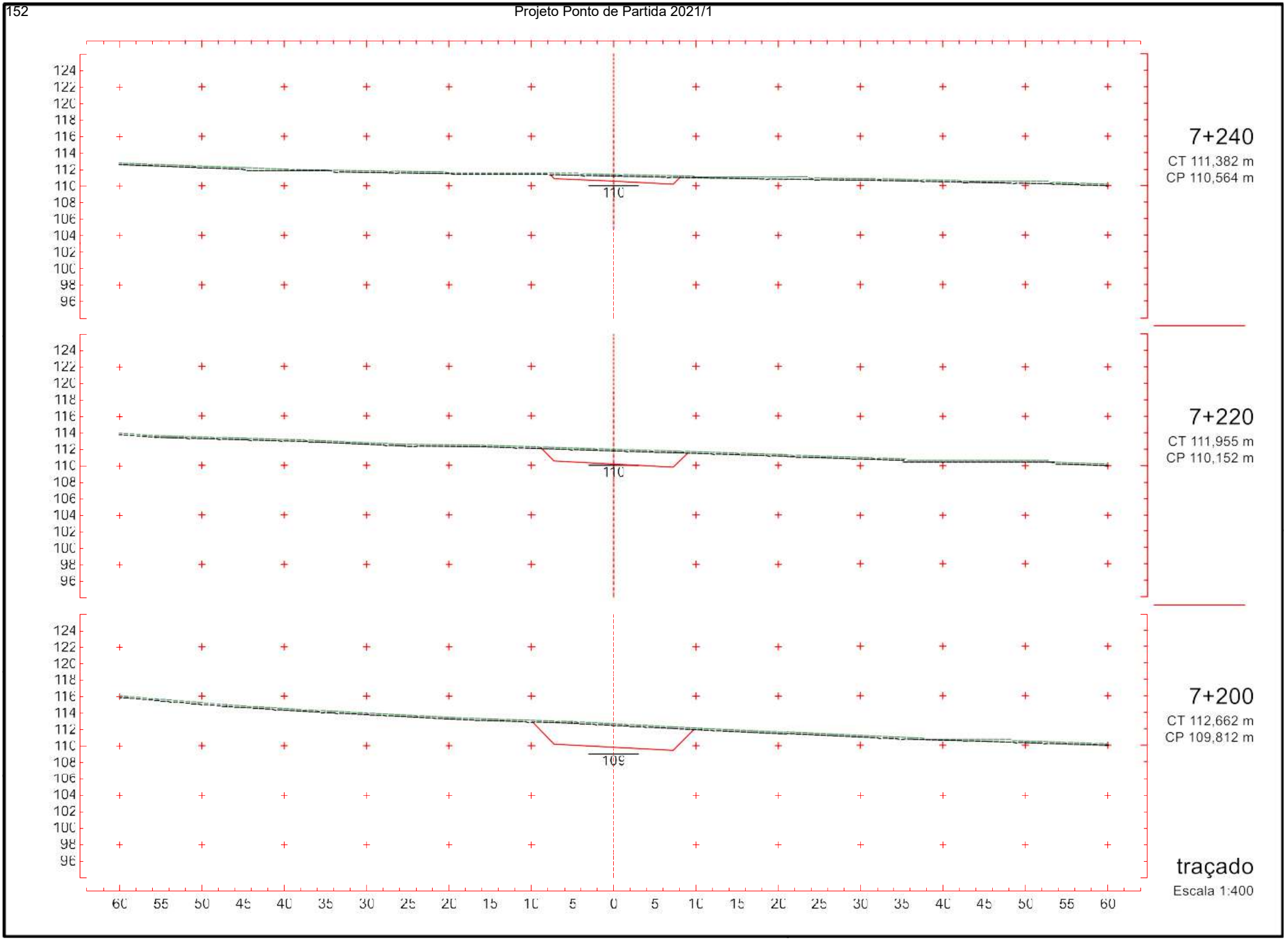

7+000
CT 104,566 m
CP 106,420 m
6+980
CT 104,088 m
CP 106,081 m
6+960
CT 103,622 m
CP 105,742 m
traçado
Escala 1:400

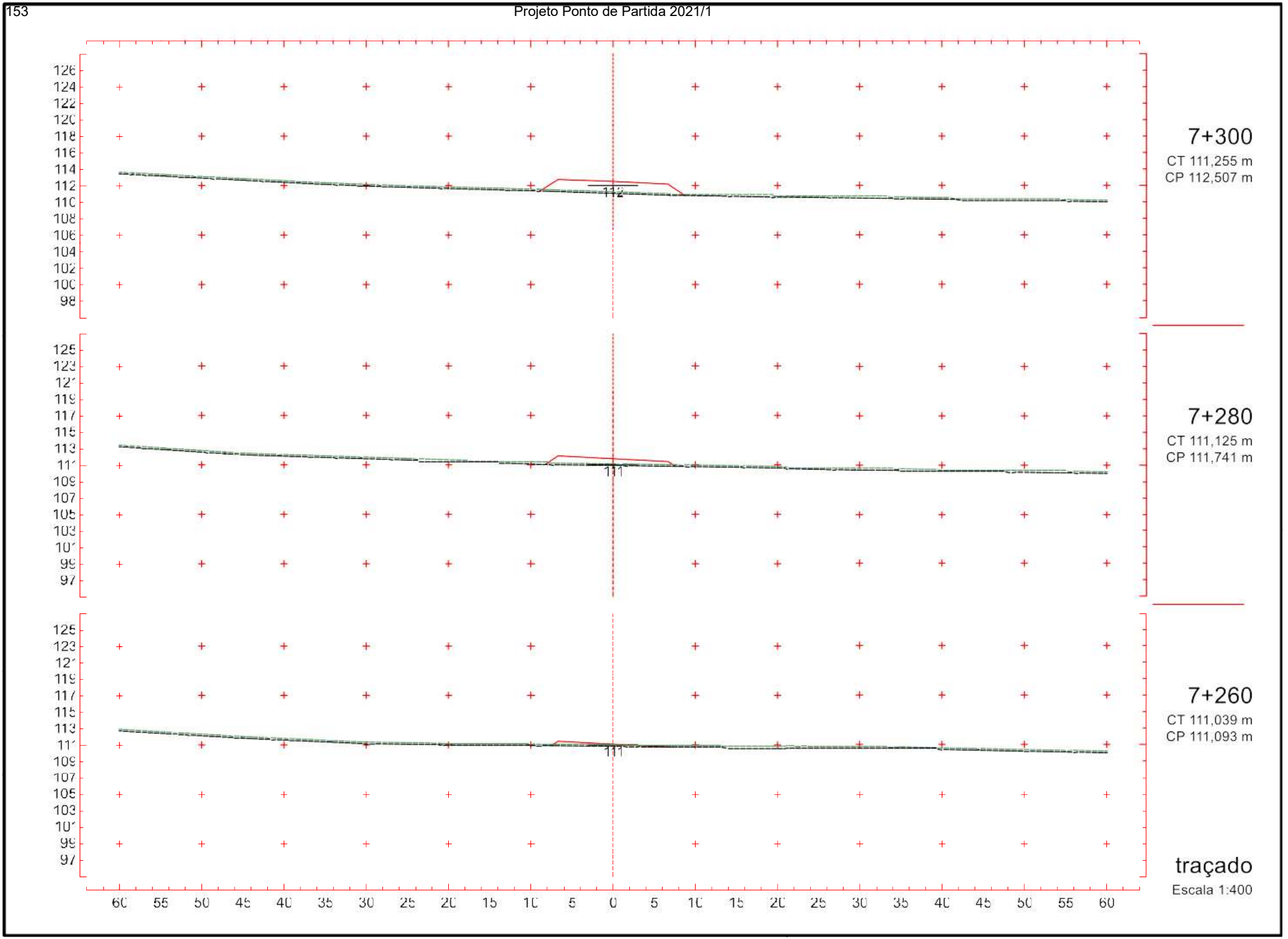

7+060
CT 107,480 m
CP 107,438 m
7+040
CT 106,332 m
CP 107,098 m
7+020
CT 105,262 m
CP 106,759 m
traçado
Escala 1:400

