

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

PROJETO PONTO DE PARTIDA

PARTE II

EDIÇÃO UFRGS 2023/1



Daniel Sergio Presta Garcia
Emanuel Salvador Caldeira
Rodrigo Heitor Viana dos Santos
Luiz Fernando Garcez Scherer

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PORTO ALEGRE

UNIVERSIDADE FEDERAL DO RIO GRANDE DO SUL

2023

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CDU: 625.7

CAPÍTULO II

Roadmasters

Ana Cecília Rodrigues Dalpiás

Gabriela Damiani Yurgel

Pedro Moreira Rocha

Victor Ferreira Coletto

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 IBIRAIARAS E MULITERNO

Rodovia: PPP-UFRGS-2023/1
Norma Técnica: DNER/1999
Classe da rodovia: III
Região: Ondulada
Configuração: pista simples com acostamentos
Classificação do solo: 1ª Categoria
Faixa de exploração: 2 x 250m
Extensão aproximada: 7,32 km



VOLUME 2 – PROJETO EXECUTIVO

BB2 – ROADMASTERS
AGOSTO/2023

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: **231**

Ano: **2023**

Semestre: **1**

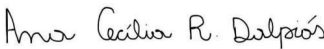
Disciplina: **Rodovias**

Turma: **B**

Código da Equipe: **BB2**

Nome: **ROADMASTERS**

Integrantes do grupo:


Ana Cecília Rodrigues Dalpiás - 00332752


Gabriela Damiani Yurgel - 00334419

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PEDRO MOREIRA ROCHA
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Verifique em <https://validar.iti.gov.br>
Pedro Moreira Rocha - 00325976

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VICTOR FERREIRA COLETTTO
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Victor Ferreira Coletto - 00324089

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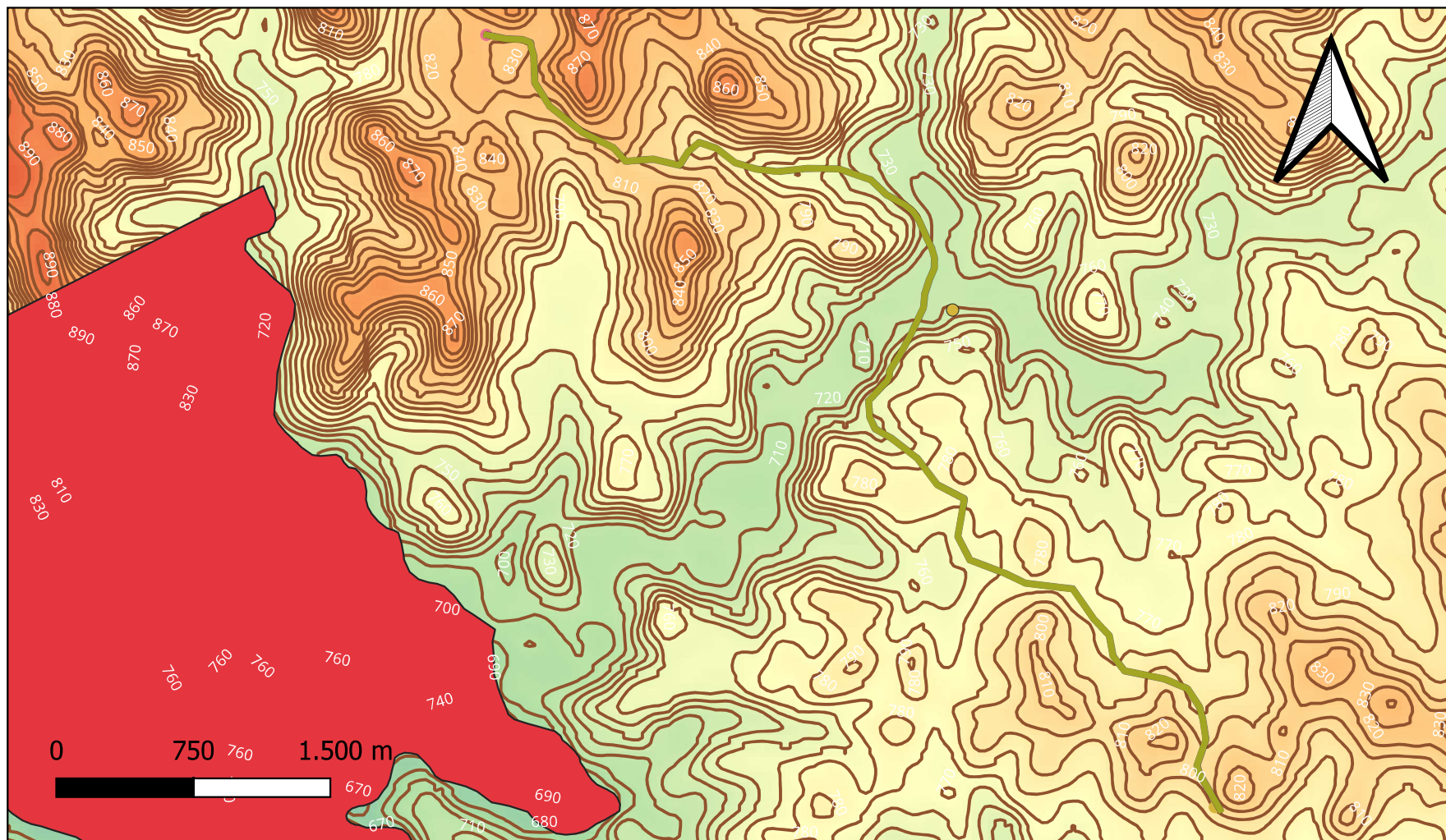
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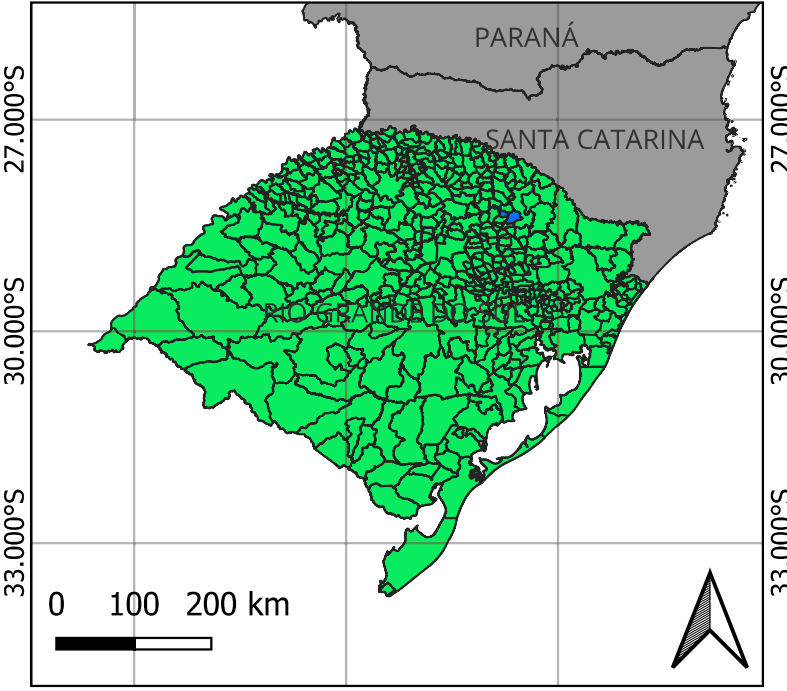
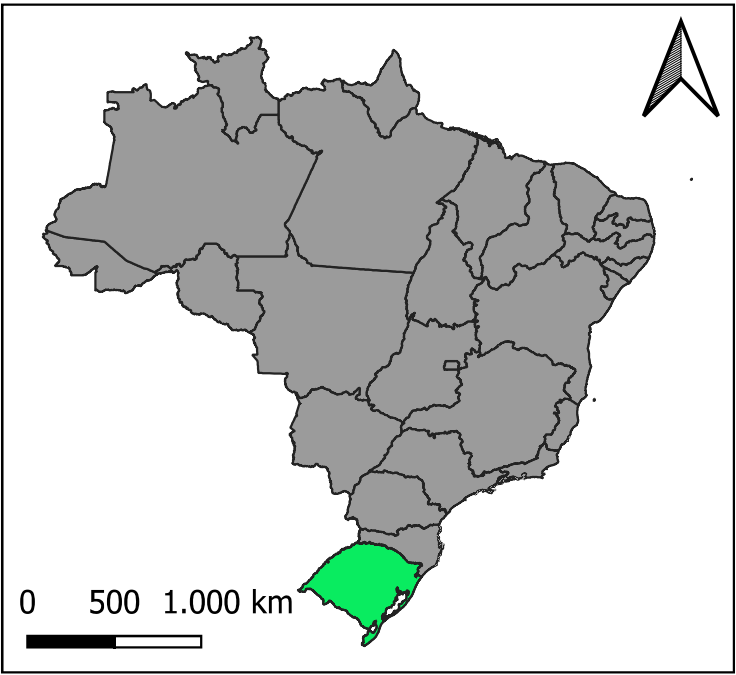
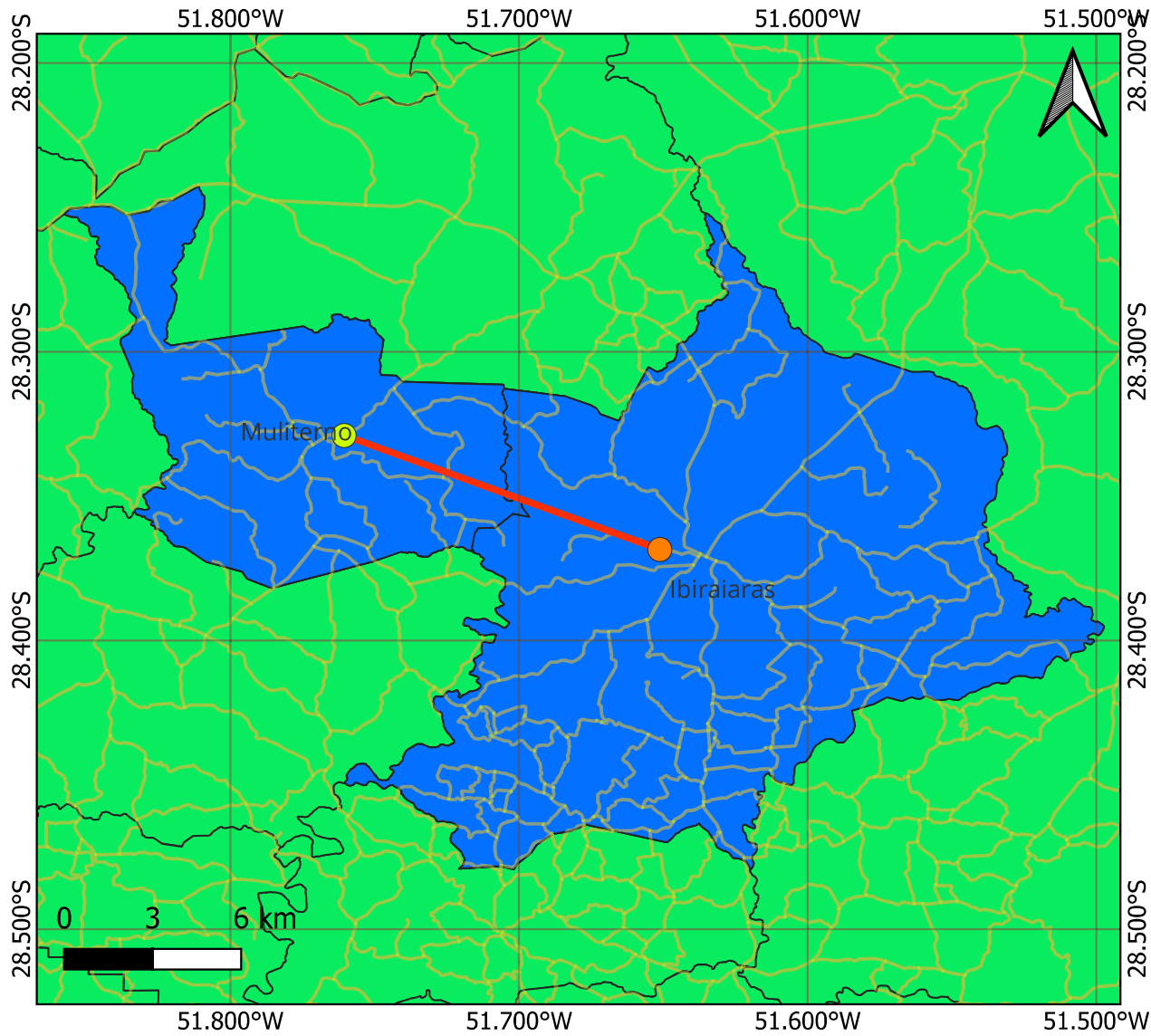
APRESENTAÇÃO



-  TRAÇADO FINAL
-  Diretriz — Traçado
-  PontodeEncontro
-  Reserva Indigena
-  Curvas de nível

TRAÇADO FINAL ENTRE IBIRAIARAS (RS) E MULITERNO (RS) - LOTE 2
 Base de dados: IBGE, FEPAM
 Autor: BB2 - RoadMasters
 UFRGS

■ Mapa de Localização



Base de Dados: IBGE, FEPAM
 Autor: Equipe BB1 (Muliara Engenharia)
 Sistema de Coordenadas Geográficas - Datum: SIRGAS 2000

■ Quadro de Características Técnicas

CARACTERÍSTICAS TÉCNICAS

Rodovia: Grupo de Eixos 1
 Trecho: Eixo1
 Segmento: km: 0+000,00 ao km: 7+311,57

CARACTERÍSTICAS GERAIS

DE PROJETO		PLANIALTIMÉTRICAS				SEÇÕES TRANSVERSAIS			
NORMA	DNIT	RAIO MIN. COM TRANS.	125,000	K MIN/DES CÔNCAVA	15 / 17	LARG. PISTA DE ROL.		PLATAFORMA ATERRO	
CLASSE DA RODOVIA	III	RAIO MIN. SIMPLES	700,000	K MIN/DES CONVEXA	14 / 18	LARG. ACOST. INT.		PLATAFORMA CORTE	
REGIÃO	Ondulada	RAMPA MÁXIMA	6,000	DIST. VIS. PARADA		LARG. ACOST. EXT.		TALUDE ATERRO	
VELOCIDADE DIRETRIZ	60	RAMPA MÍNIMA	0,300	DIST. VIS. ULTRAP.		ABAUAMENTO		TALUDE CORTE 1ª CAT.	
		EXTENSÃO TOTAL	7311,575	FAIXA DOM. (LE/LD+OFF)	15 / 15 + 5	SUPERELEVÇÃO MÁX.		TALUDE CORTE 3ª CAT.	

PLANIMETRIA

DISTRIBUIÇÃO DE CURVAS

T R A N S I Ç Ã O	RAIOS (m)		FREQ.	Dc (m)	%	Lc1+Lc2 (m)	%
	R	R mínimo =	125,000	1	132,225	1,81	80,000
A	125,000 < R ≤	100,000					
N	100,000 < R ≤	200,000	16	1472,169	20,13	1440,000	19,69
S	200,000 < R ≤	300,000	3	88,824	1,21	280,000	3,83
I	300,000 < R ≤	500,000					
Ç	R >	500,000					
.	TOTAL EM TRANSIÇÃO		20	1693,218	23,16	1800,000	24,62
S I M P L E S	RAIOS (m)		FREQ.	Dc (m)	%		
	R mínimo =	1000000,000					
	1000000,000 < R ≤	500,000					
	500,000 < R ≤	700,000					
	700,000 < R ≤	1000,000					
	1000,000 < R ≤	1500,000					
	R >	1500,000					
TOTAL SIMPLES							
TOTAL EM CURVA			20	1693,218	23,16	5186,436	70,93

EXTENSÃO DAS INTERTANGENTES

MÍNIMA		MÁXIMA		TOTAL	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
20,601	0,28	575,219	7,87	3818,357	52,22

PARÂMETROS PLANIMÉTRICOS

TORTUOSIDADE		DISTÂNCIA EM DIRETRIZ	
TOTAL (°/m)	MÉDIA (°/m.km)	EXTENSÃO (m)	ACRÉSCIMO (%)
6,883	0,941	5846,777	25,053

ALTIMETRIA

VARIAÇÃO ALTIMÉTRICA

ACLIVES			NÍVEL		DECLIVES		
INTERVALO	EXTENSÃO (m)	%	EXTENSÃO	%	INTERVALO	EXTENSÃO (m)	%
0 < i ≤ 1	893,515	12,22			0 < i ≤ 1		
1 < i ≤ 2					1 < i ≤ 2	1496,131	20,46
2 < i ≤ 3					2 < i ≤ 3		
3 < i ≤ 4	720,699	9,86			3 < i ≤ 4		
4 < i ≤ 5					4 < i ≤ 5	427,259	5,84
5 < i ≤ 6	1141,260	15,61			5 < i ≤ 6		
6 < i ≤ 7					6 < i ≤ 7	832,711	11,39
7 < i ≤ 8					7 < i ≤ 8		
8 < i ≤ 9					8 < i ≤ 9		
9 < i ≤ 10					9 < i ≤ 10		
i > 10					i > 10		
TOTAL	2755,474	37,69			TOTAL	2756,101	37,70

EXTENSÃO DOS ELEMENTOS VERTICAIS

RAMPA		CURVA CÔNCAVA		CURVA CONVEXA		CURVA TOTAL	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
5511,575	75,38	900,000	12,31	900,000	12,31	1800,000	24,62

PARÂMETROS K MÍNIMOS ADOTADOS

EM CURVA CÔNCAVA	32,551	EM CURVA CONVEXA	56,143
------------------	--------	------------------	--------

PARÂMETROS ALTIMÉTRICOS

COMPRIMENTO VIRTUAL IDA		COMPRIMENTO VIRTUAL VOLTA		COMPRIMENTO VIRTUAL MÉDIO	
EXTENSÃO (m)	%	EXTENSÃO (m)	%	EXTENSÃO (m)	%
13458,596	184,07	11955,357	163,51	12706,977	173,79