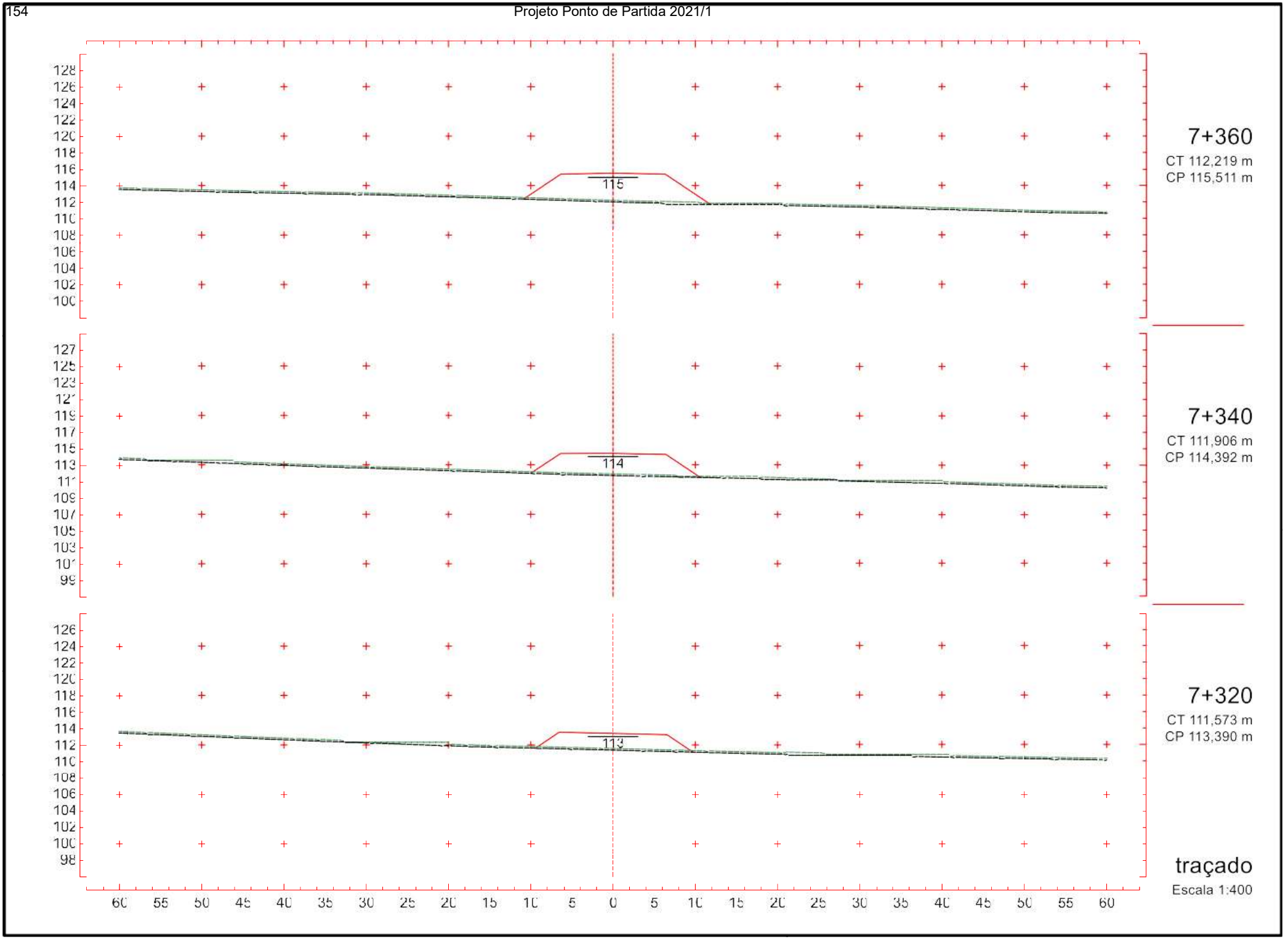
Projeto Ponto de Partida 2021/1



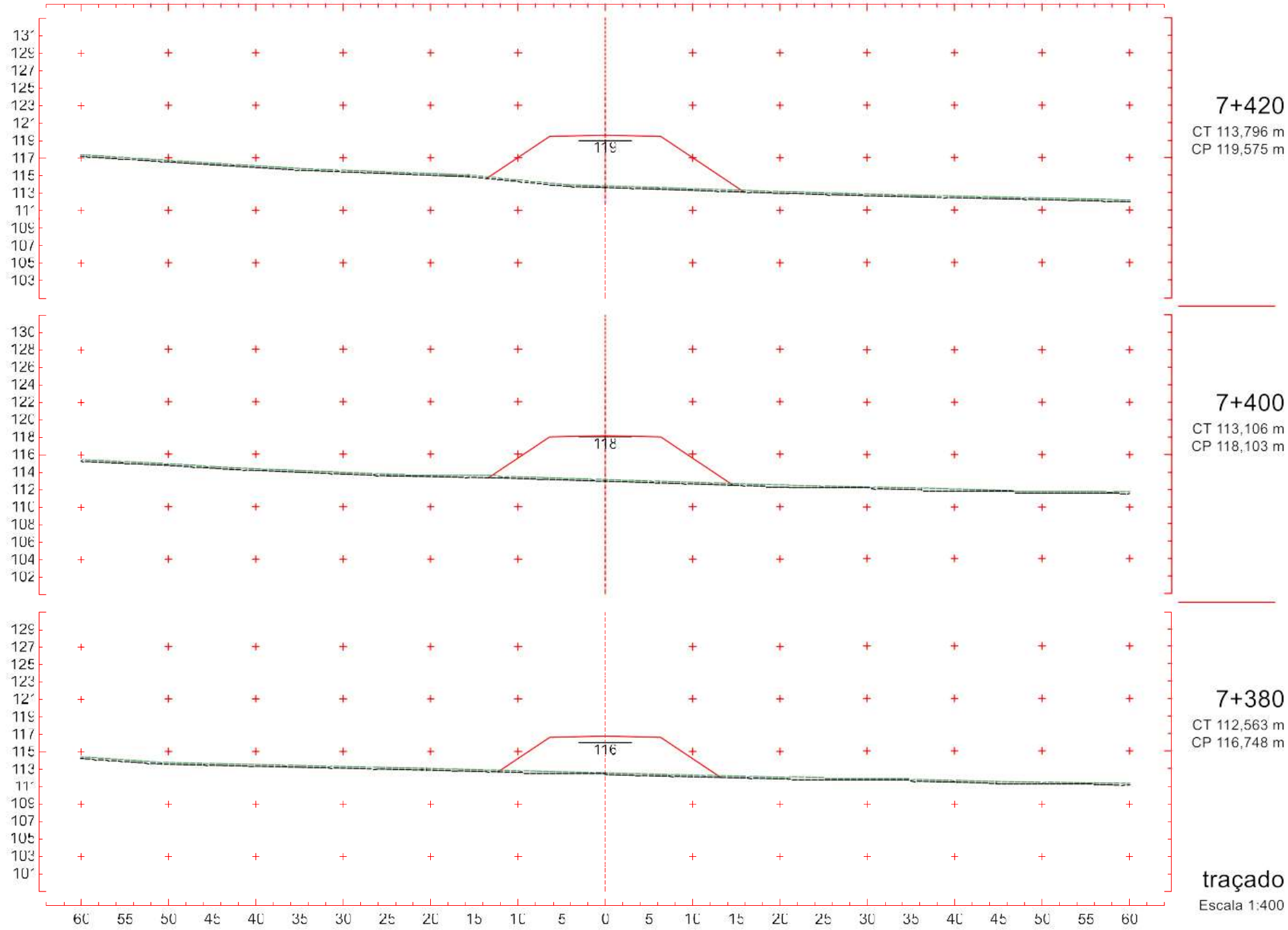

7+180
CT 113,049 m
CP 109,473 m
109
7+160
CT 112,763 m
CP 109,133 m
109
7+140
CT 112,102 m
CP 108,794 m
108
traçado
Escala 1:400

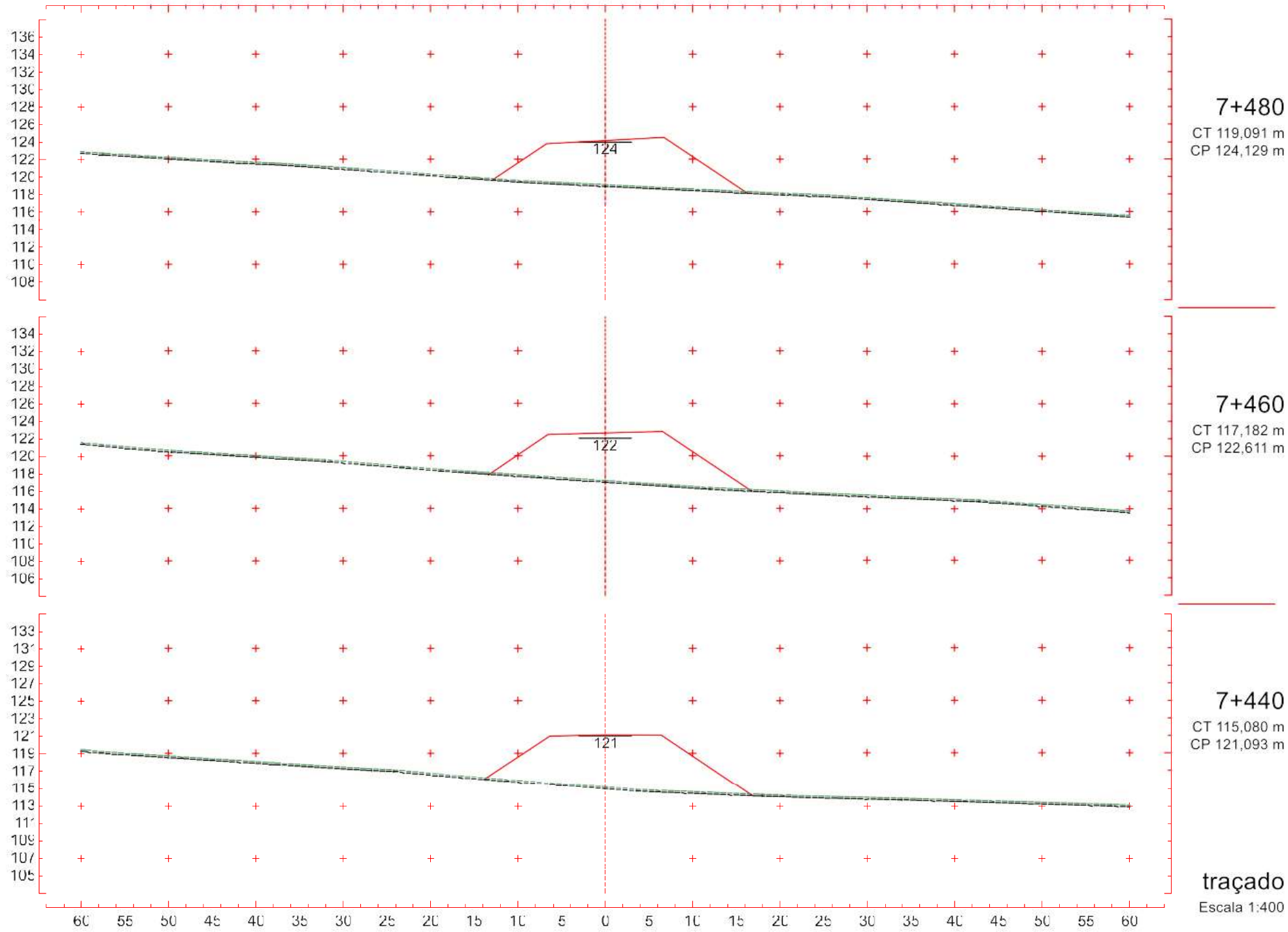

7+240
CT 111,382 m
CP 110,564 m
7+220
CT 111,955 m
CP 110,152 m
7+200
CT 112,662 m
CP 109,812 m
traçado
Escala 1:400

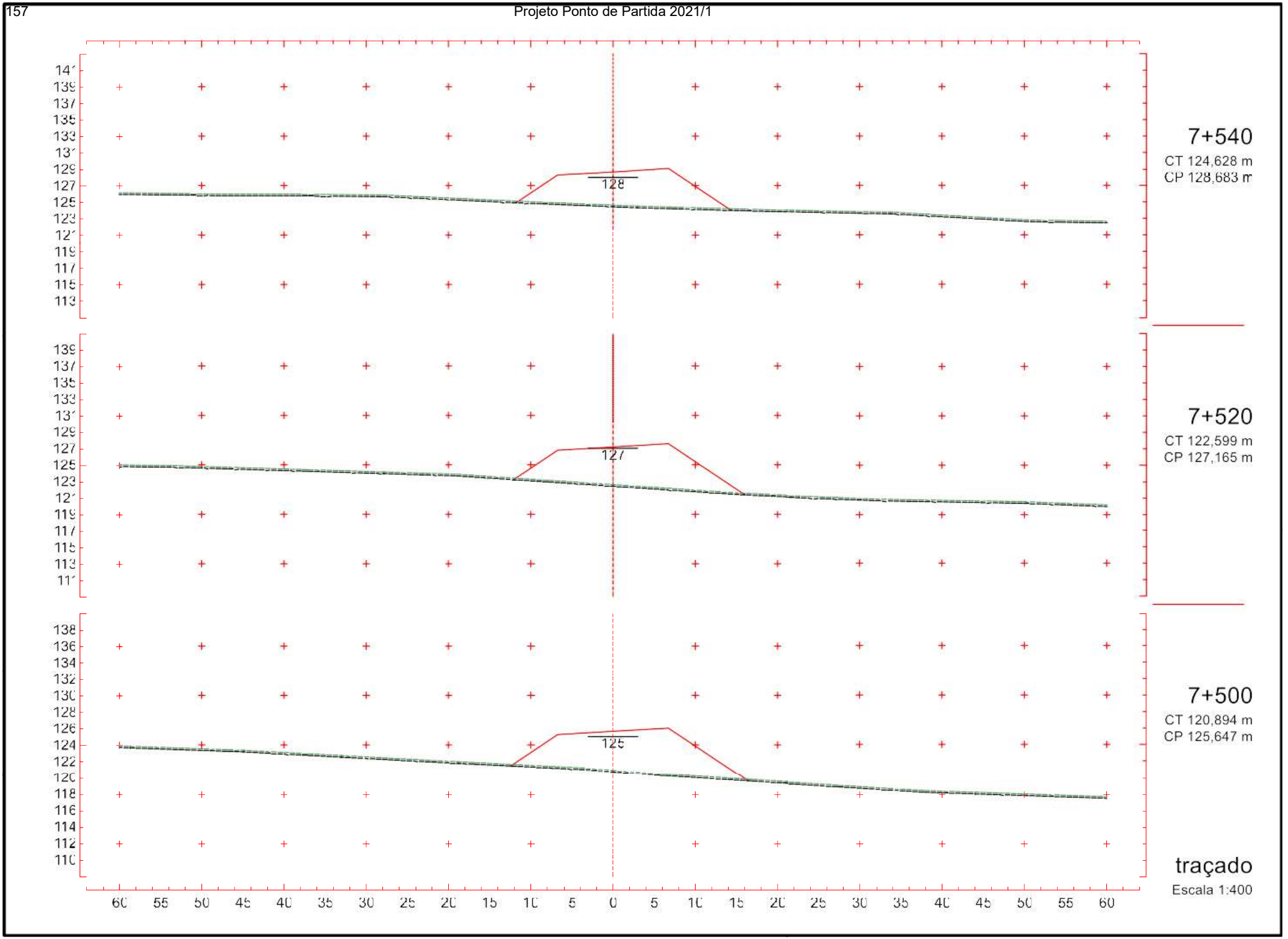

7+300
CT 111,255 m
CP 112,507 m
7+280
CT 111,125 m
CP 111,741 m
7+260
CT 111,039 m
CP 111,093 m
traçado
Escala 1:400