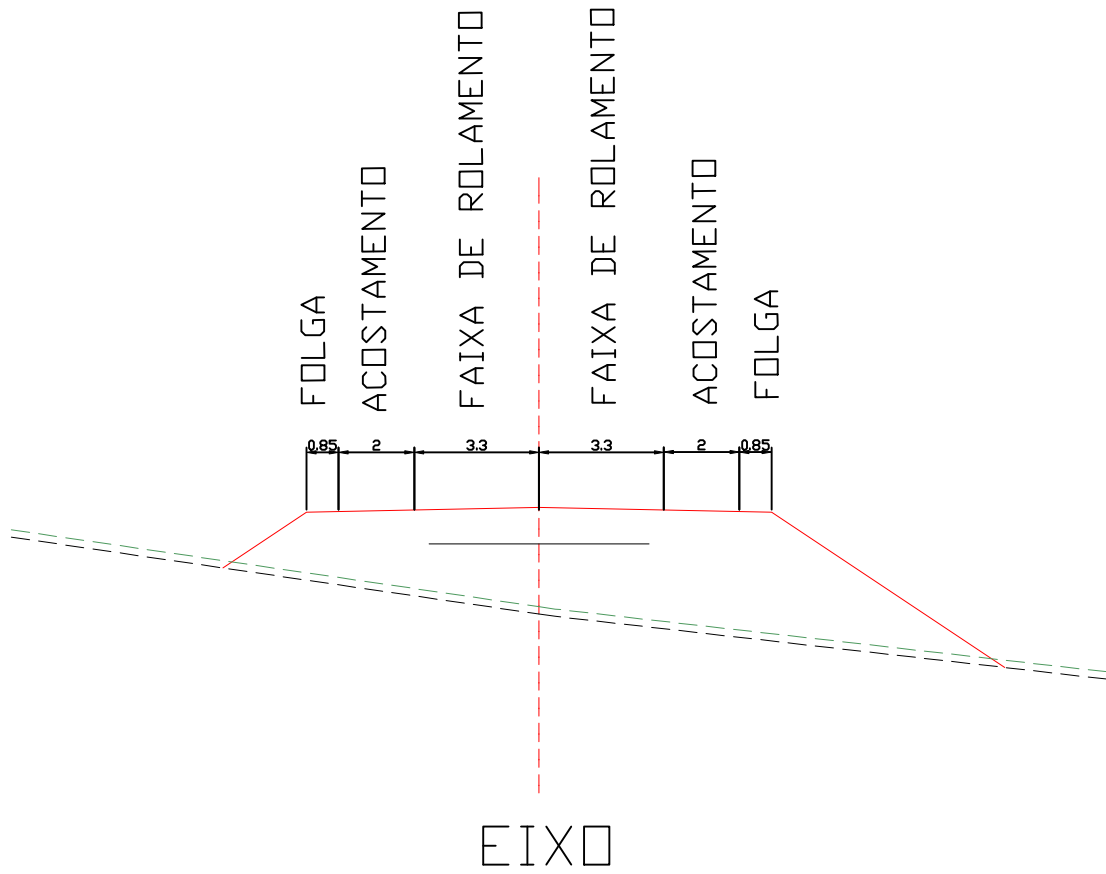
CARACTERÍSTICAS OPERACIONAIS

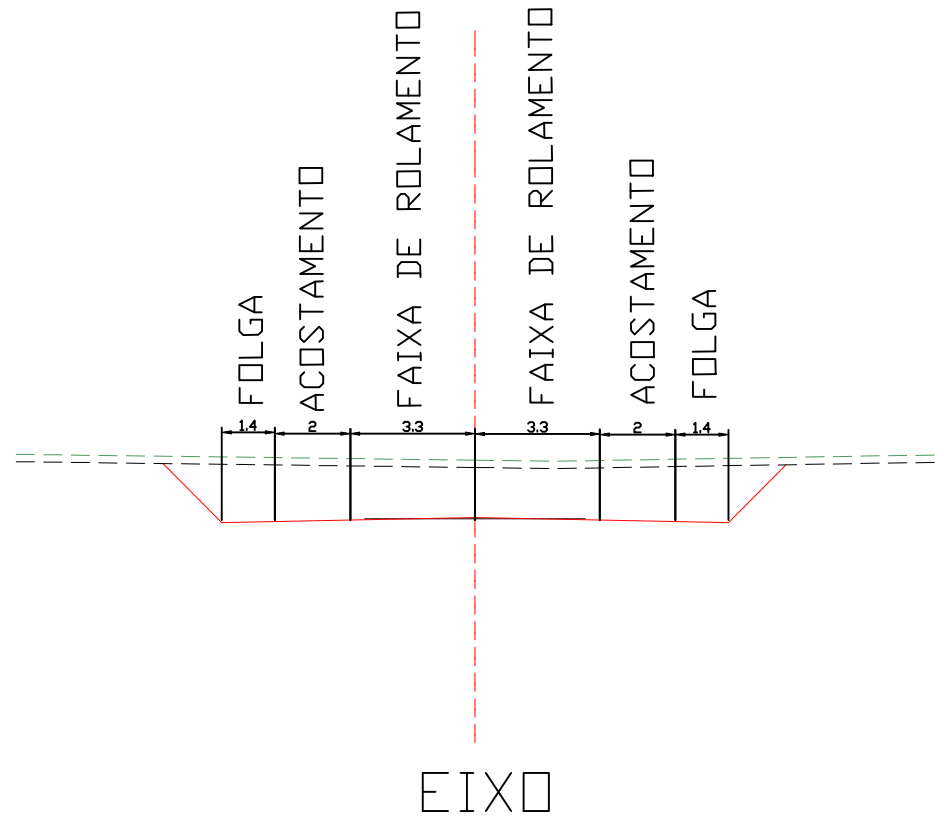
ANO DE ABERTURA		VDM ABERTURA		PARÂMETRO			
ANO FINAL DA VIDA ÚTIL		VDM FINAL					

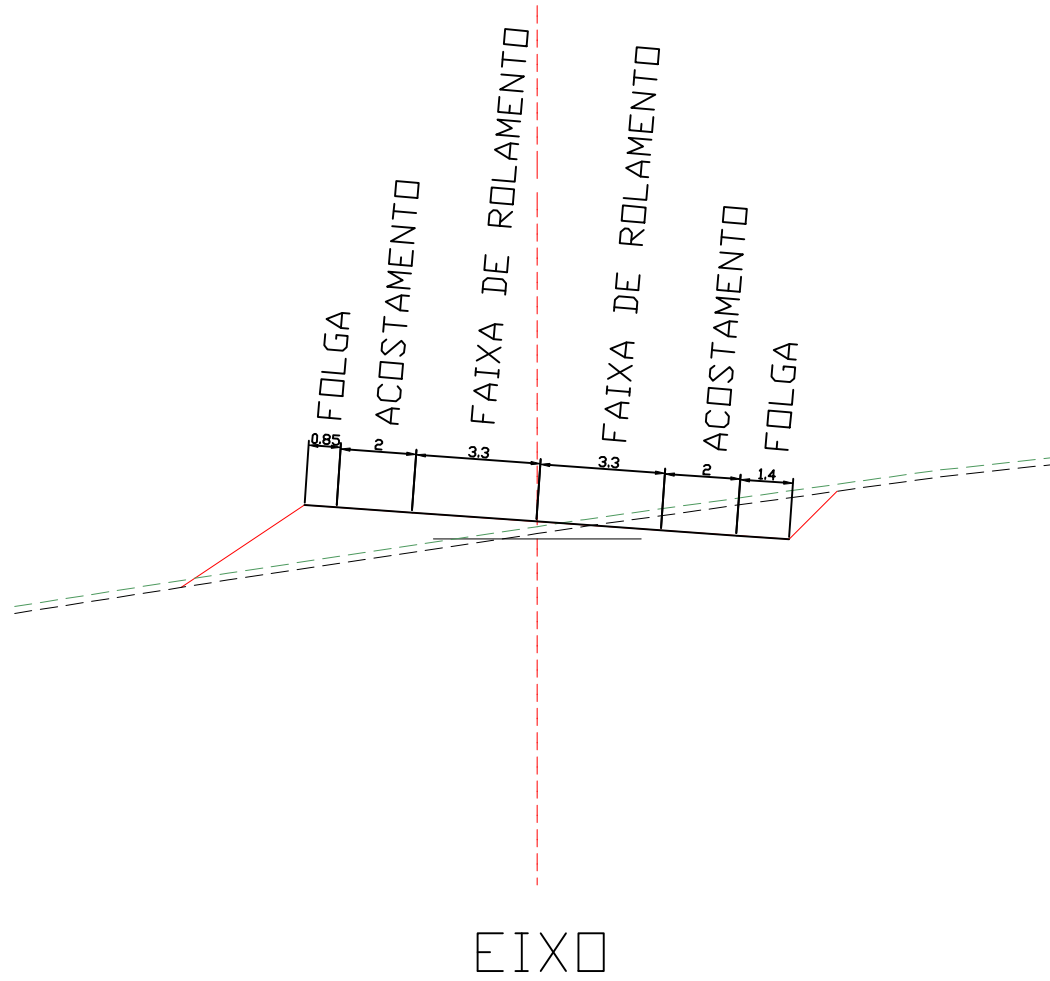
PROJETO GEOMÉTRICO

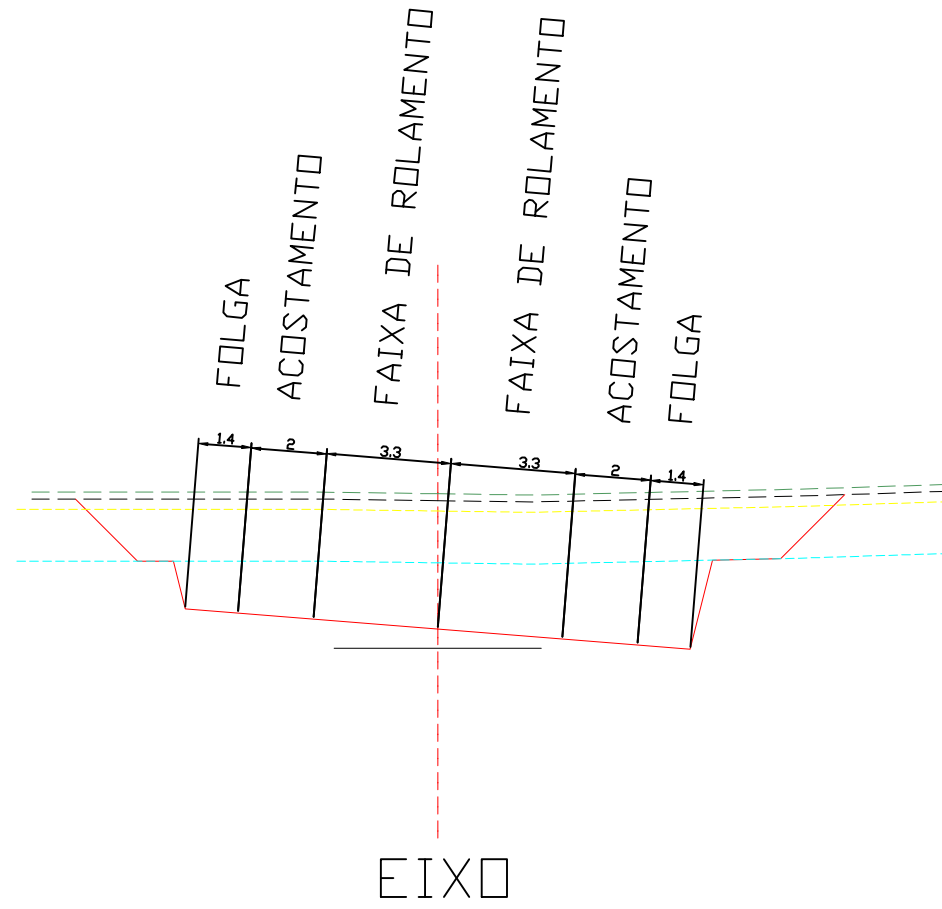
2 PROJETO GEOMÉTRICO

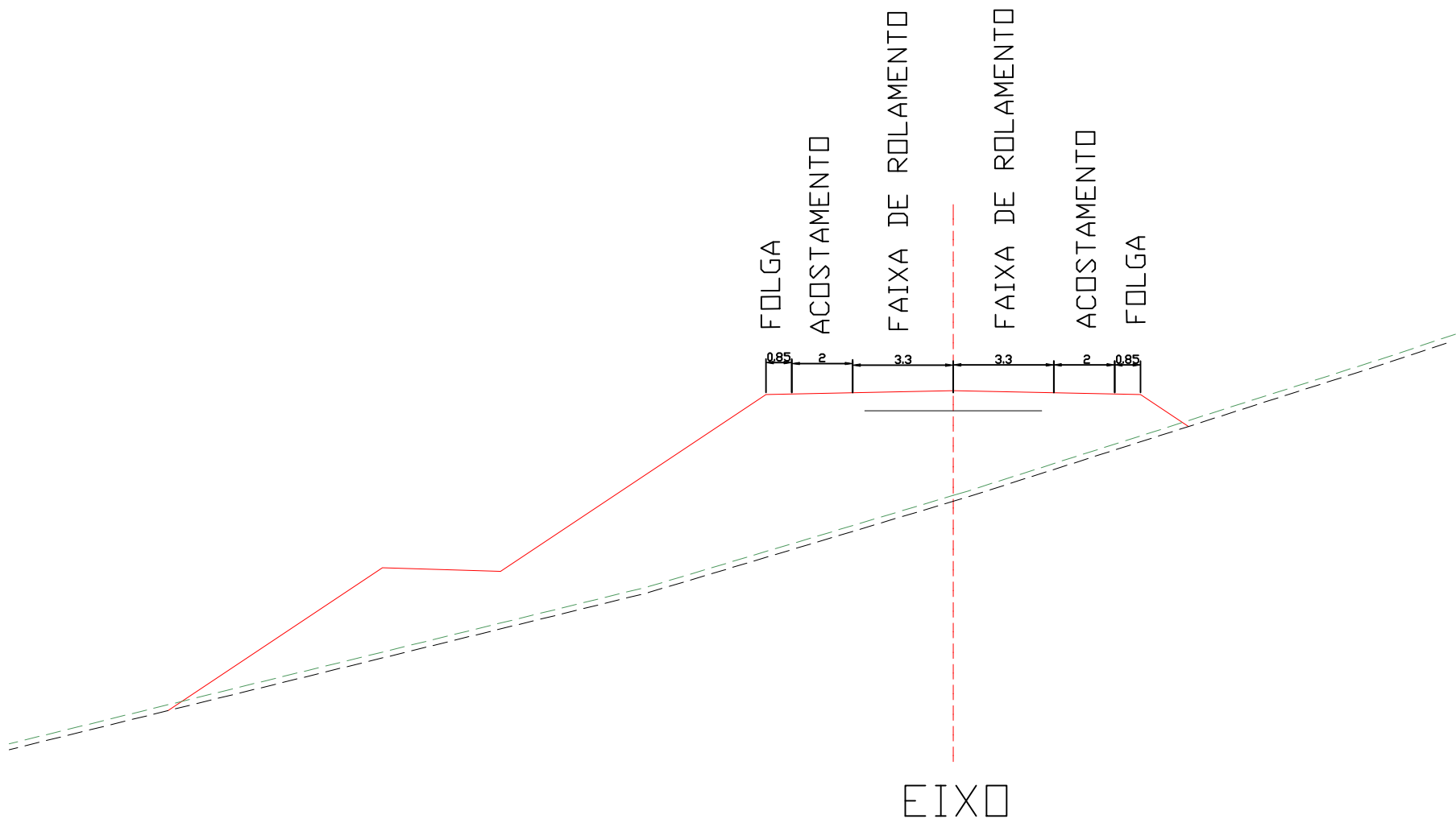
■ Seções Transversais Tipo

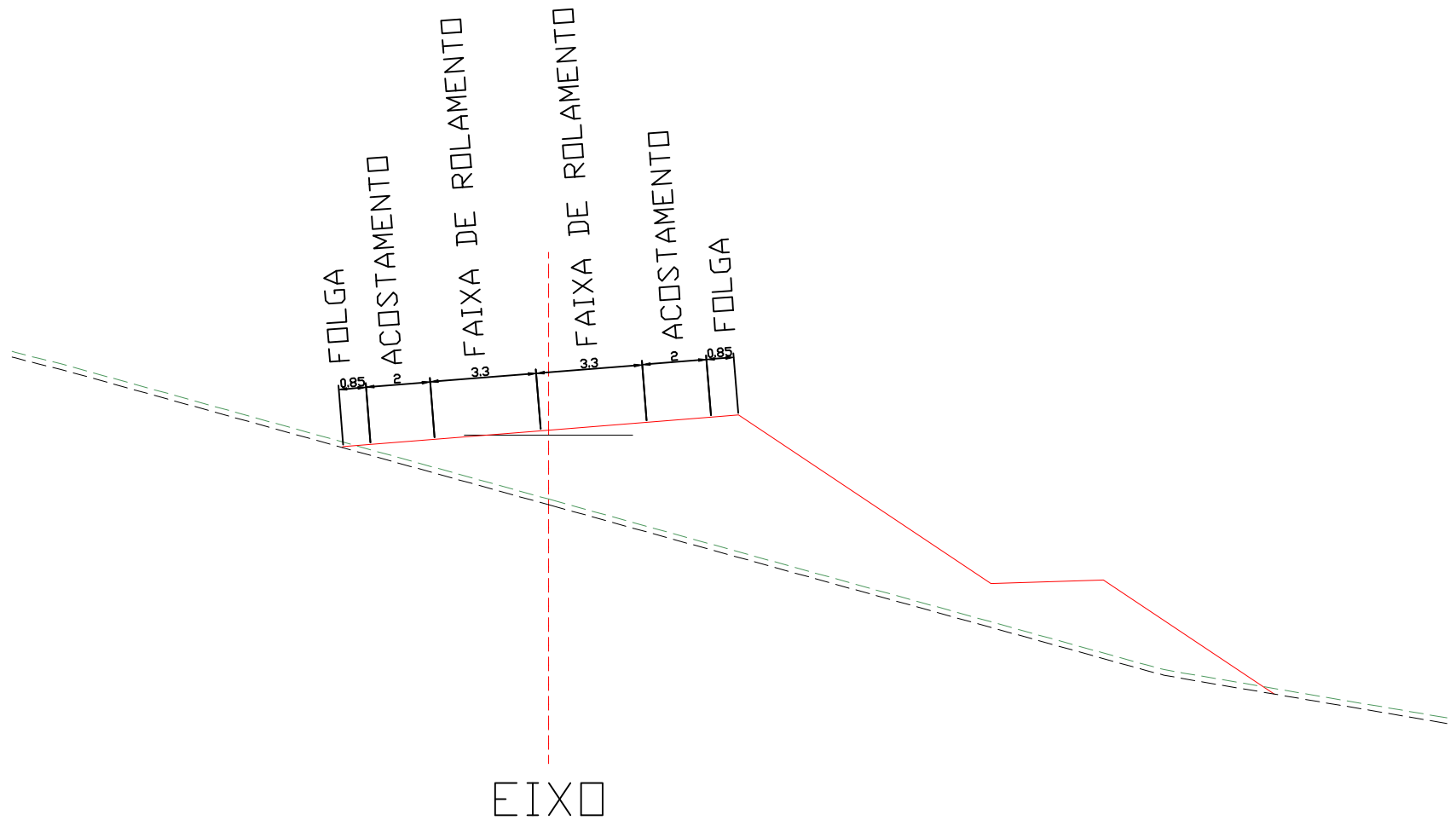




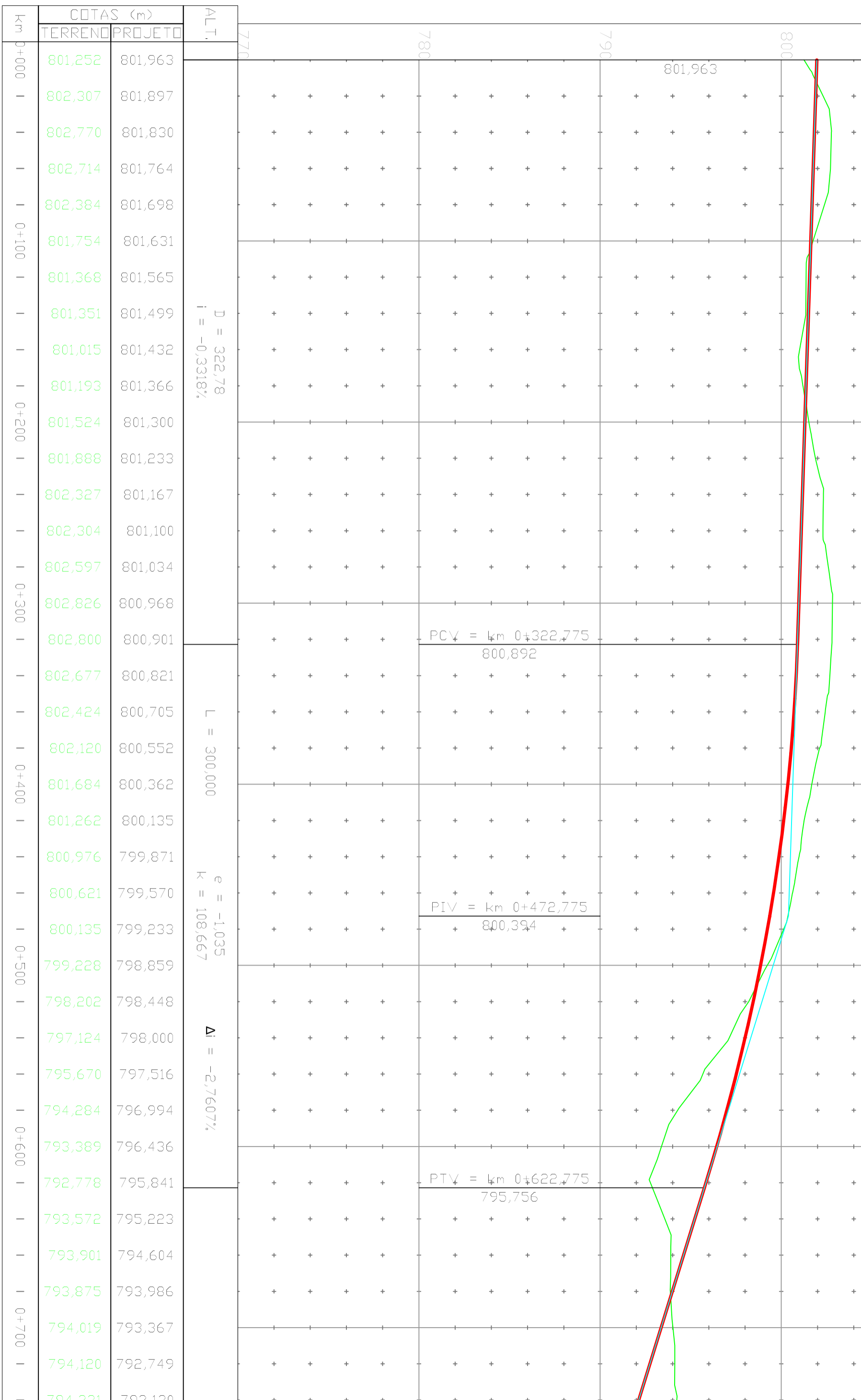






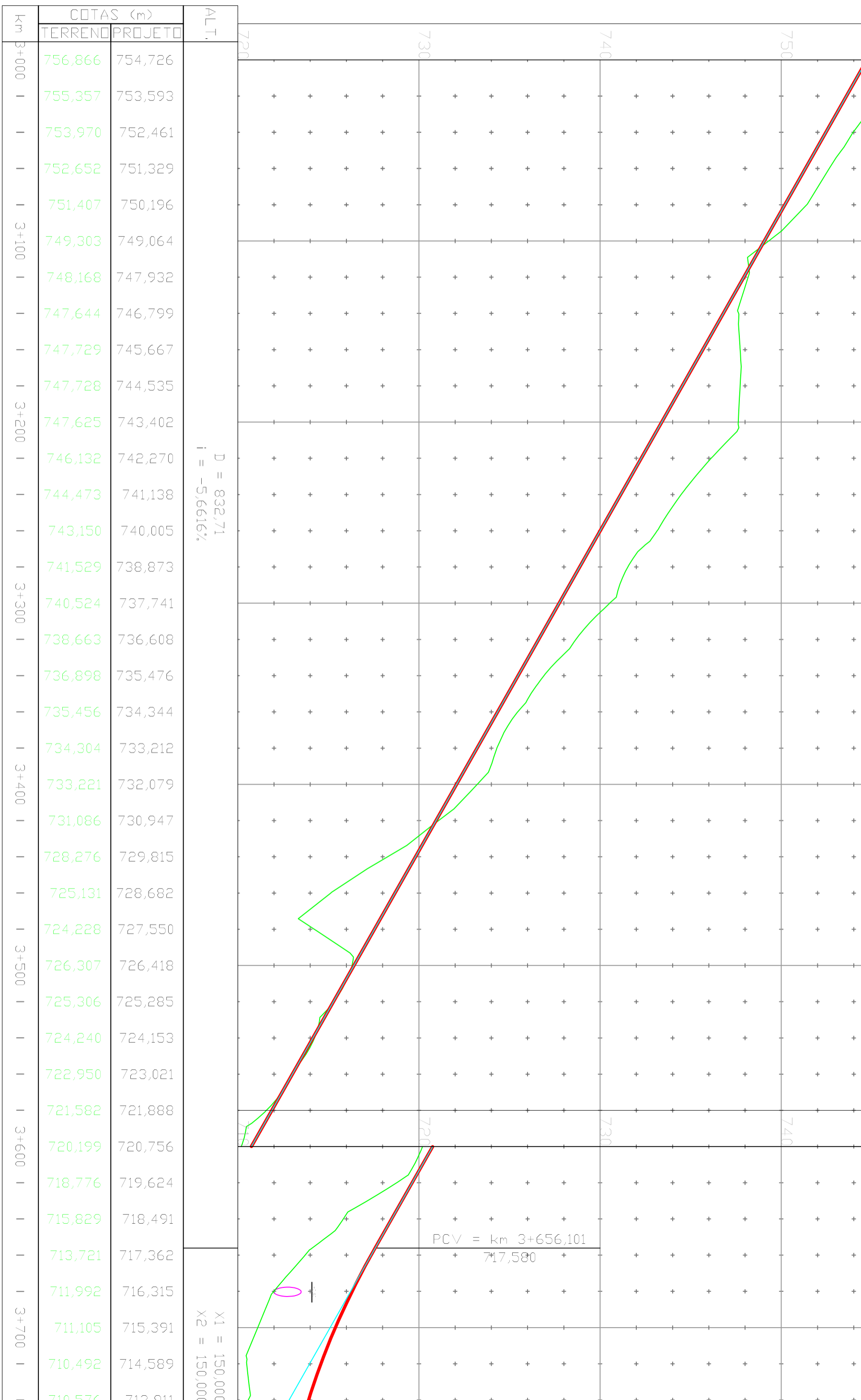


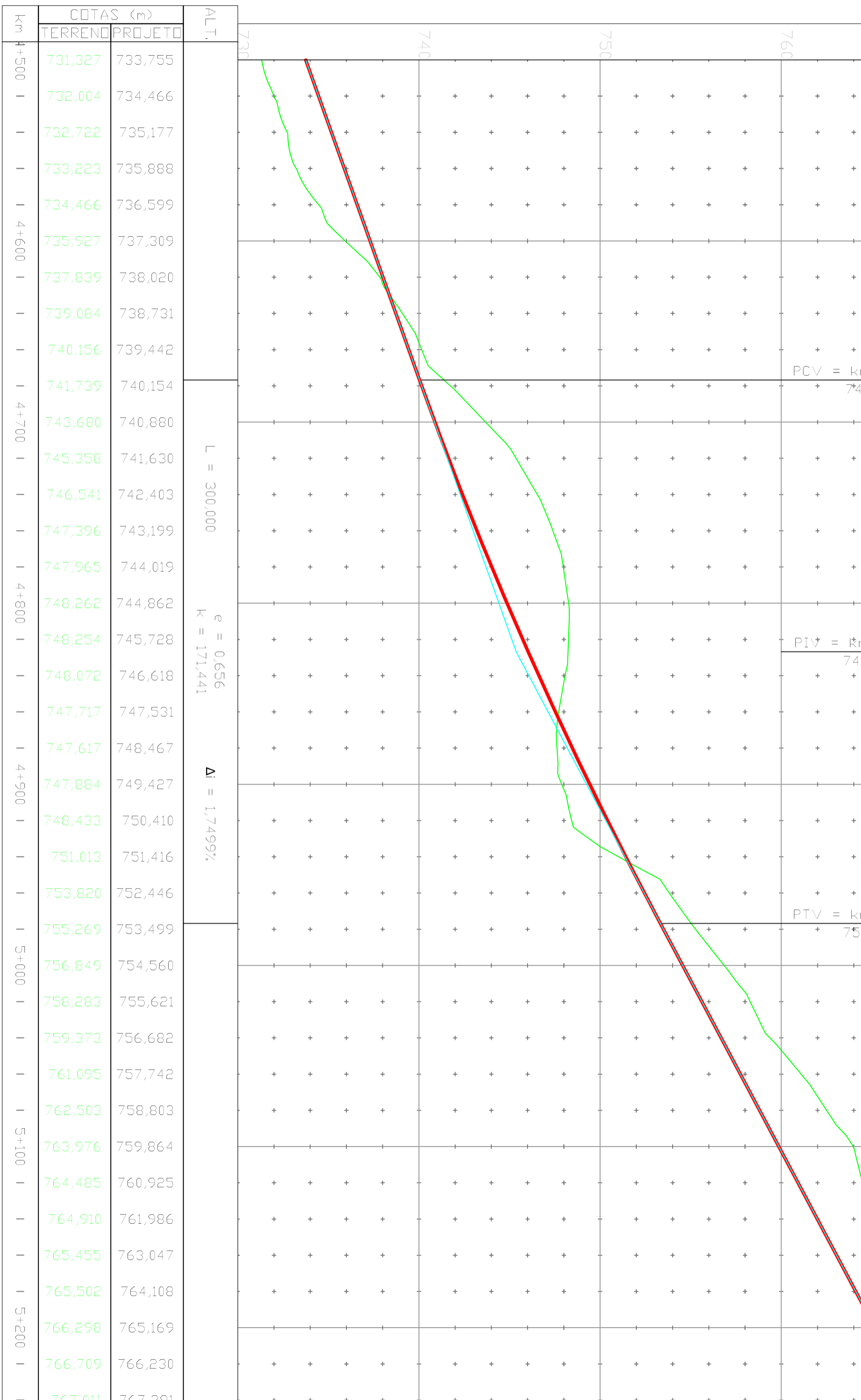
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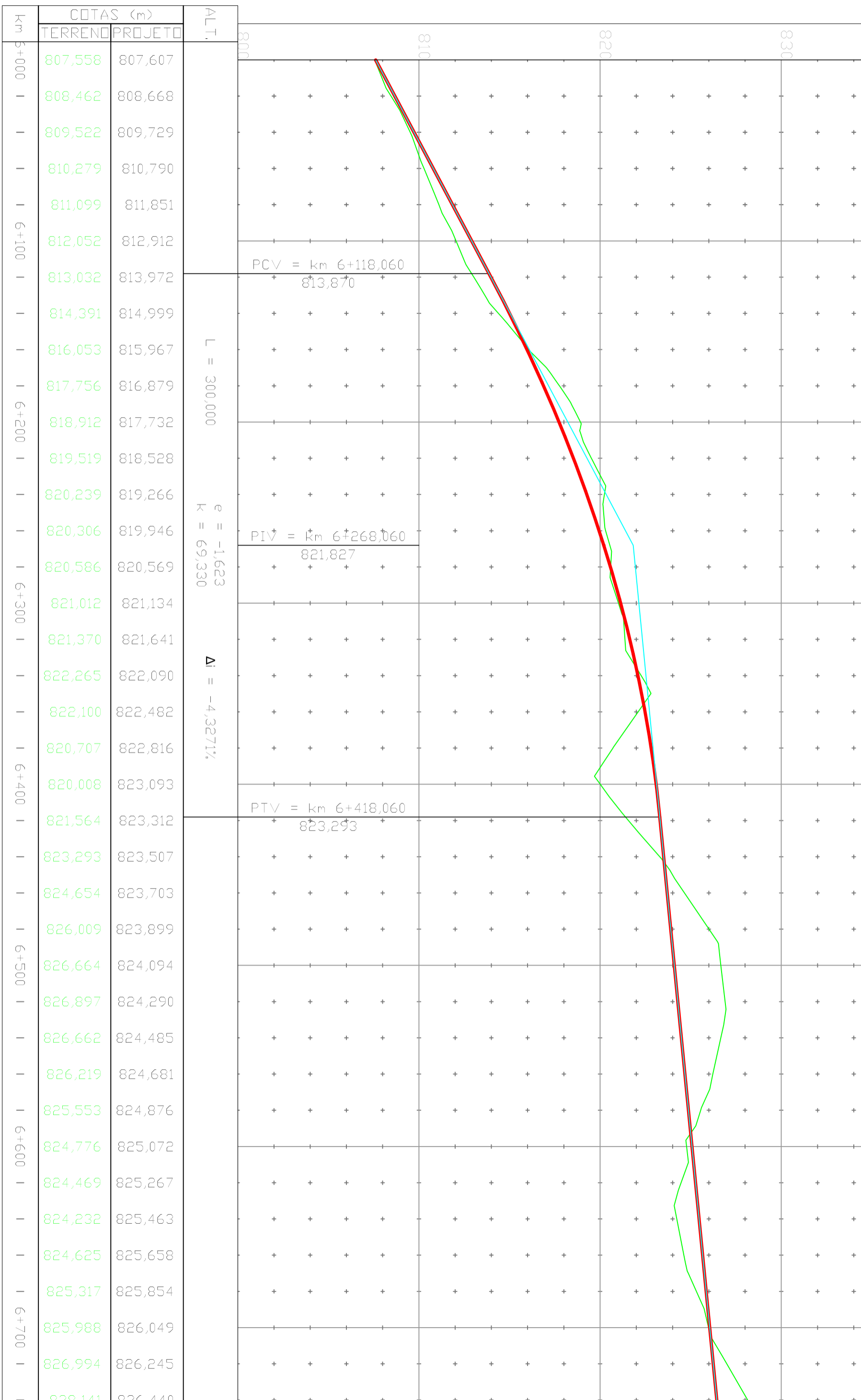


Km	COTAS (m)		ALT.
	TERRENO	PROJETO	
1+500	774,824	776,949	D = 1173,36 i = -0,3181%
	774,676	776,886	
	774,863	776,822	
	775,089	776,759	
	775,665	776,695	
1+600	776,454	776,631	
	777,217	776,568	
	777,708	776,504	
	777,936	776,440	
	777,525	776,377	
1+700	777,602	776,313	
	777,488	776,250	
	777,480	776,186	
	777,552	776,122	
	777,954	776,059	
1+800	778,251	775,995	
	777,441	775,931	
	776,732	775,868	
	775,879	775,804	
	775,068	775,741	
1+900	774,481	775,677	
	774,187	775,613	
	773,877	775,550	
	773,198	775,486	
	773,150	775,422	
2+000	773,462	775,359	
	774,112	775,295	
	774,395	775,232	
	774,594	775,168	
	774,568	775,104	
2+100	774,430	775,041	
	773,968	774,977	
	773,516	774,914	
	773,255	774,850	
	773,056	774,786	
2+200	772,919	774,723	
	773,626	774,659	
	774,615	774,595	

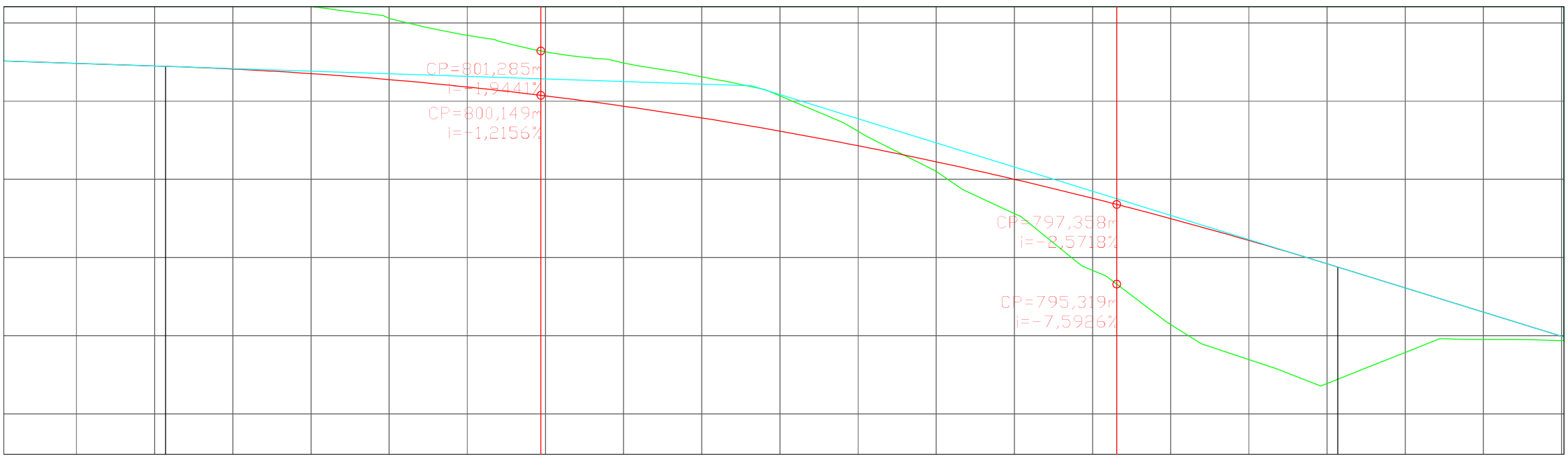
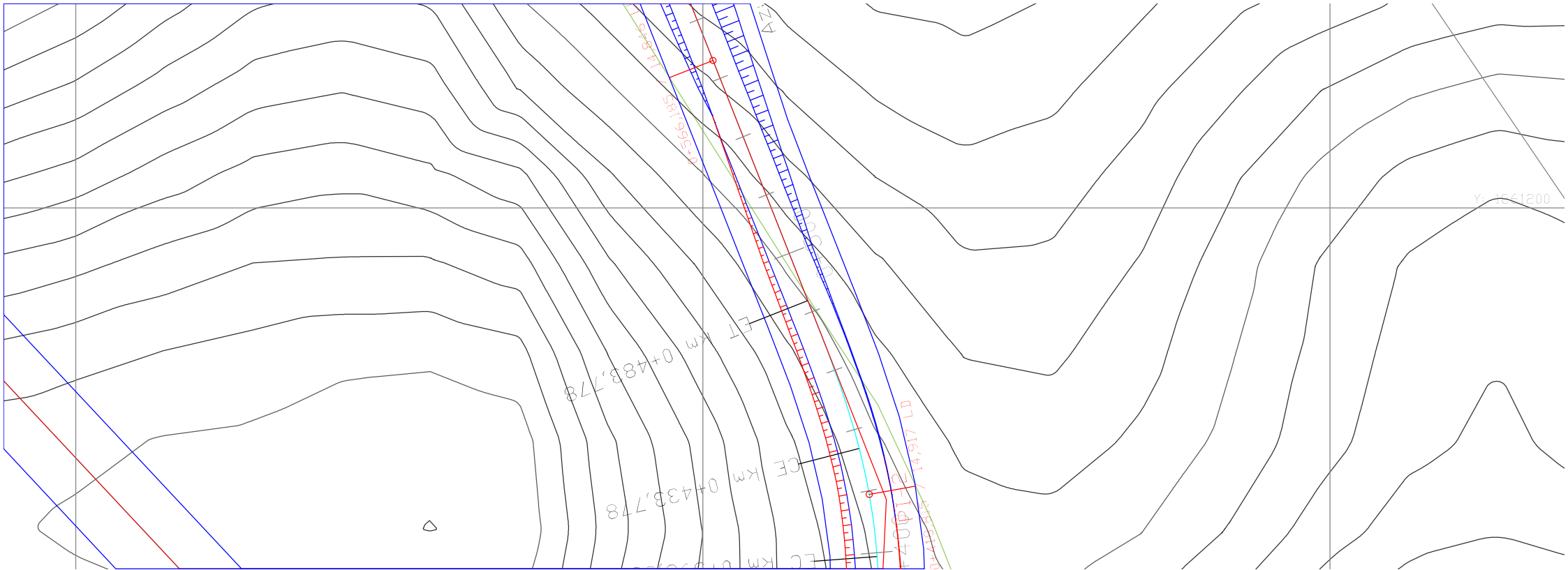


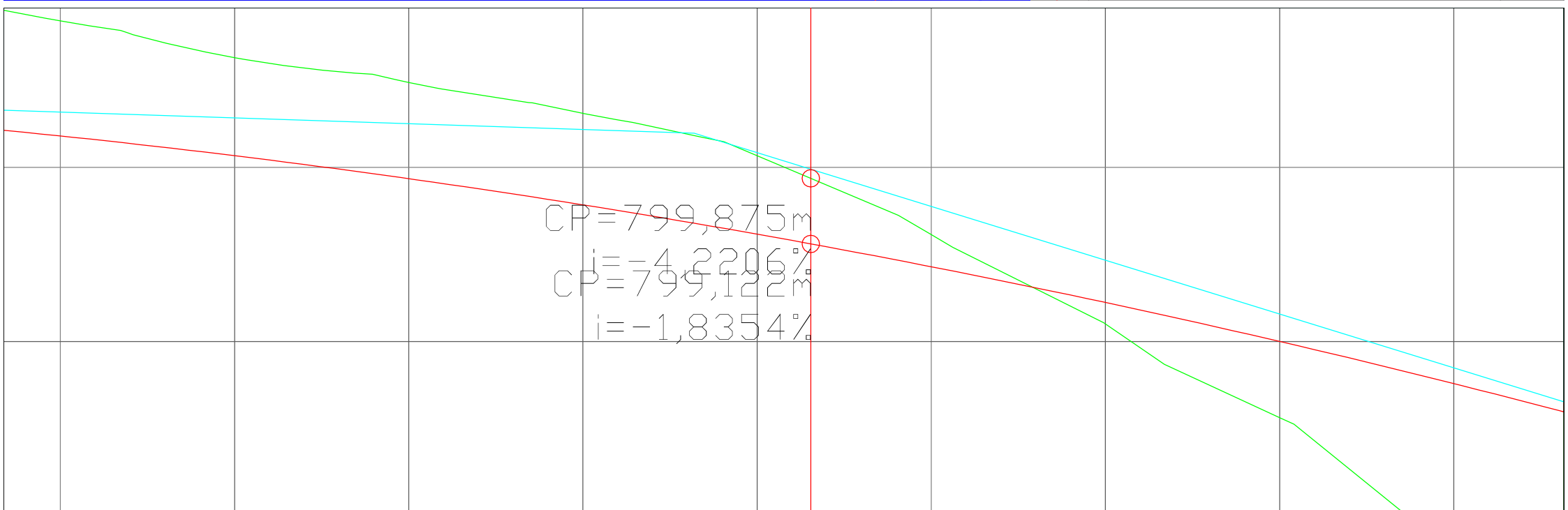
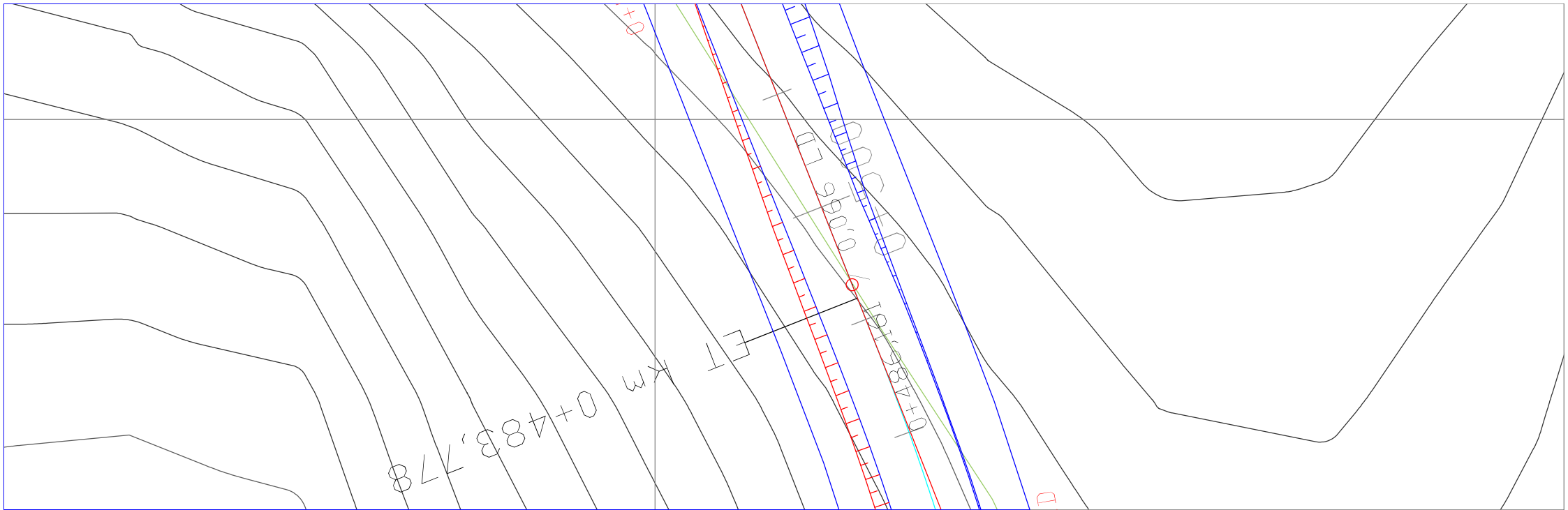