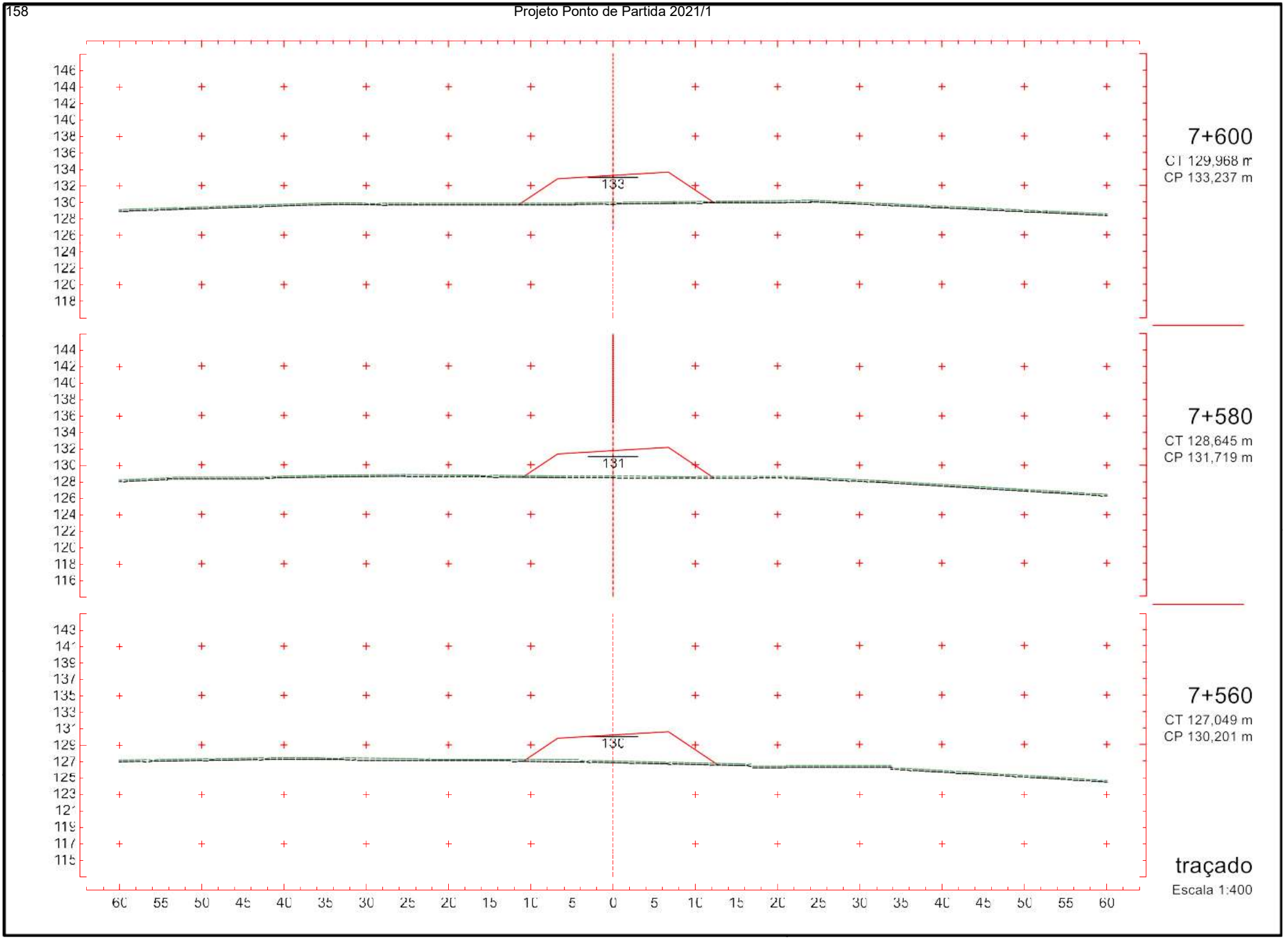

7+360
CT 112,219 m
CP 115,511 m
7+340
CT 111,906 m
CP 114,392 m
7+320
CT 111,573 m
CP 113,390 m
traçado
Escala 1:400

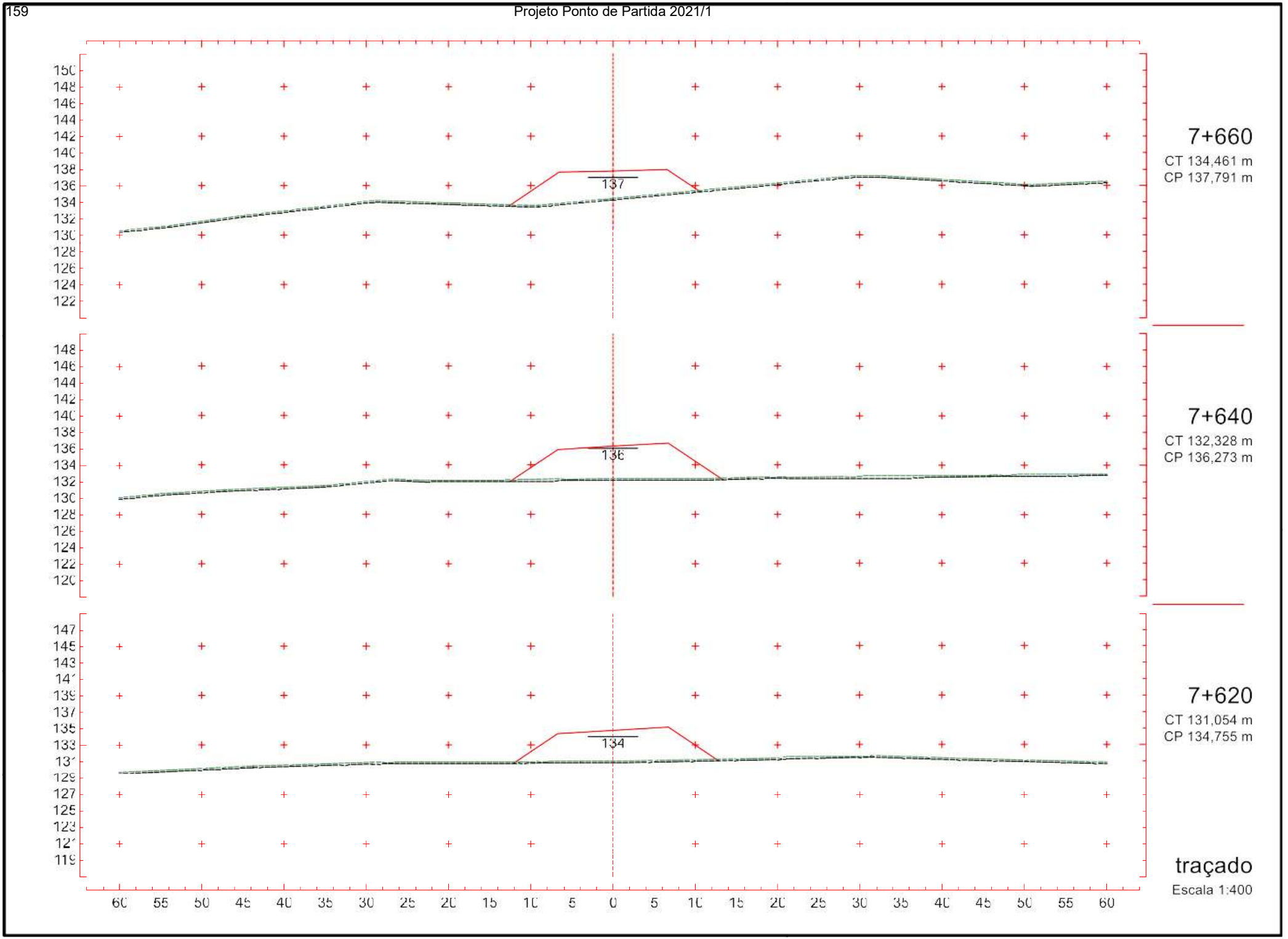
Projeto Ponto de Partida 2021/1

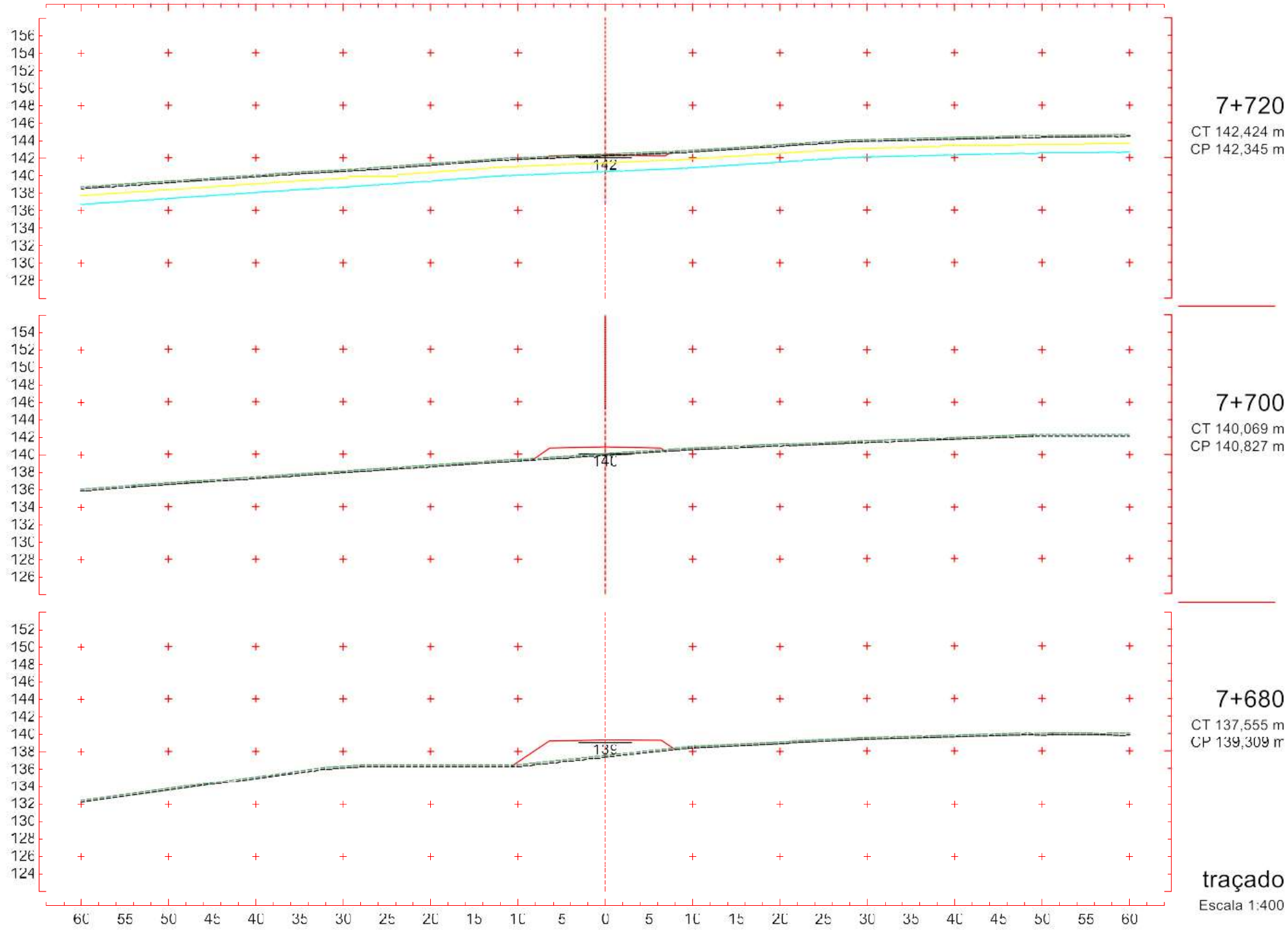



7+480
CT 119,091 m
CP 124,129 m
124
7+460
CT 117,182 m
CP 122,611 m
122
7+440
CT 115,080 m
CP 121,093 m
121
traçado
Escala 1:400