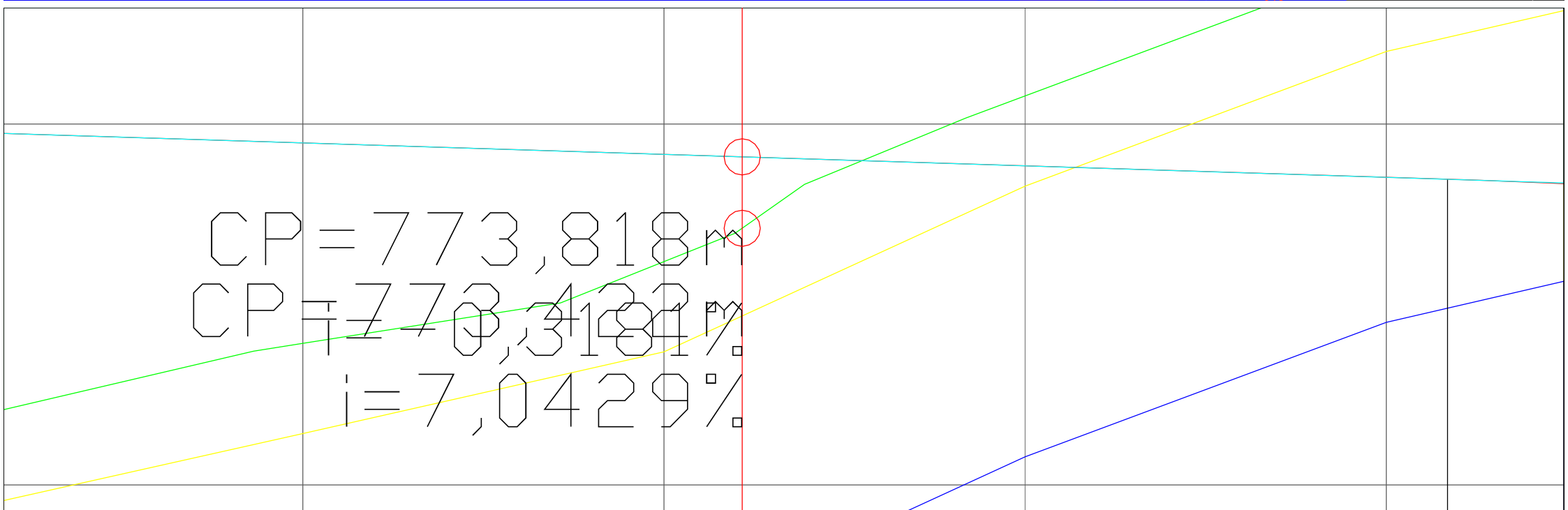
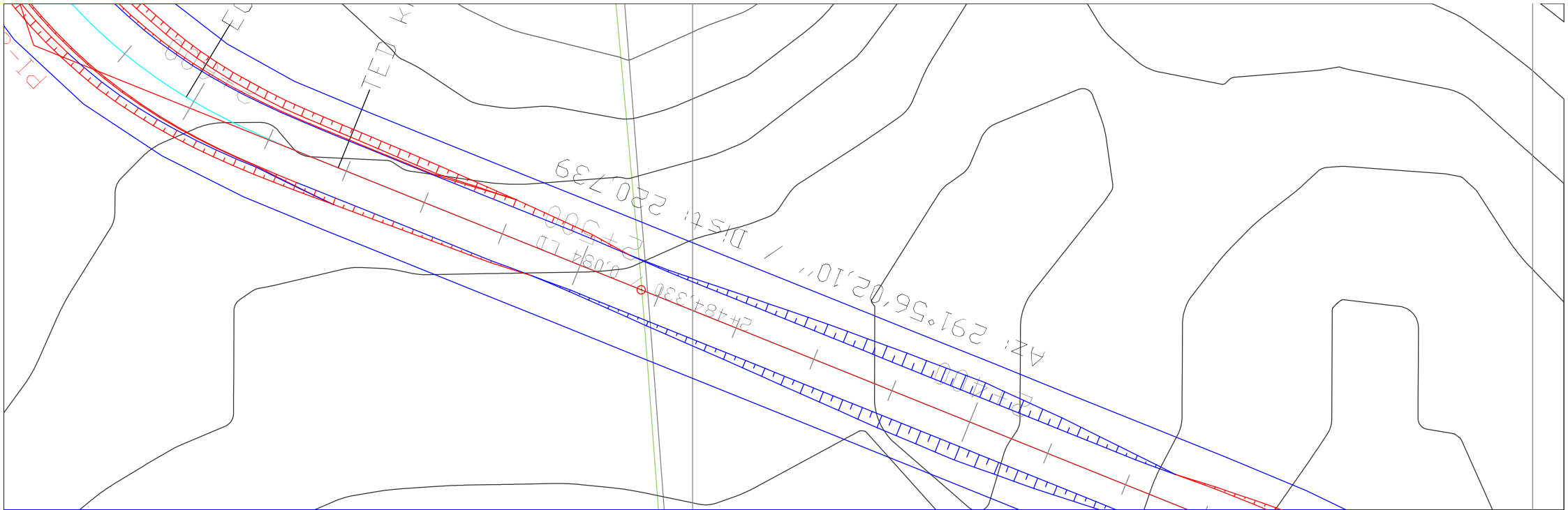


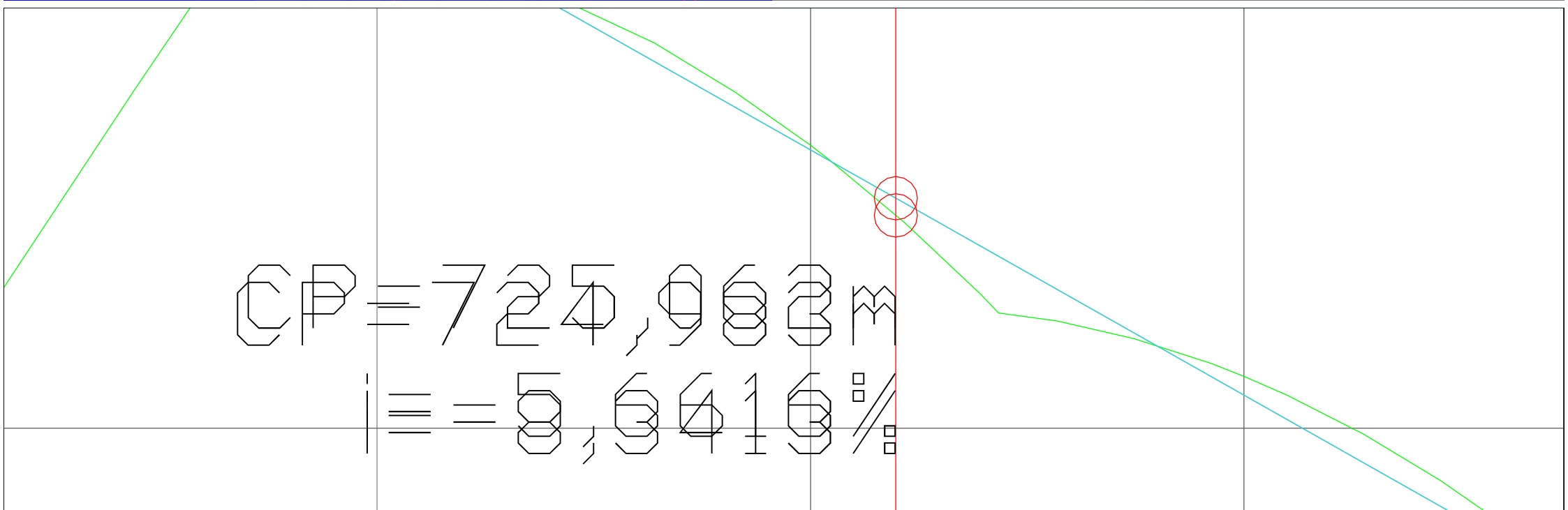
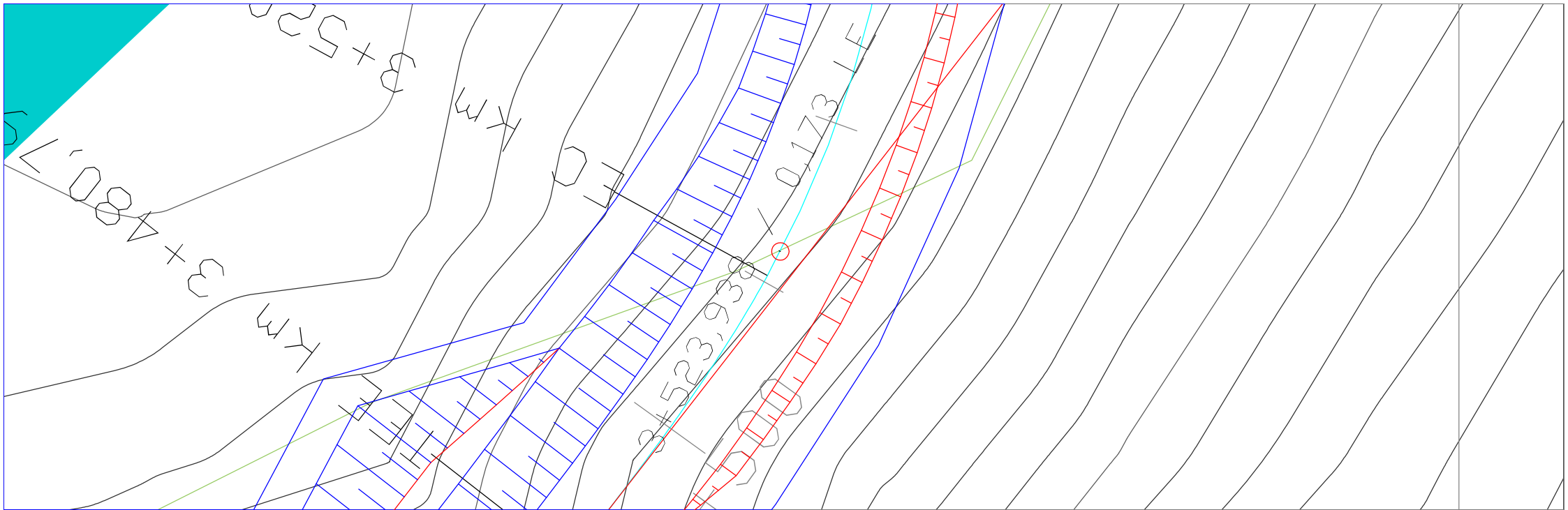


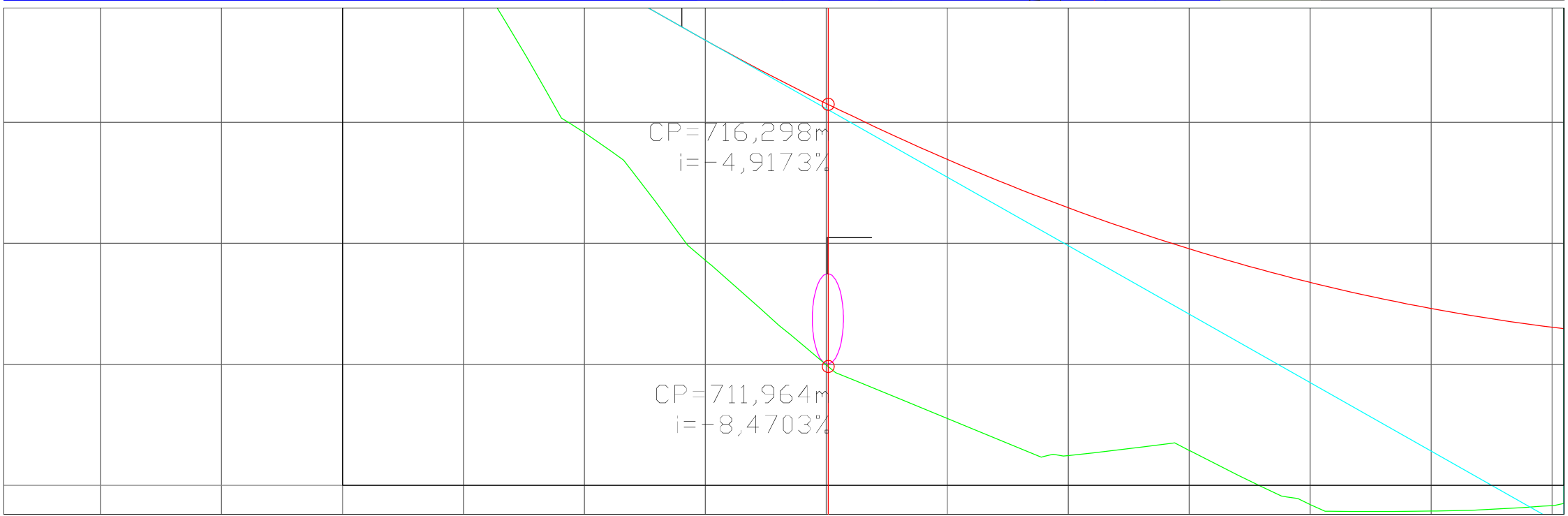
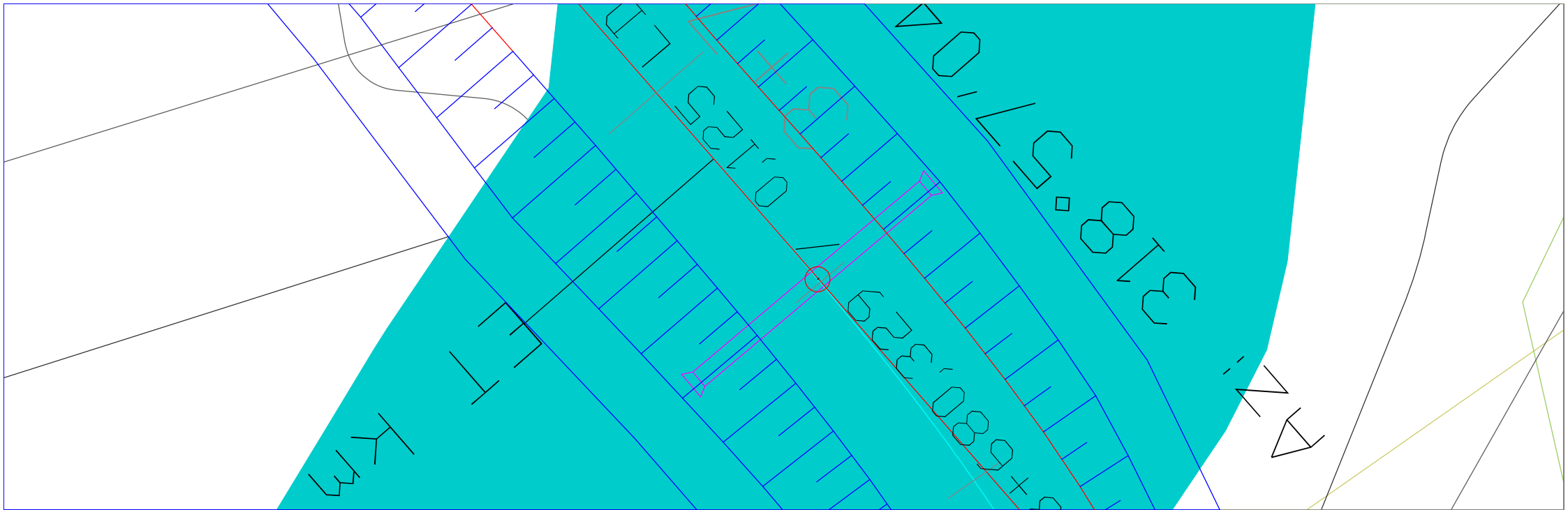
■ Detalhamento do Projeto Planialtimétrico