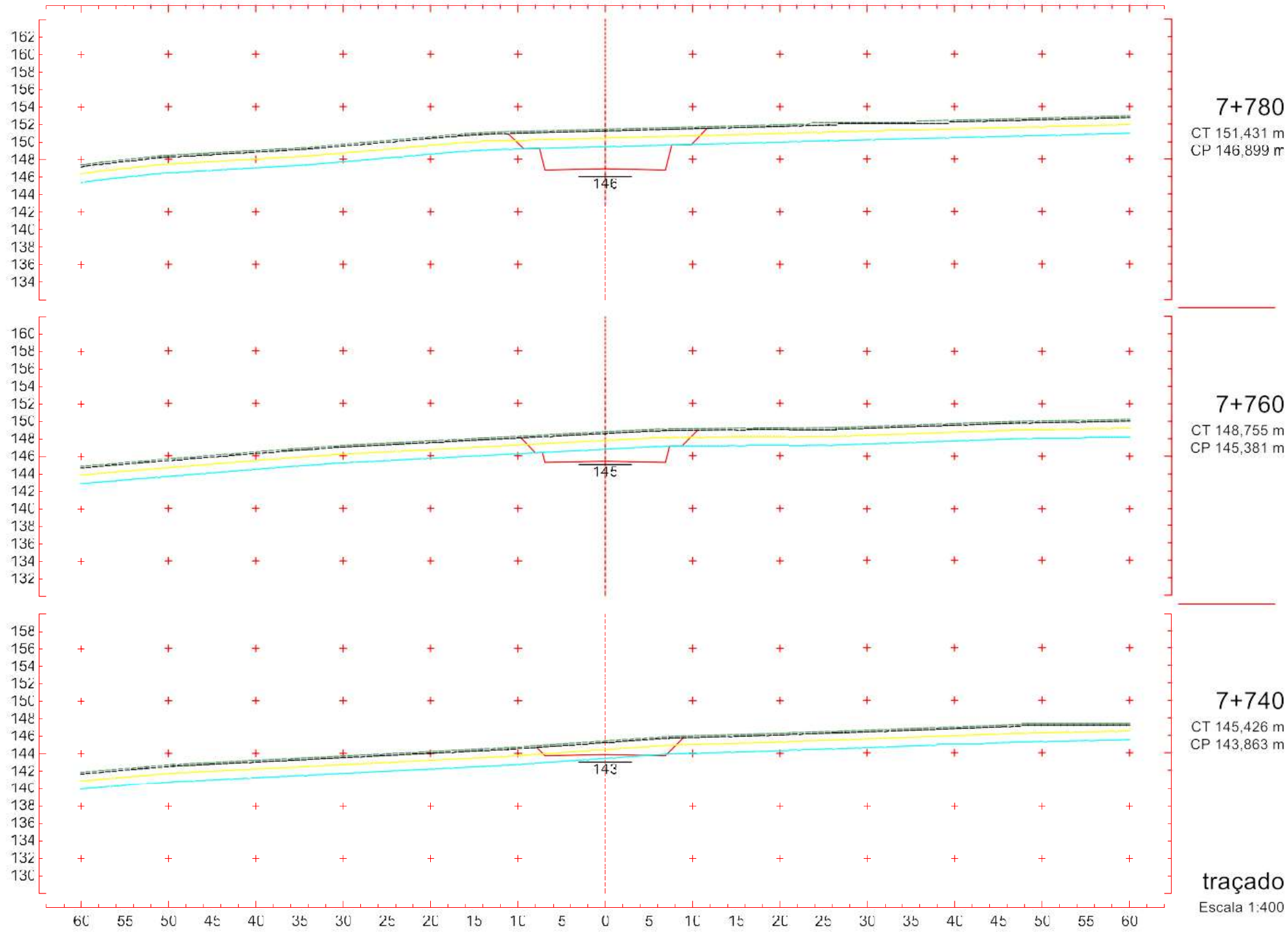

7+540
CT 124,628 m
CP 128,683 m
7+520
CT 122,599 m
CP 127,165 m
7+500
CT 120,894 m
CP 125,647 m
traçado
Escala 1:400

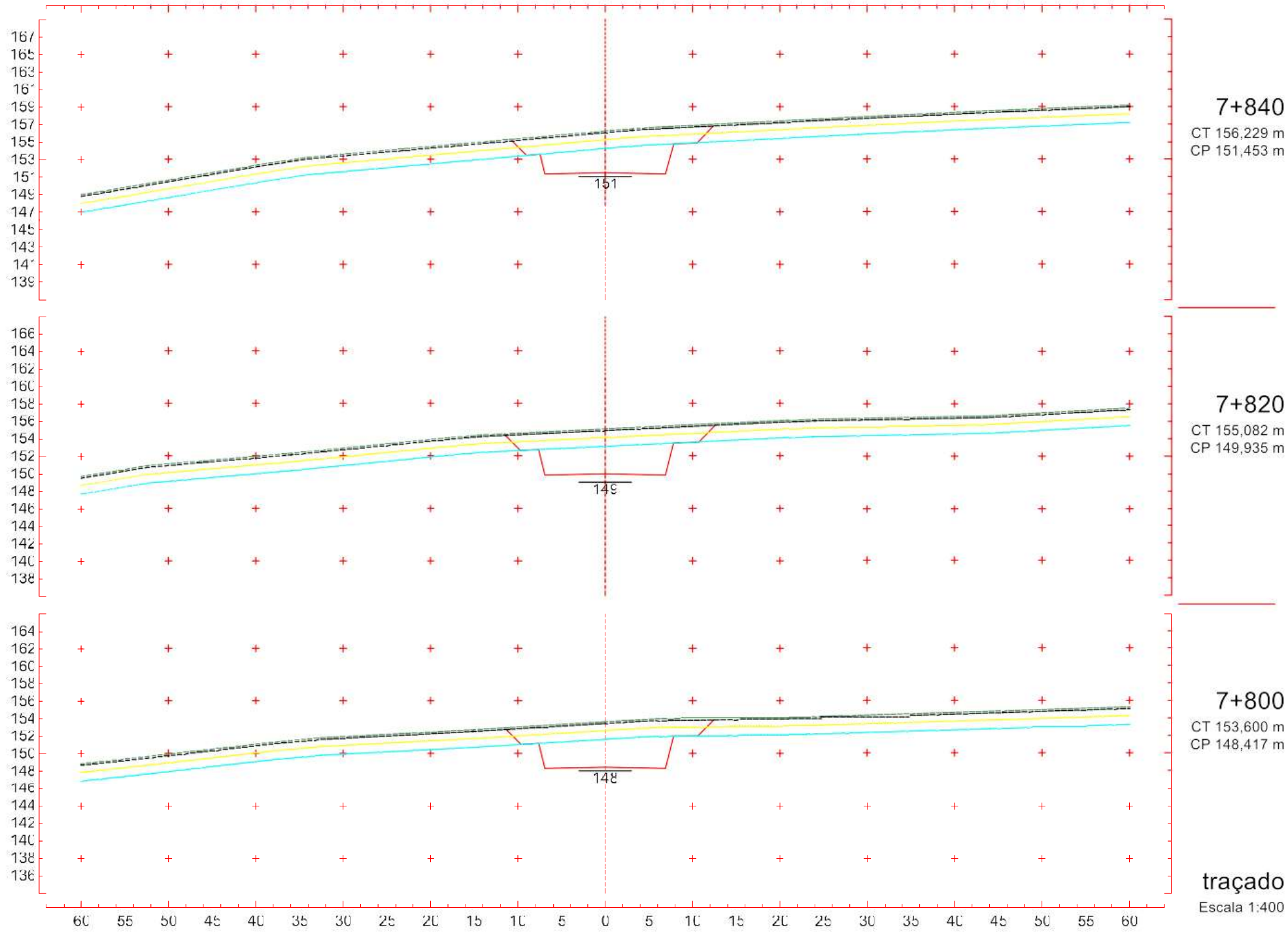

7+600
CT 129,968 m
CP 133,237 m
7+580
CT 128,645 m
CP 131,719 m
7+560
CT 127,049 m
CP 130,201 m
traçado
Escala 1:400

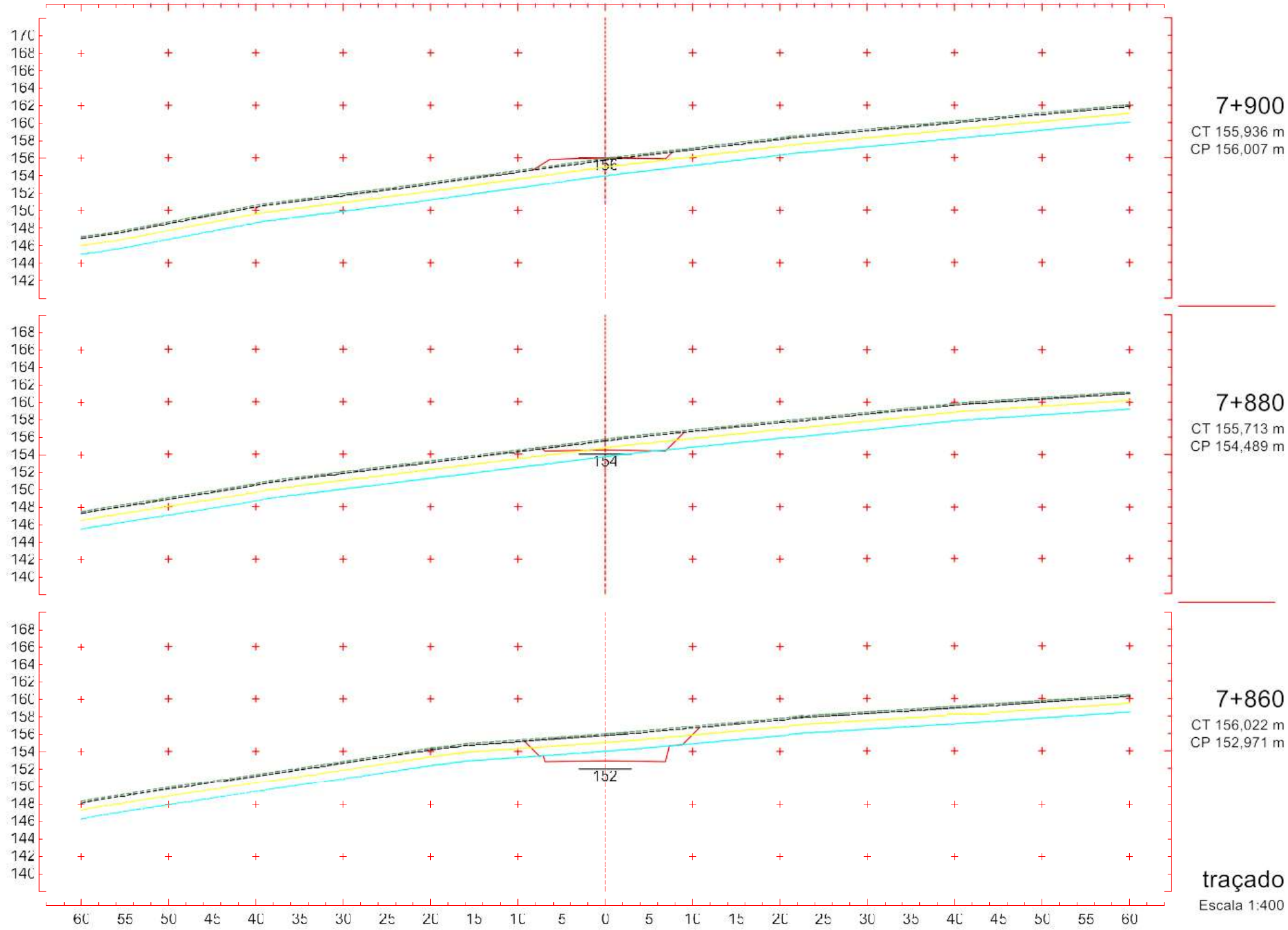

7+660
CT 134,461 m
CP 137,791 m
7+640
CT 132,328 m
CP 136,273 m
7+620
CT 131,054 m
CP 134,755 m
traçado
Escala 1:400