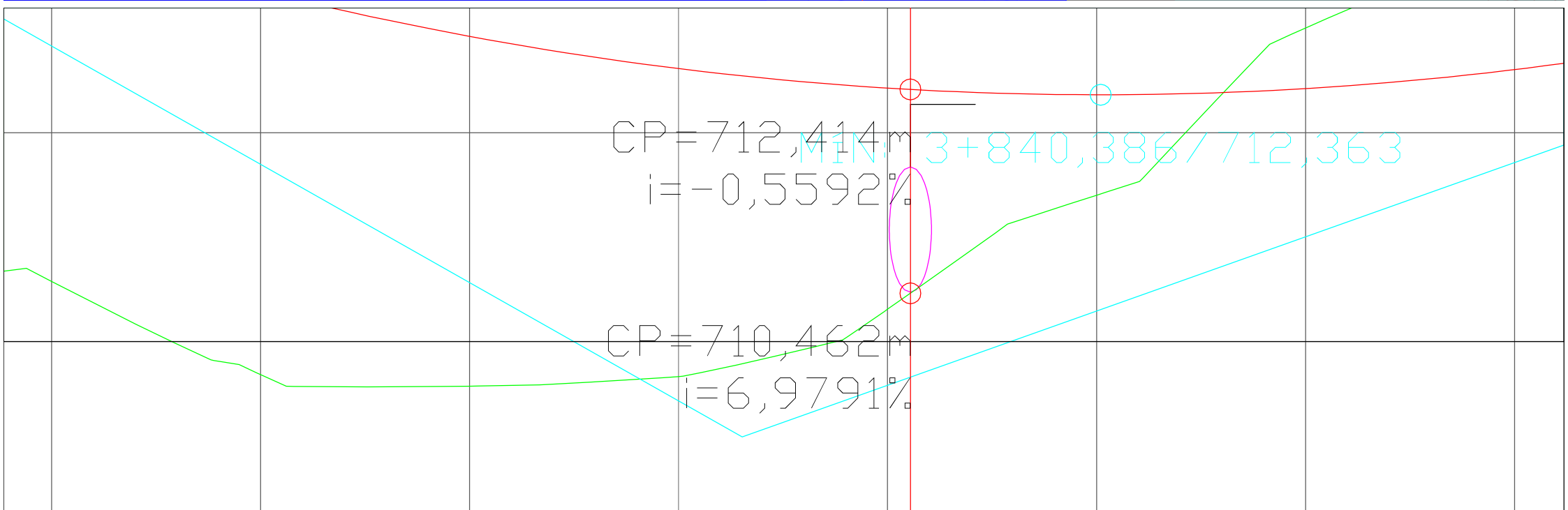
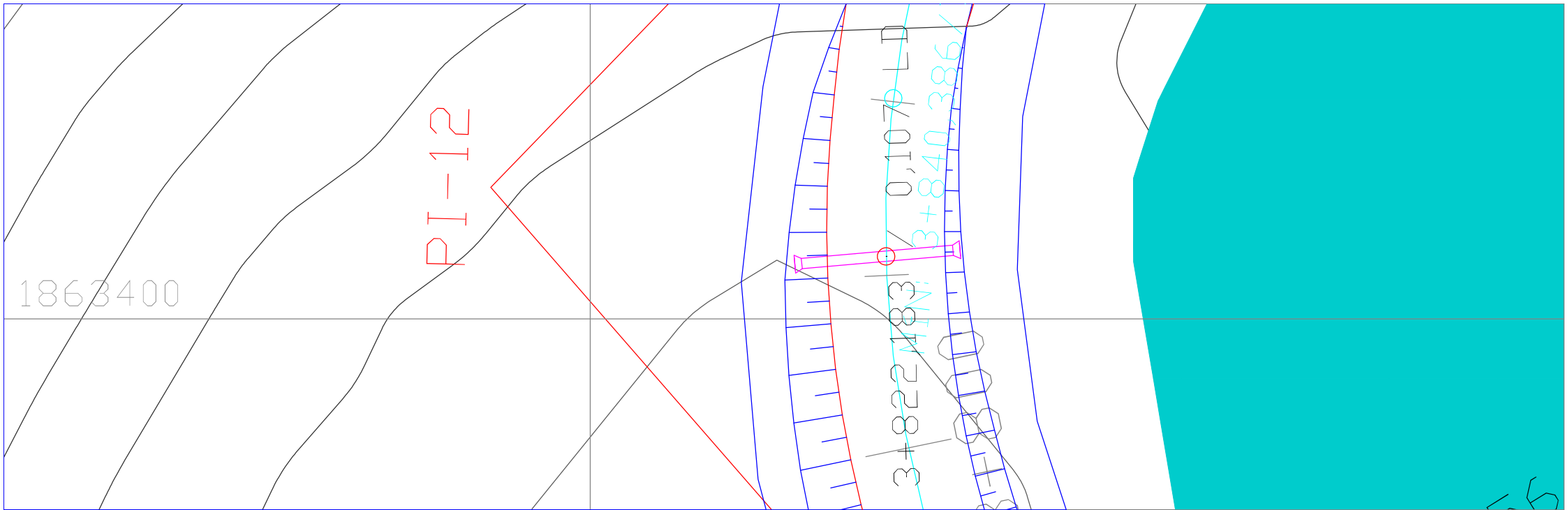


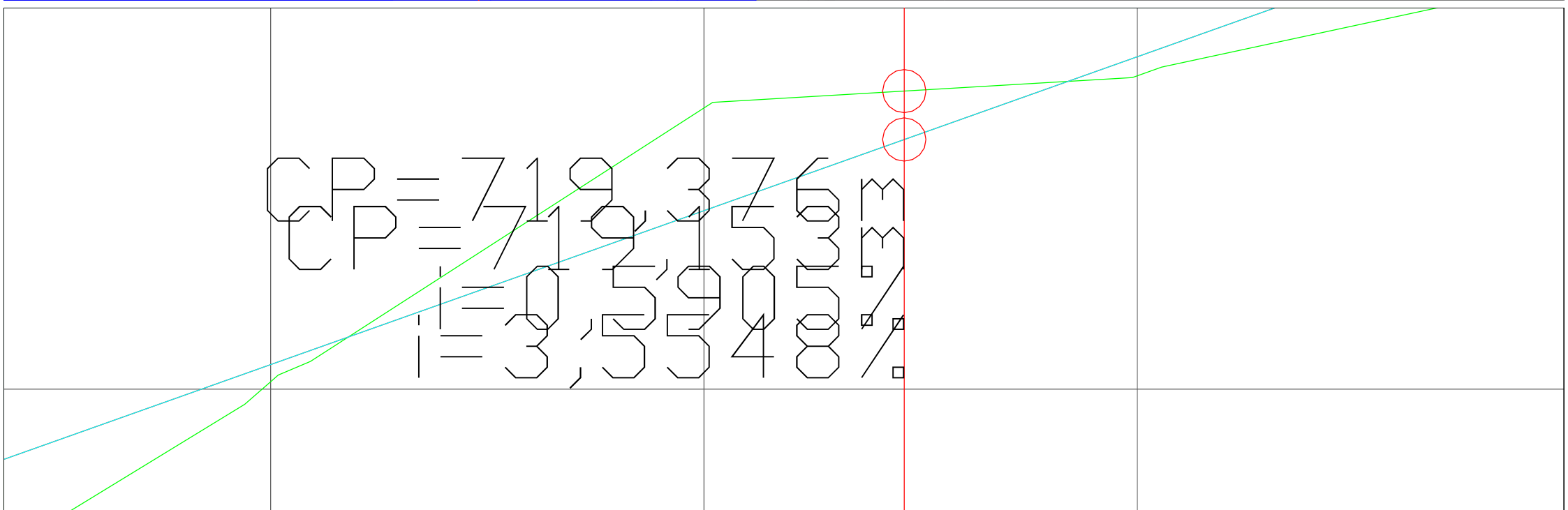
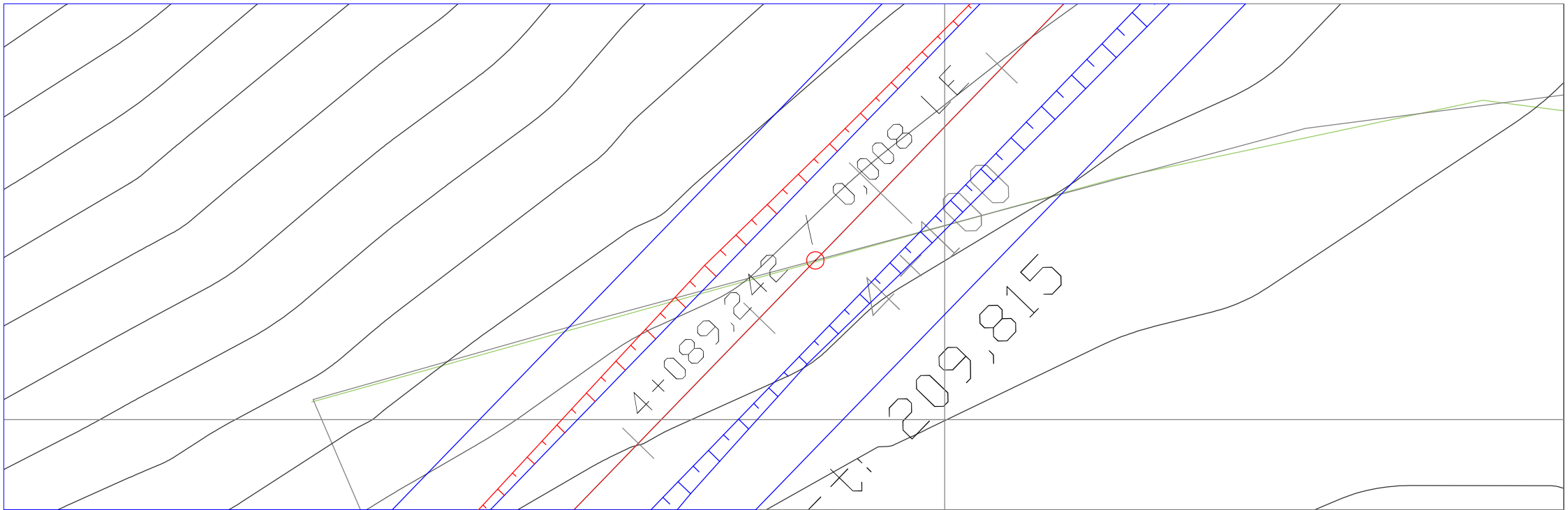


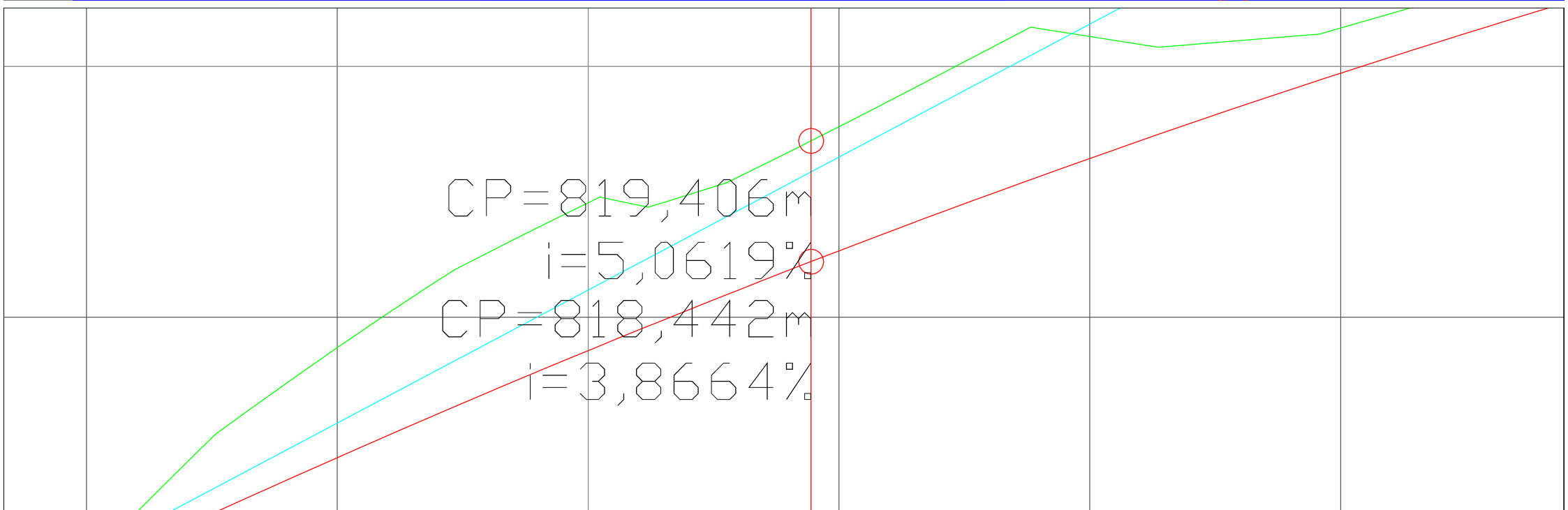
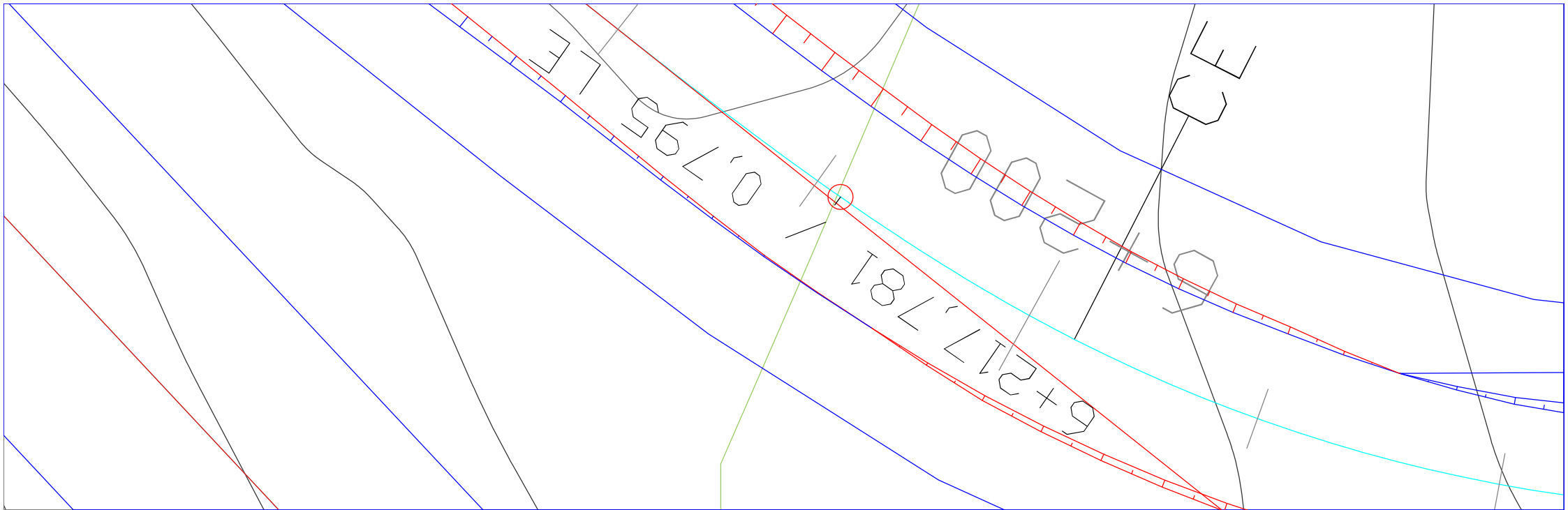