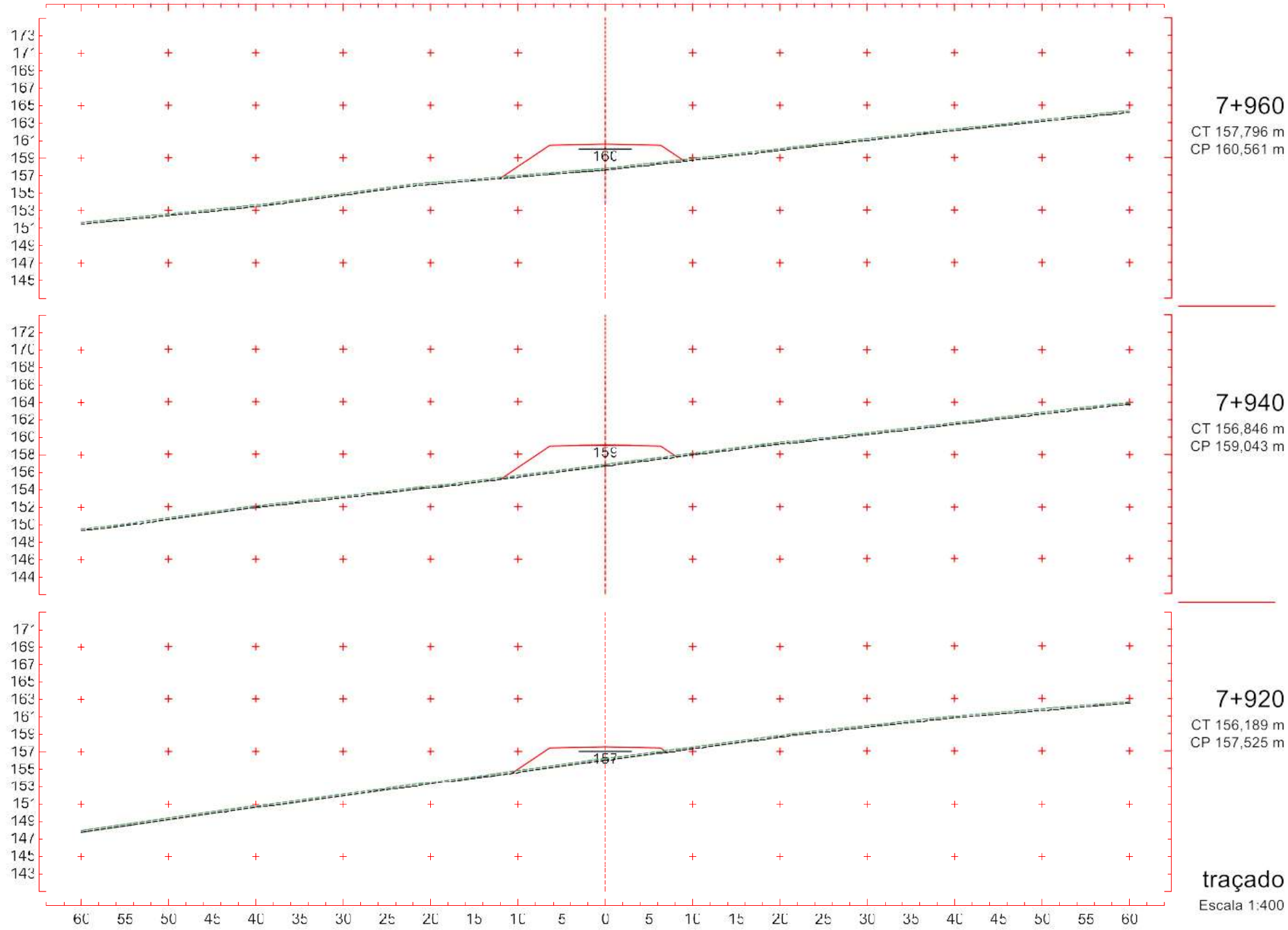

7+720
CT 142,424 m
CP 142,345 m
7+700
CT 140,069 m
CP 140,827 m
7+680
CT 137,555 m
CP 139,309 m
traçado
Escala 1:400

Projeto Ponto de Partida 2021/1

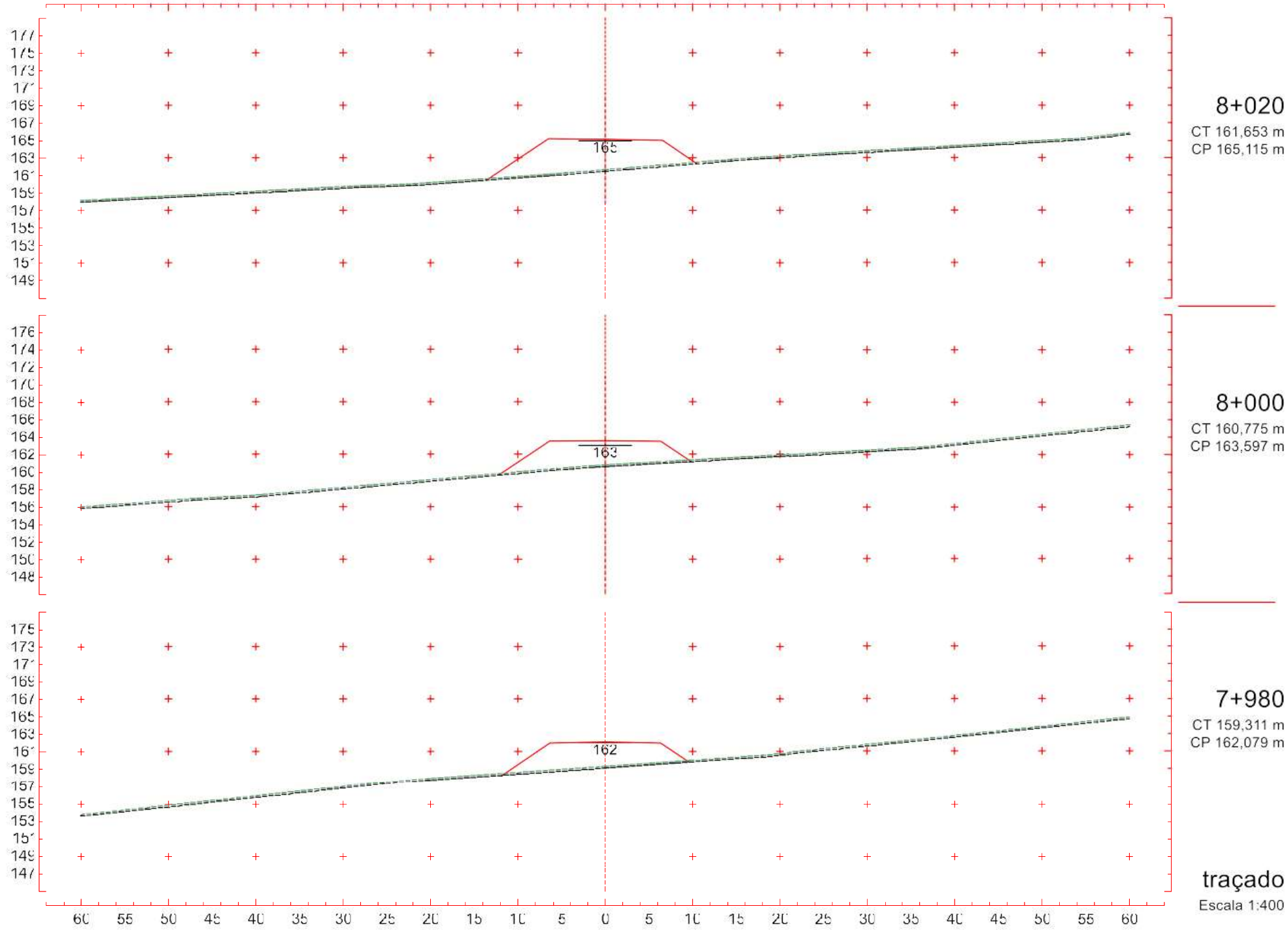



7+840
CT 156,229 m
CP 151,453 m
7+820
CT 155,082 m
CP 149,935 m
7+800
CT 153,600 m
CP 148,417 m
traçado
Escala 1:400

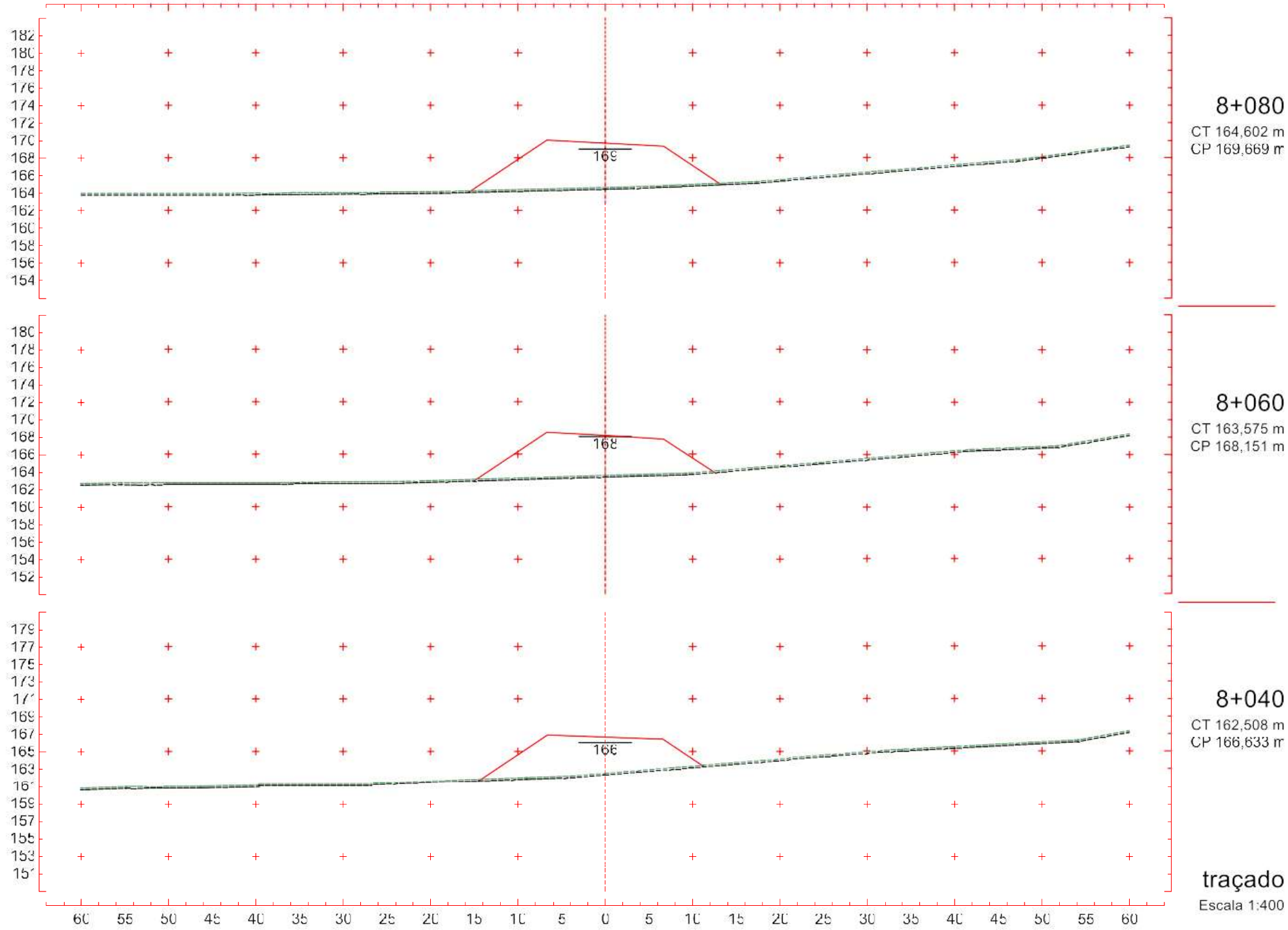

7+900
CT 155,936 m
CP 156,007 m
7+880
CT 155,713 m
CP 154,489 m
7+860
CT 156,022 m
CP 152,971 m
traçado
Escala 1:400


7+960
CT 157,796 m
CP 160,561 m
7+940
CT 156,846 m
CP 159,043 m
7+920
CT 156,189 m
CP 157,525 m
traçado
Escala 1:400

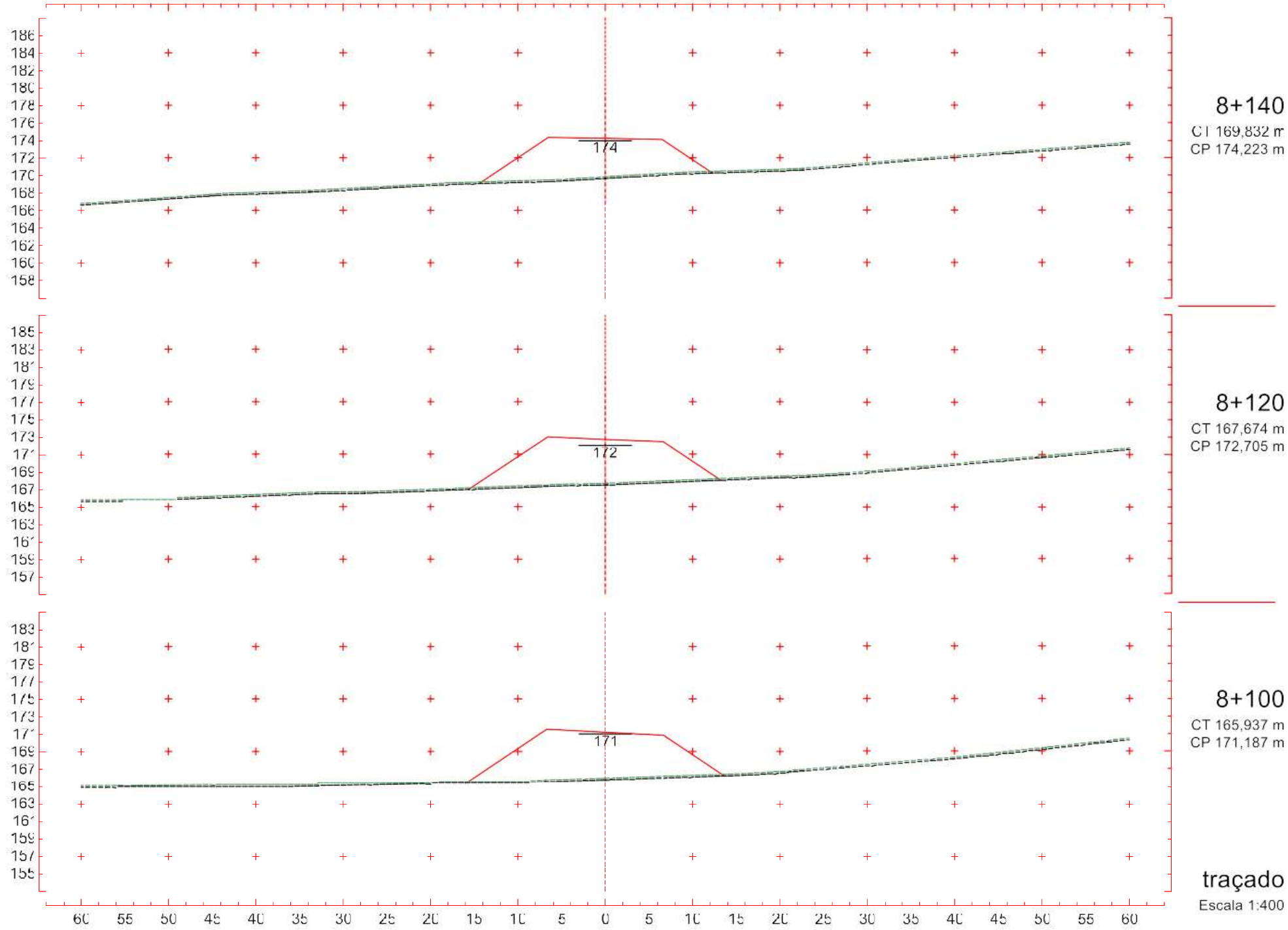
Projeto Ponto de Partida 2021/1

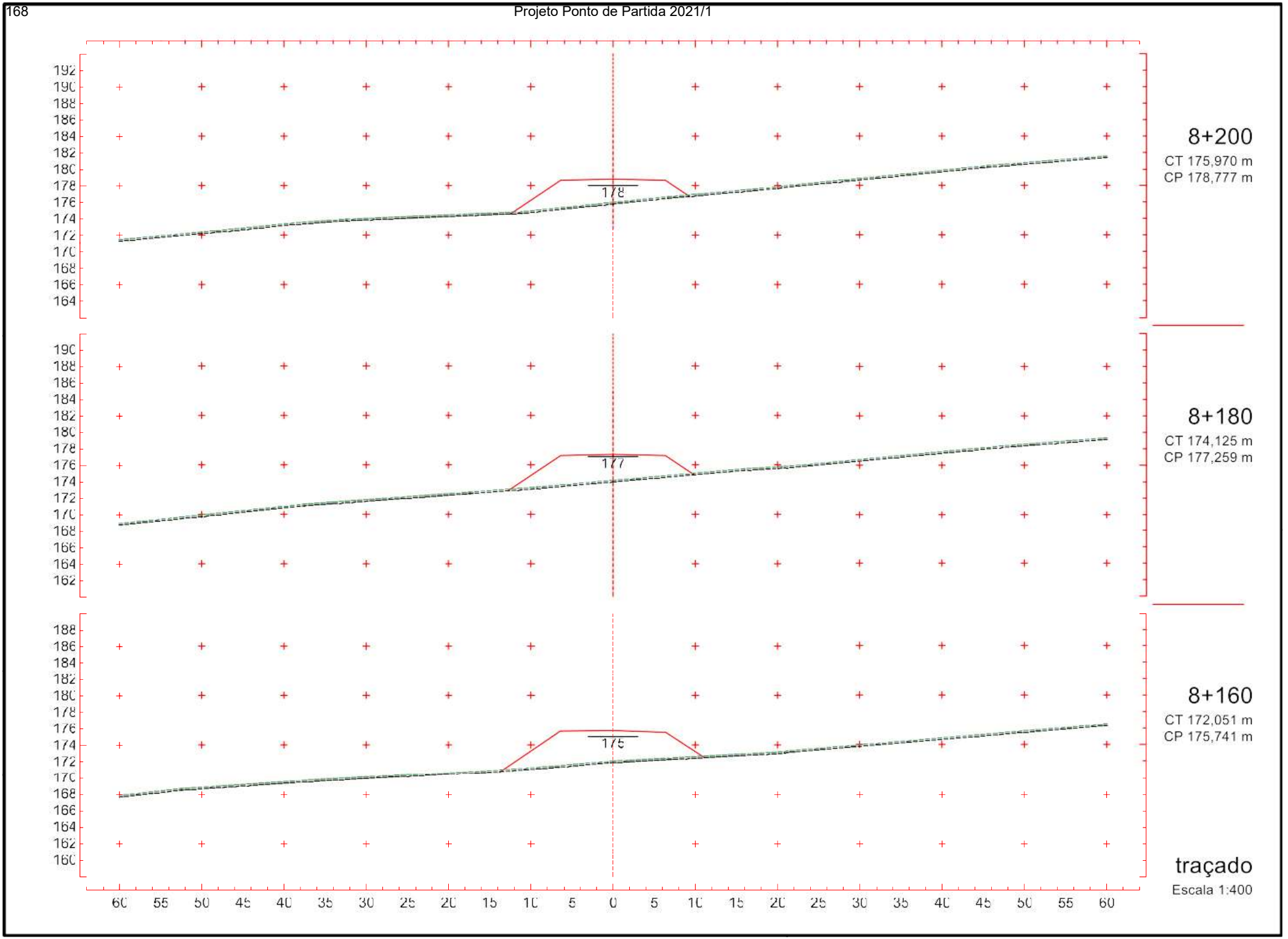


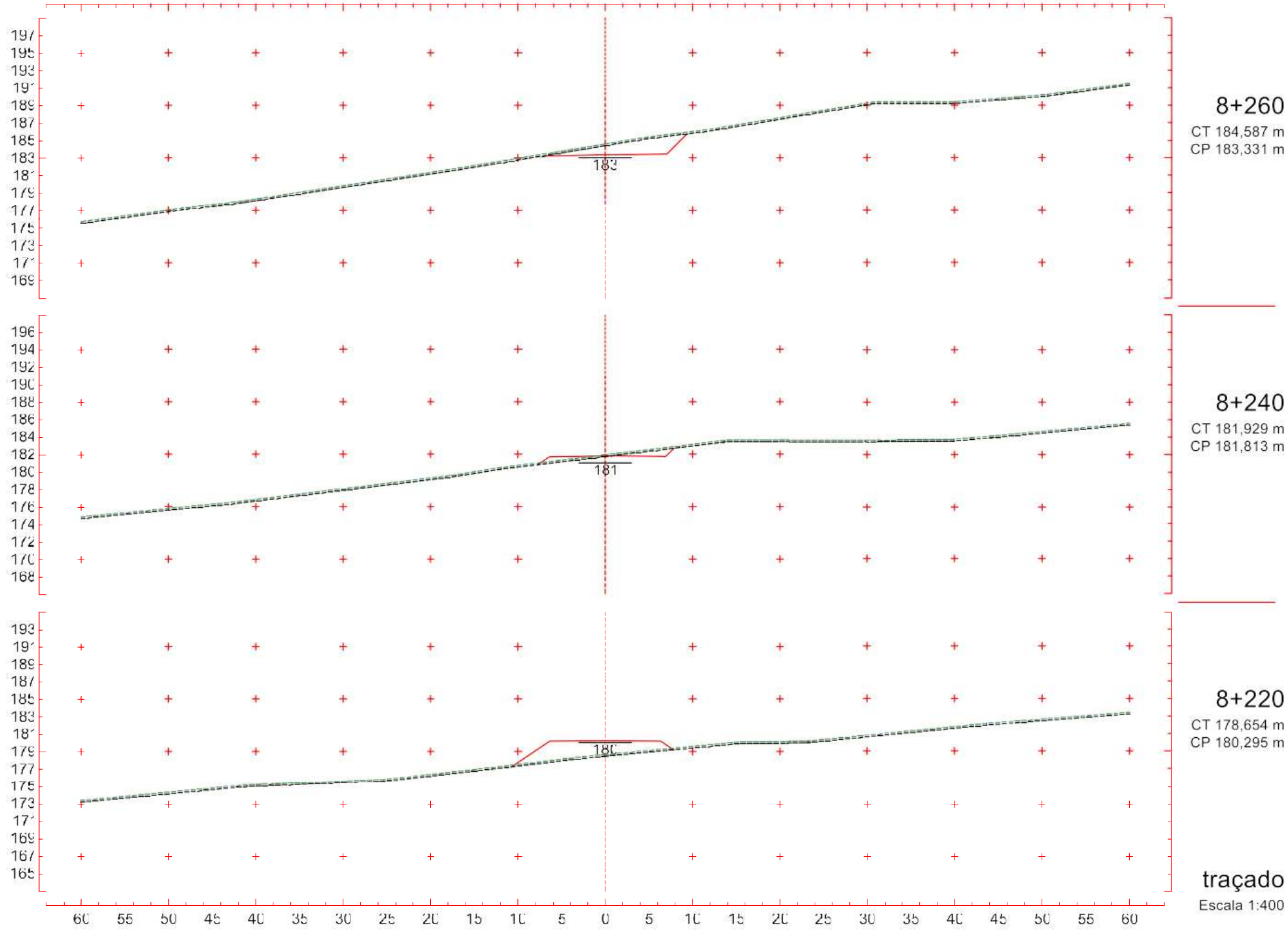
Projeto Ponto de Partida 2021/1



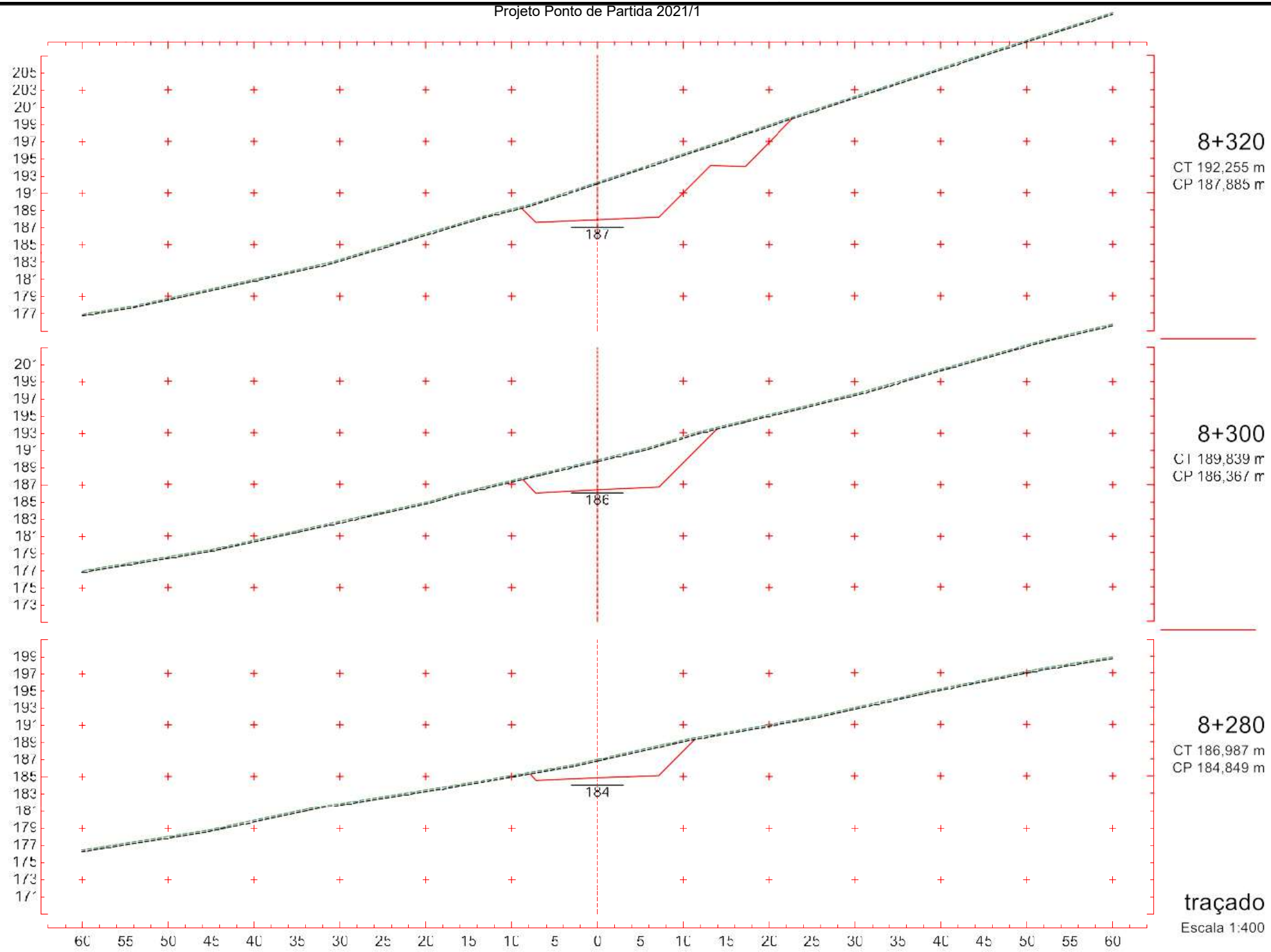
Projeto Ponto de Partida 2021/1

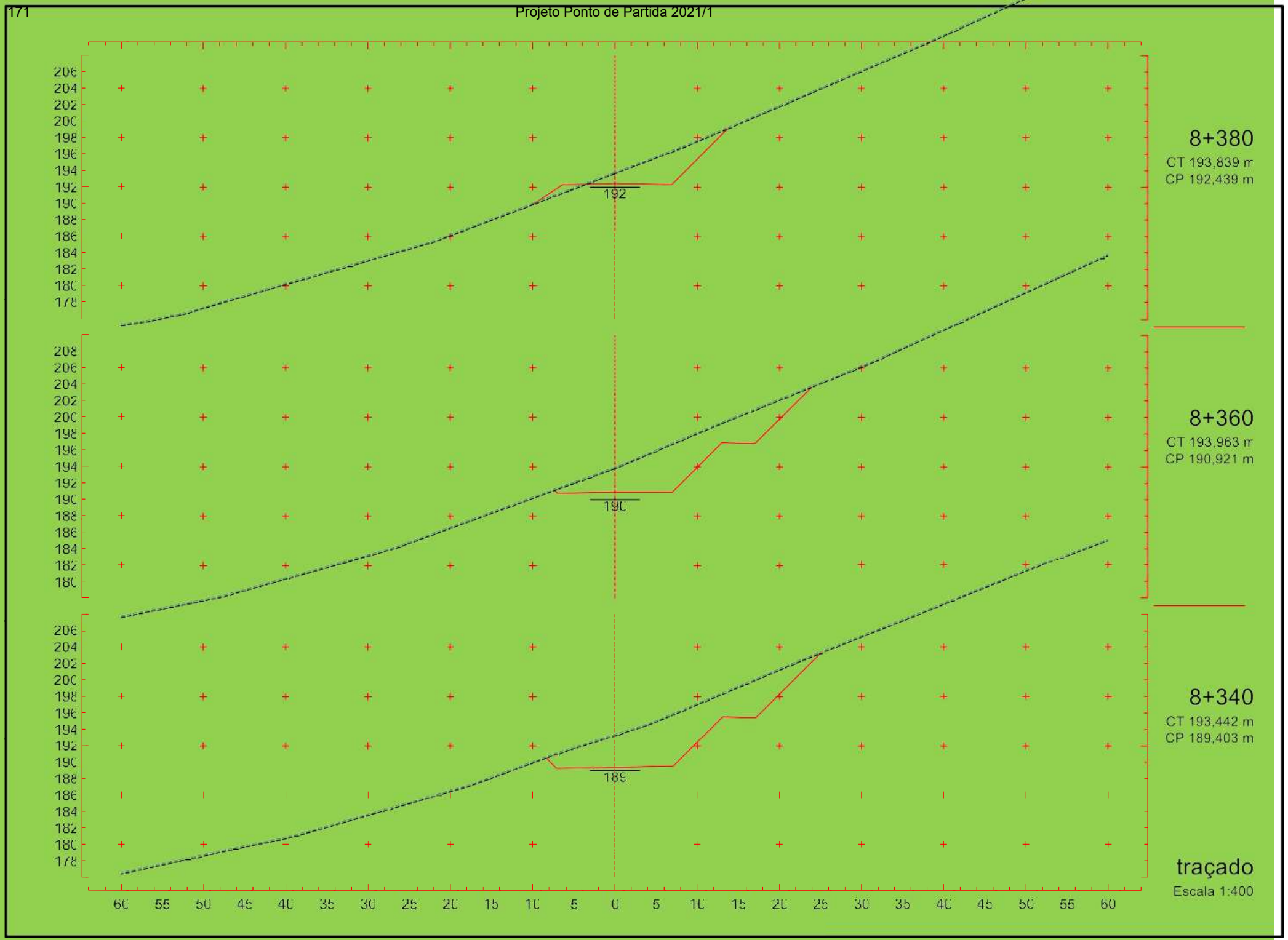



8+200
CT 175,970 m
CP 178,777 m
8+180
CT 174,125 m