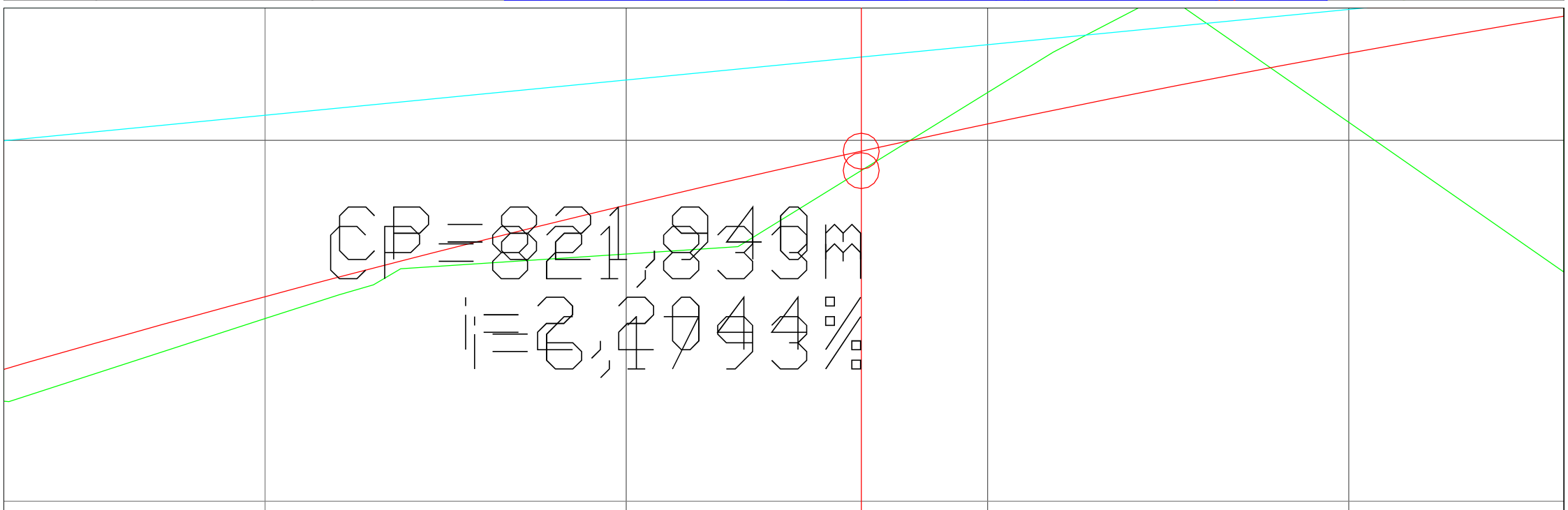
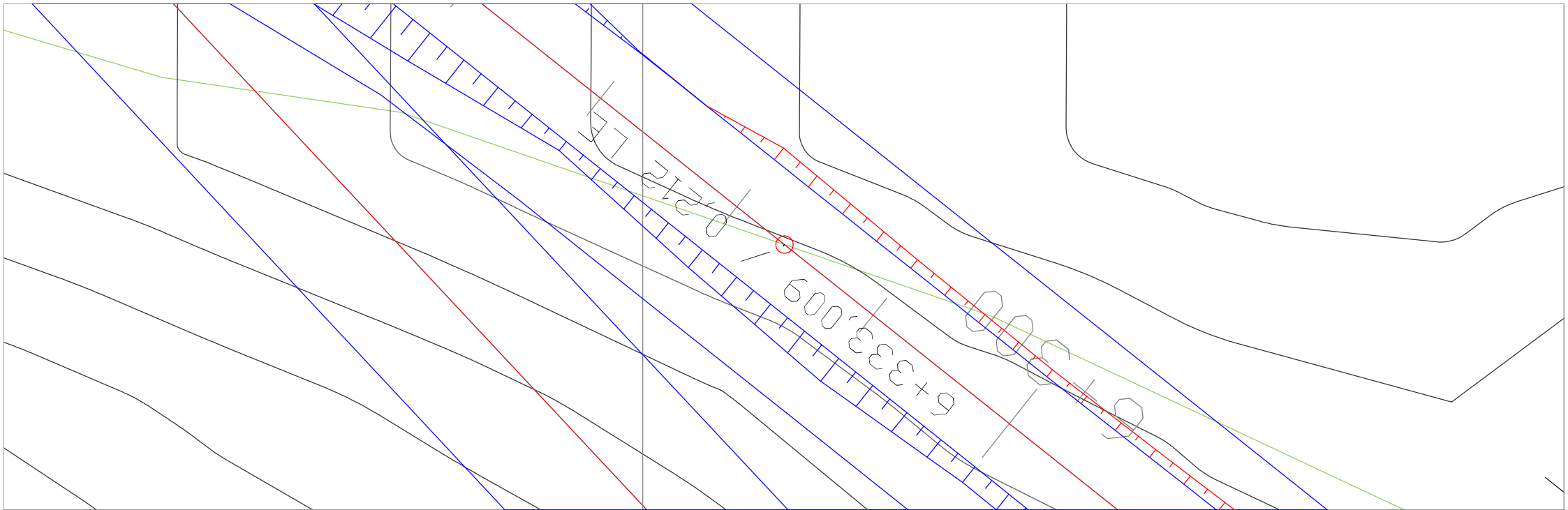




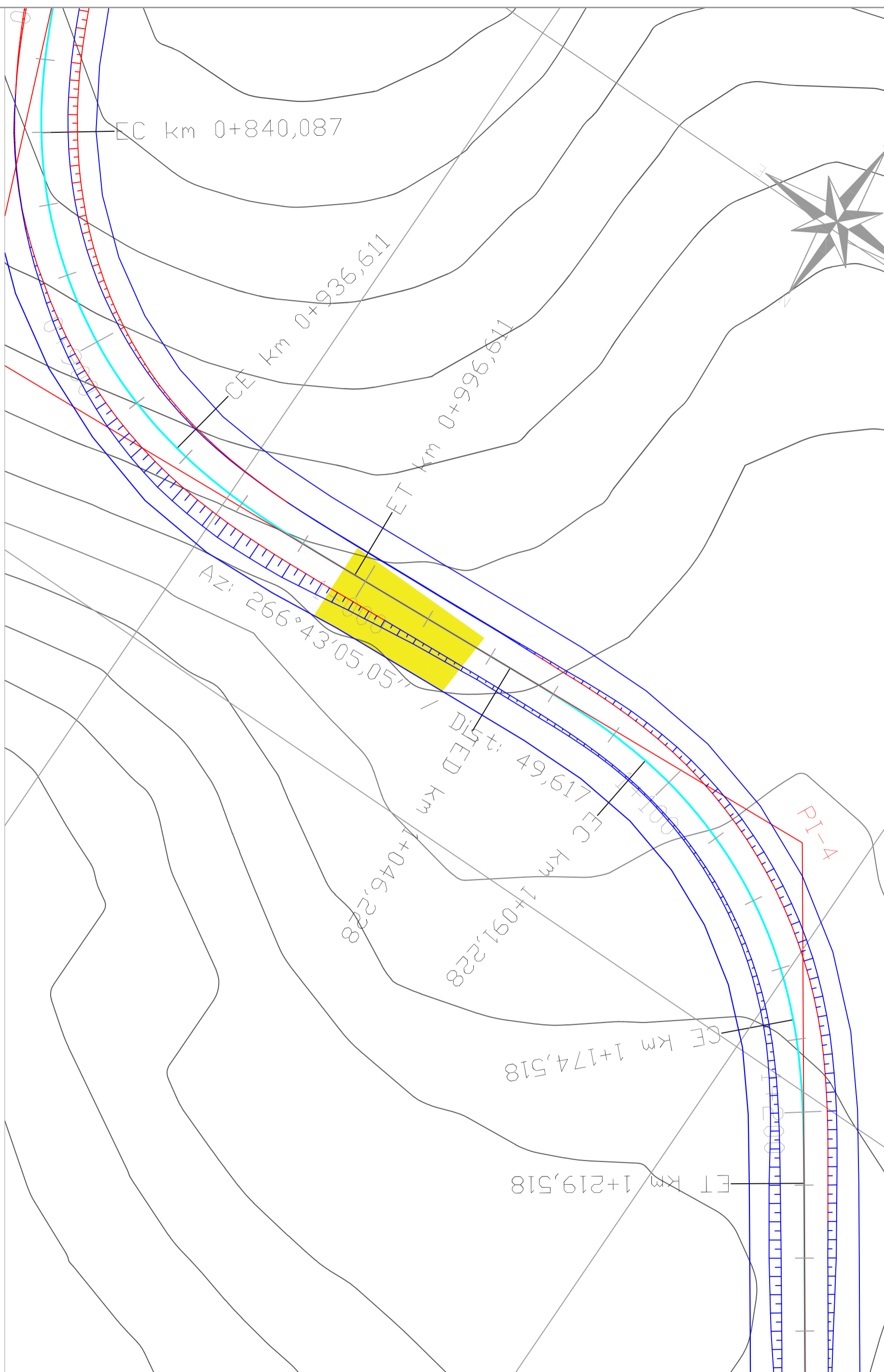




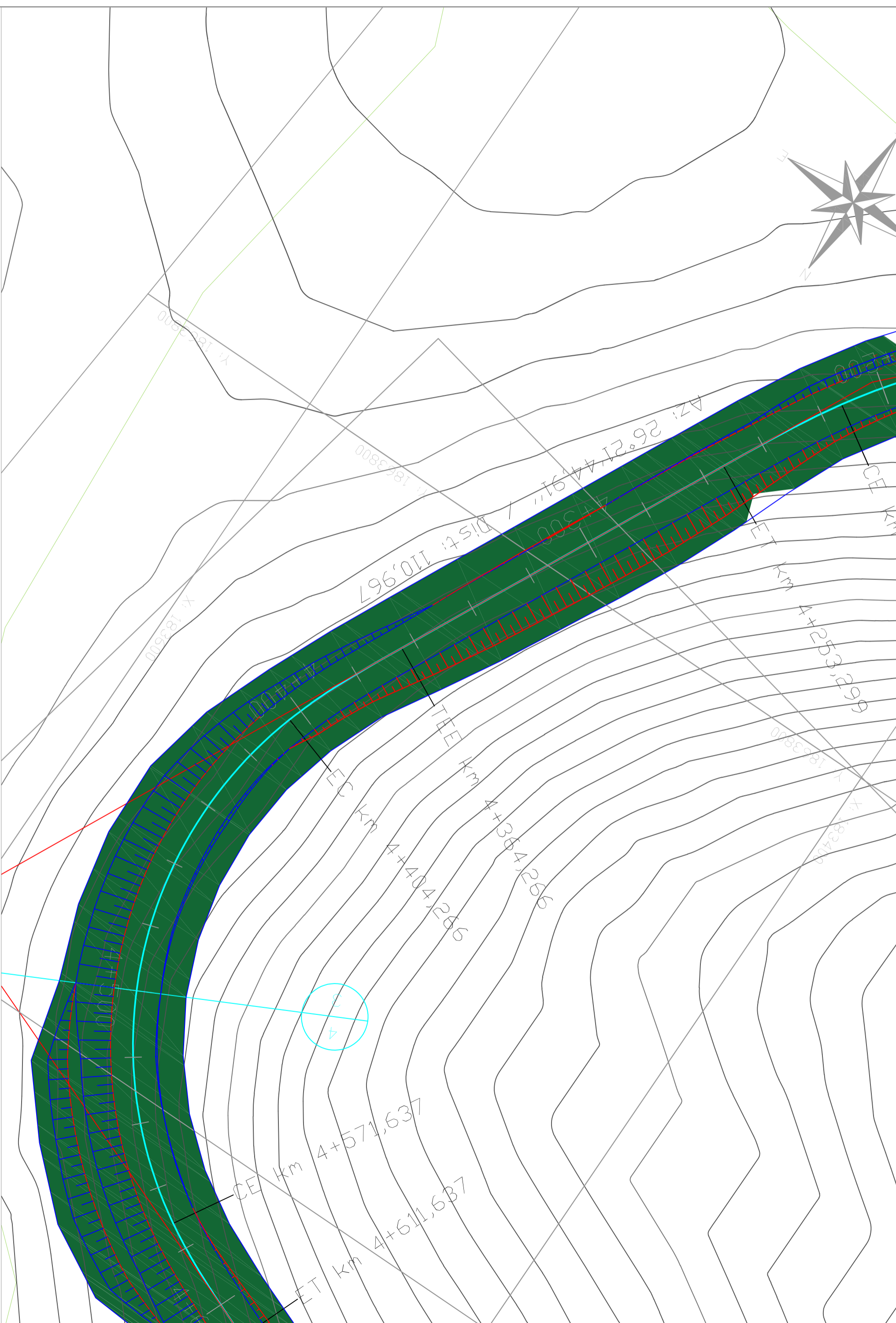
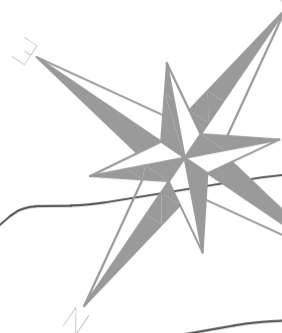




2.4 Desapropriações



DETALHAMENTO 03: DESAPROPRIAÇÃO DE UMA EDIFICAÇÃO (270,00 m²)