CP 177,259 m
8+160
CT 172,051 m
CP 175,741 m
traçado
Escala 1:400


8+260
CT 184,587 m
CP 183,331 m
8+240
CT 181,929 m
CP 181,813 m
8+220
CT 178,654 m
CP 180,295 m
traçado
Escala 1:400

Projeto Ponto de Partida 2021/1




8+380
CT 193,839 m
CP 192,439 m
8+360
CT 193,963 m
CP 190,921 m
8+340
CT 193,442 m
CP 189,403 m
traçado
Escala 1:400

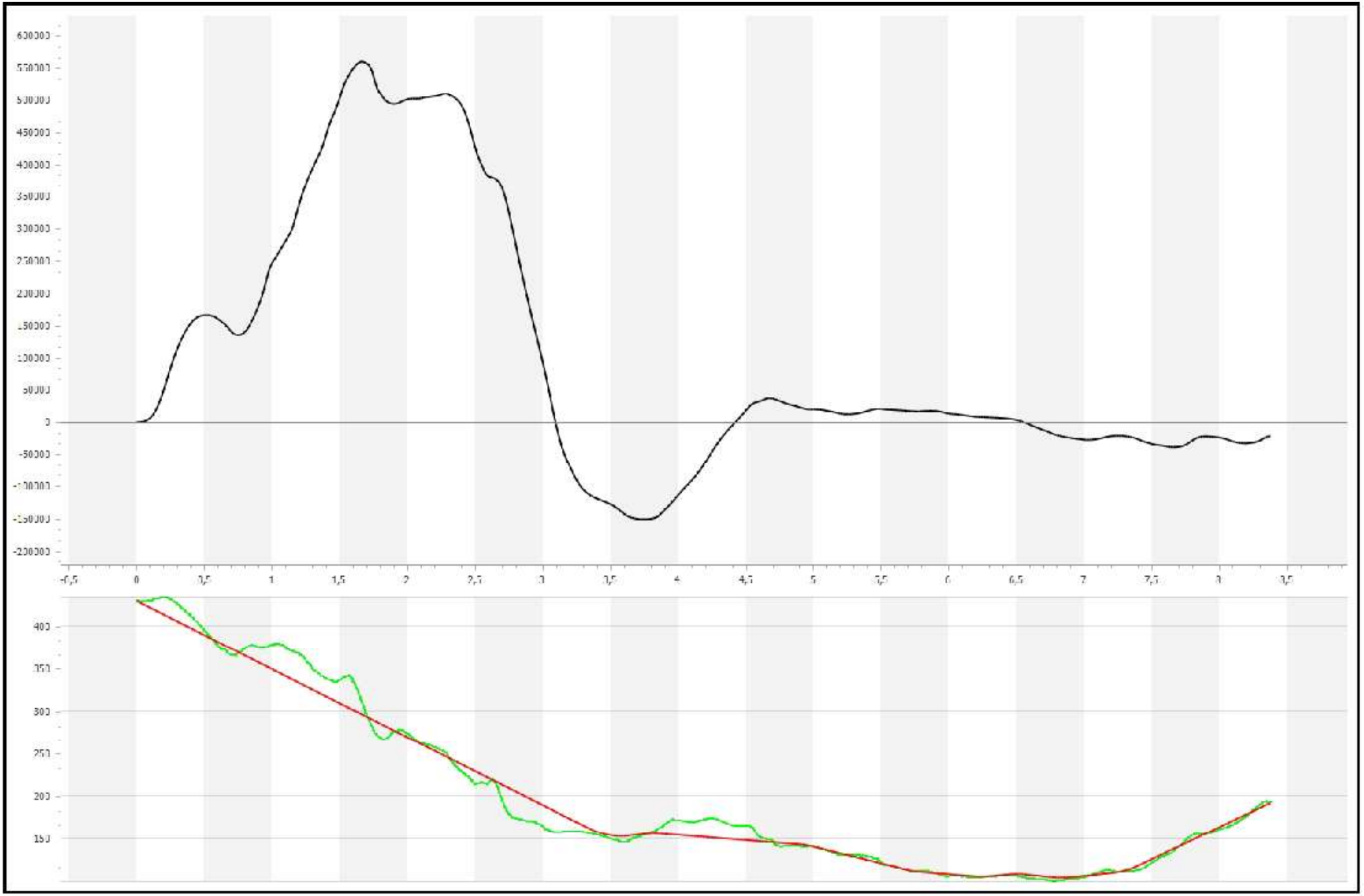
PROJETO DE TERRAPLENAGEM

3. PROJETO DE TERRAPLENAGEM

3.1. Diagrama de Massa

DIAGRAMA DE MASSAS (BRÜCKNER)

Rodovia:	Grupo de Eixos 1	Homogeneização:	- Corte 1ª Categoria: 1,300
Trecho:	traçado	- Aterro Camada Superior: 1,000	- Corte 2ª Categoria: 1,000
Segmento:	km: 0+000,00 ao km: 8+384,76	- Aterro Camada Inferior : 1,000	- Corte 3ª Categoria: 0,800



3.2. Quadro de Origem e Destino

QUADRO DE ORIENTAÇÃO DA TERRAPLENAGEM

Rodovia: Grupo de Eixos 1
Trecho: traçado
Segmento: km: 0+000,00 ao km: 8+384,76

Homogeneização:
- Aterro Camada Superior: 1,000
- Aterro Camada Inferior : 1,000
- Corte 1ª Categoria: 1,300
- Corte 2ª Categoria: 1,000
- Corte 3ª Categoria: 0,800

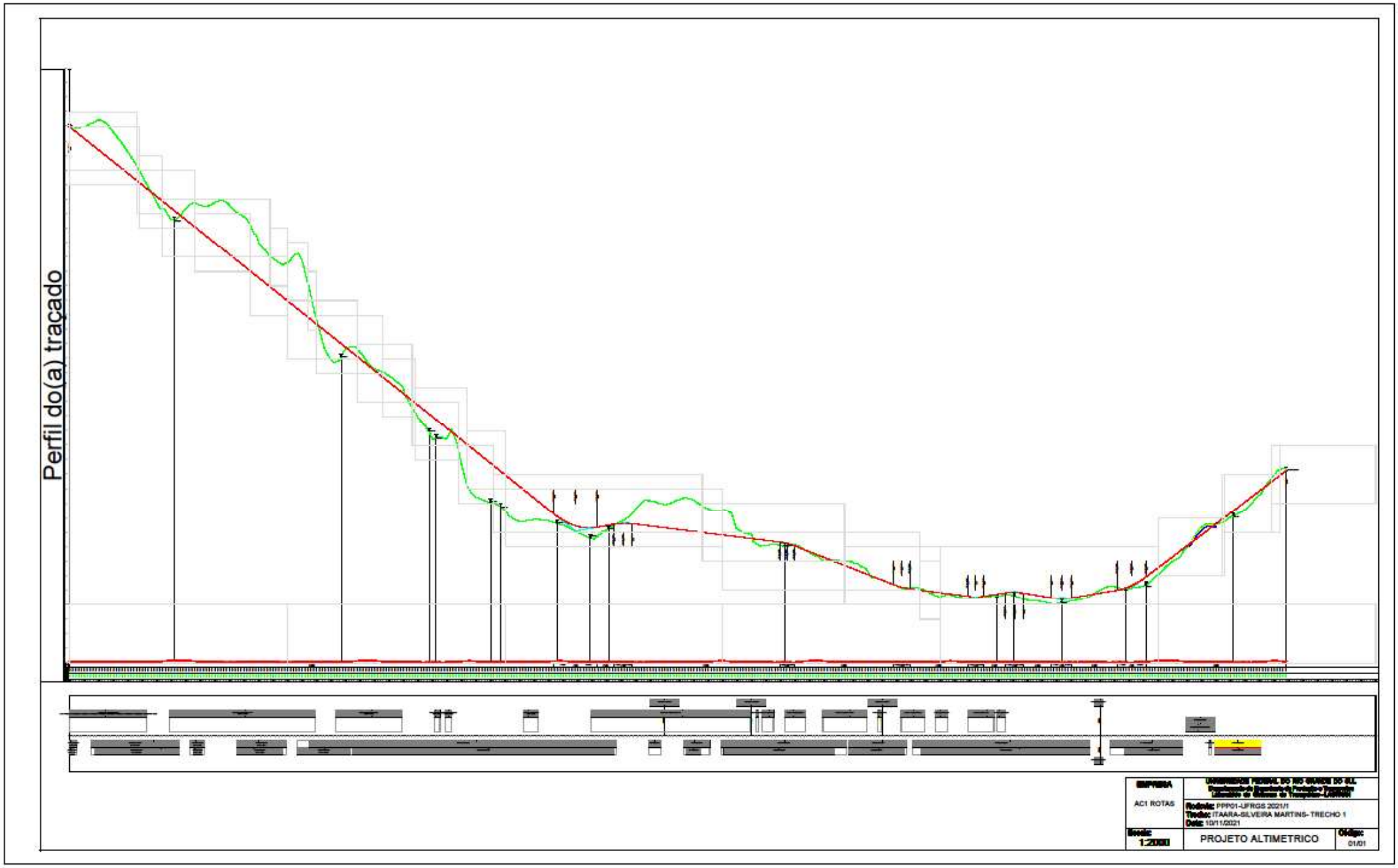
Vol. transp. : 1079933,00m³
Momento tot.: 1683253,63m³.m
DMT : 1,559km

ORIGEM										DESTINO							TRANSPORTE			
IDENTIFICAÇÃO			LOCALIZAÇÃO				VOLUMES (m3)			IDENTIFICAÇÃO		LOCALIZAÇÃO				VOLUME	DIST.	VOL.	MOM. DE	OBS
ESPECIFICAÇÃO		FATOR	POSICIONAMENTO			DM	GEO.	HOMOGENEIZADO		ESPECIFICAÇÃO		POSICIONAMENTO			DM	GEO.	TRANSP.	COMP.	TRANSP.	
ID	TIPO	HOMO.	INÍCIO	CM	FIM	(km)	TOTAL	TOTAL	PARC.	ID	TIPO	INÍCIO	CM	FIM	(km)	TOTAL	(km)	(m³)	(m³ x km)	
C-15-2	C2ª	1	7+690	7+790	7+890		3523	3523,00												
									3523	A-11-I	AI	7+270	7+460	7+670		13796	0,33	3523	1162,59	
C-15-3	C3ª	0,8	7+690	7+780	7+890		8438	10547,50												
									2280,53	A-11-I	AI	7+270	7+460	7+670			0,32	1824,42	583,815	
									8266,97	A-13-I	AI	7+890	8+060	8+210		8429	0,28	6613,58	1851,802	
C-01	C1ª	1,3	0+000	0+250	0+530		220175	169365,38												
									1	A-01-I	AI	0+000	0+010	0+030		1	0,24	1,3	0,312	
									22	A-01-S	AS	0+000	0+010	0+050		22	0,24	26,6	6,864	
									29385	A-02-I	AI	0+170	0+630	0+750		29385	0,38	38200,5	14516,19	
									4740	A-02-S	AS	0+150	0+580	0+750		4740	0,33	6162	2033,46	
									14	A-03-I	AI	0+850	0+860	0+910		14	0,61	18,2	11,102	
									52	A-03-S	AS	0+830	0+870	0+930		52	0,62	67,6	41,912	
									326	A-04-I	AI	1+150	1+270	1+470		326	1,02	423,8	432,276	
									318	A-04-S	AS	1+150	1+300	1+490		318	1,05	413,4	434,07	
									65290	A-05-I	AI	1+570	1+760	1+930		65290	1,51	84877	128164,27	
									69217,38	A-05-I	AI	1+950	2+890	3+750			2,64	89982,6	237554,064	
C-02	C1ª	1,3	0+690	1+210	1+690		557415	428780,77												
									428780,77	A-05-I	AI	1+950	2+890	3+750			1,68	557415	936457,2	
C-03	C1ª	1,3	1+830	2+080	2+290		28085	21603,85												
									21603,85	A-05-I	AI	1+950	2+890	3+750			0,81	28085	22748,85	
C-04	C1ª	1,3	2+510	2+520	2+550		22	16,92												
									16,92	A-05-I	AI	1+950	2+890	3+750			0,37	22	8,14	
C-05	C1ª	1,3	2+590	2+610	2+630		299	230,00												
									230	A-05-I	AI	1+950	2+890	3+750			0,28	299	83,72	
C-06	C1ª	1,3	3+130	3+160	3+230		19	14,62												
									14,62	A-05-I	AI	1+950	2+890	3+750			0,27	19	5,13	
C-07	C1ª	1,3	3+590	4+220	4+690		247742	190570,77												
									111086,46	A-05-I	AI	1+950	2+890	3+750			1,33	144412,4	192068,492	
									40348	A-05-S	AS	1+650	2+800	3+770		40348	1,42	52452,4	74482,408	
									8	A-06-S	AS	3+990	4+080	4+070		8	0,19	10,4	1,976	
									6	A-07-I	AI	4+250	4+300	4+350		6	0,08	7,8	0,624	
									39	A-07-S	AS	4+230	4+310	4+410		39	0,09	50,7	4,563	
									20835	A-08-I	AI	4+510	4+890	5+270		20835	0,67	27085,5	18147,285	
									6918	A-08-S	AS	4+490	4+930	5+350		6918	0,71	8993,4	6385,314	
									2060	A-09-I	AI	5+370	5+580	5+750		2060	1,38	2678	3642,08	
									2431	A-09-S	AS	5+370	5+600	5+770		2431	1,38	3160,3	4361,214	
									6839,31	A-10-I	AI	5+870	6+550	7+030		32697	2,33	8891,1	20716,263	
C-08	C1ª	1,3	4+730	4+740	4+750		4	3,08												
									3,08	A-10-S	AS	5+810	6+480	7+030		12592	1,74	4	6,96	
C-09	C1ª	1,3	4+770	4+820	4+850		10	7,69												
									7,69	A-10-S	AS	5+810	6+480	7+030			1,66	10	16,6	
C-10	C1ª	1,3	4+930	4+990	5+070		1082	832,31												
									832,31	A-10-S	AS	5+810	6+480	7+030			1,49	1082	1612,18	
C-11	C1ª	1,3	5+190	5+380	5+490		11932	9178,46												
									8364,92	A-10-S	AS	5+810	6+480	7+030			1,1	10874,39	11961,829	
									813,55	BE-D	AS	7+060	7+100	7+120	0	8355	1,72	1057,61	1819,174	
C-12	C1ª	1,3	5+570	5+580	5+590		2	1,54												
									1,54	BE-D	C1ª	7+060	7+100	7+120	0		1,52	2	3,04	
C-13	C1ª	1,3	5+730	5+820	5+890		1139	876,15												
									876,15	A-11-I	AI	7+270	7+460	7+670			1,64	1139	1867,96	
C-14	C1ª	1,3	5+970	6+000	6+050		25	19,23												
									19,23	A-11-I	AI	7+270	7+460	7+670			1,46	25	36,5	
C-15	C1ª	1,3	6+190	6+320	6+370		15	11,54												
									11,54	A-11-I	AI	7+270	7+460	7+670			1,14	15	17,1	
C-16-1	C1ª	1,3	6+390	6+410	6+450		6	4,62												
									4,62	A-11-I	AI	7+270	7+460	7+670			1,05	6	6,3	

1/1

TOTAIS							1079933	835587,43	835587,44							248662		1079933	1683253,629
																		DNT	1,55866487

3.3. Esquema Linear de Distribuição dos Materiais


Perfil do(a) traçado
EMPRESA
AC1 ROTAS
Projeto: PPP01-UFRGS 2021/1
Trecho: ITAARA-SILVEIRA MARTINS- TRECHO 1
Data: 10/11/2021
Escala: 1:2000
PROJETO ALTIMETRICO
Código: 01/01