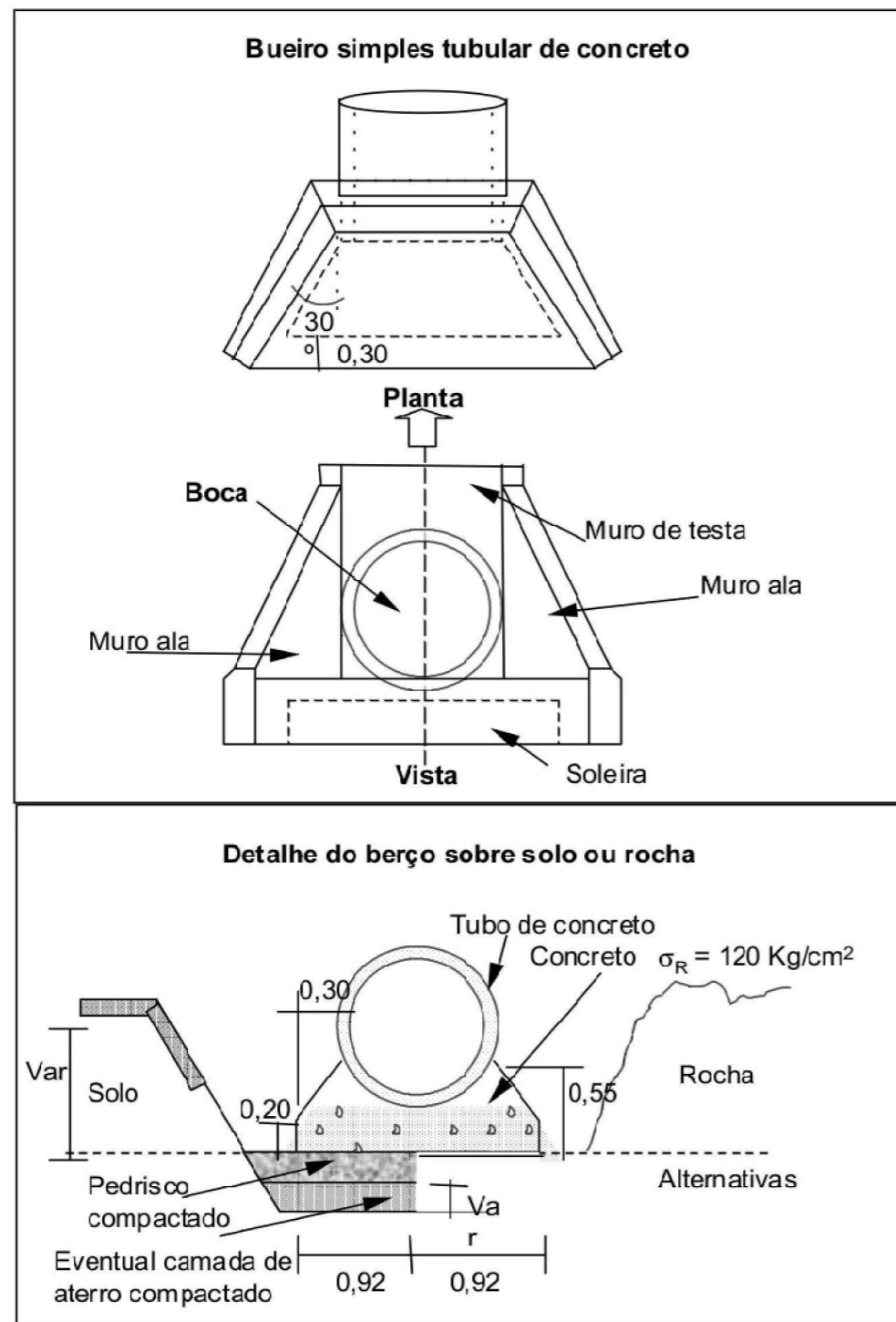


DETALHAMENTO 07: DESAPROPRIAÇÃO DE MAT.

X: 181800 / Y: 150000



DETALHAMENTO 10: DESAPROPRIAÇÃO DE MAT.



DESENHO ESQUEMÁTICO DE UM BUEIRO SIMPLES

2.5 Seções Transversais

Segundo o Termo de Referência do projeto ponto de partida, as seções deveriam abranger até 60m de largura do terreno, porém as seções feitas pela equipe não precisaram de toda essa abrangência para serem retratadas. Então, a equipe arbitrou 30m de largura do terreno em cada seção transversal do projeto.

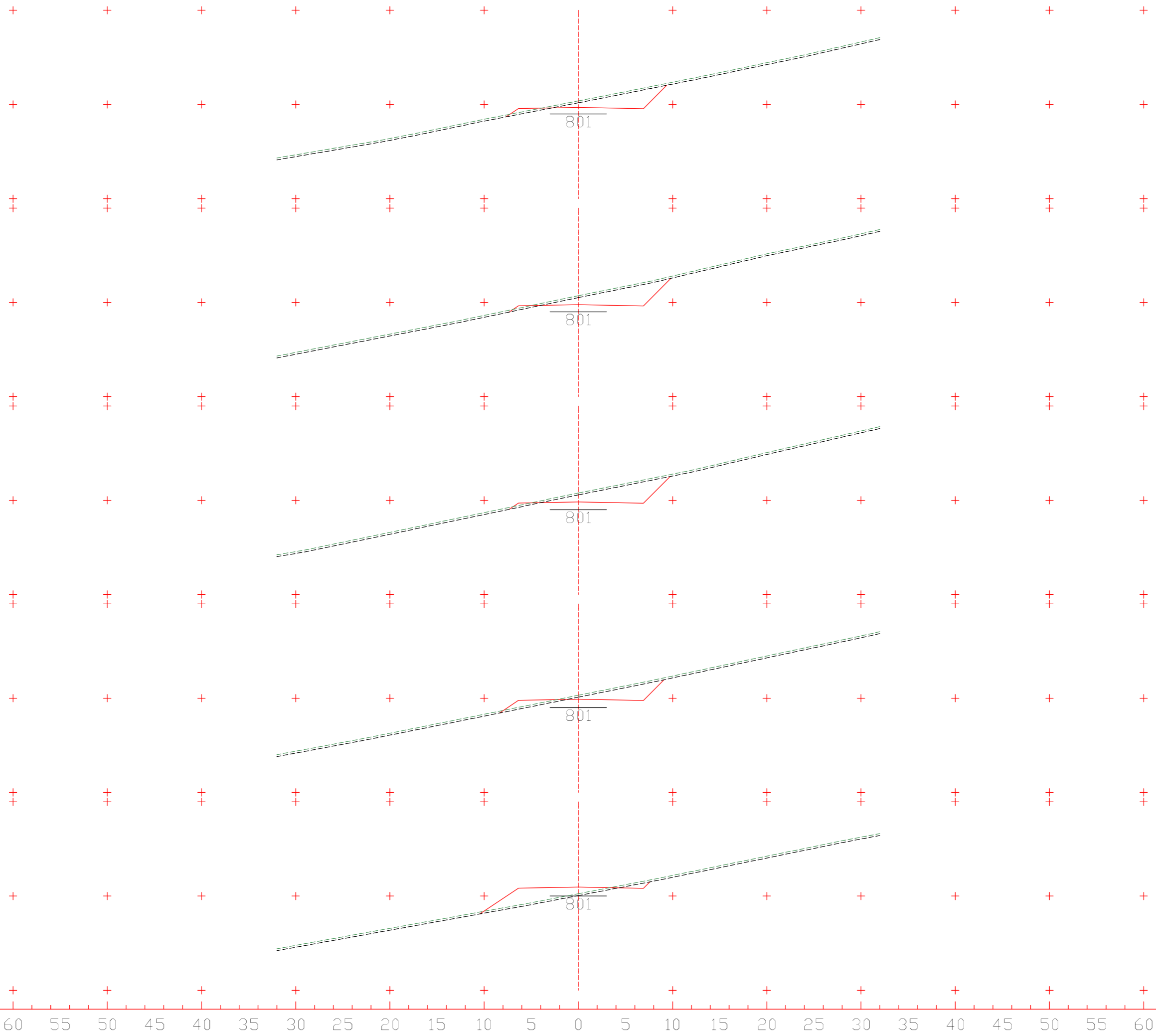
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794

809
807
805
803
801
799
797
795
793



0+080
CT 802,384 m
CP 801,698 m

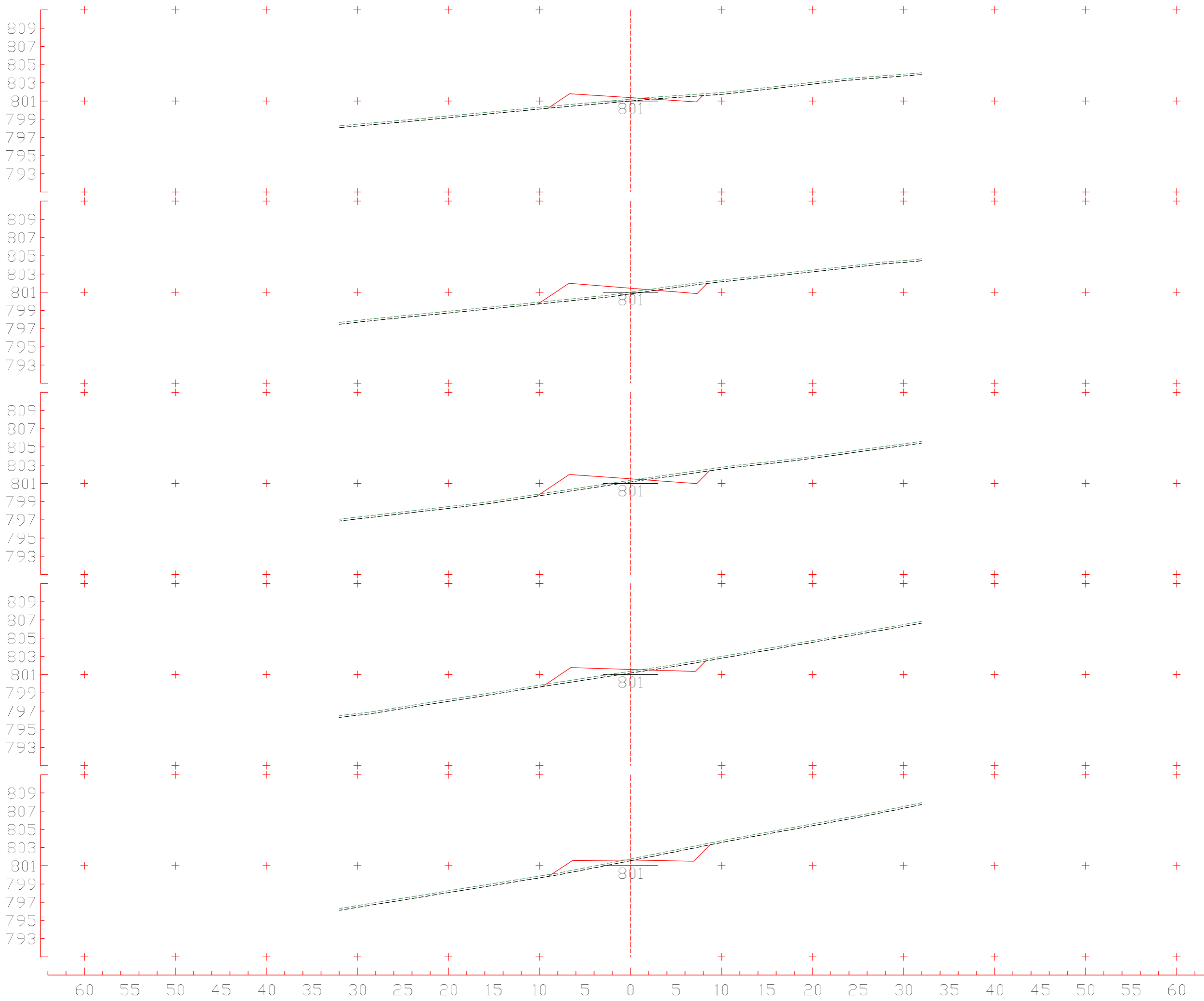
0+060
CT 802,714 m
CP 801,764 m

0+040
CT 802,770 m
CP 801,830 m

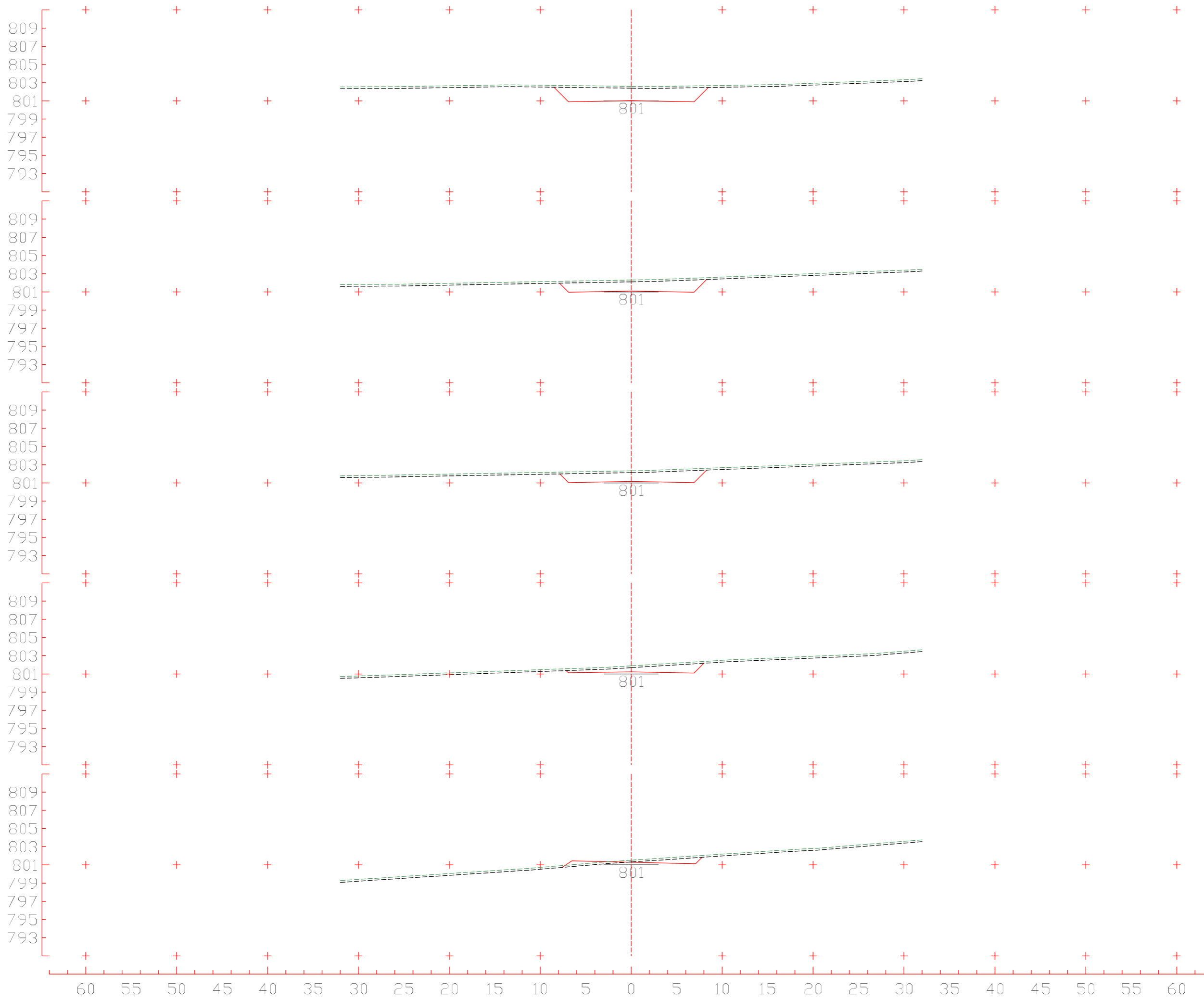
0+020
CT 802,307 m
CP 801,897 m

0+000
CT 801,252 m
CP 801,963 m

Eixo 01
Escala 1:400



Eixo 01
Escala 1:400



0+280
 CT 802,597 m
 CP 801,034 m

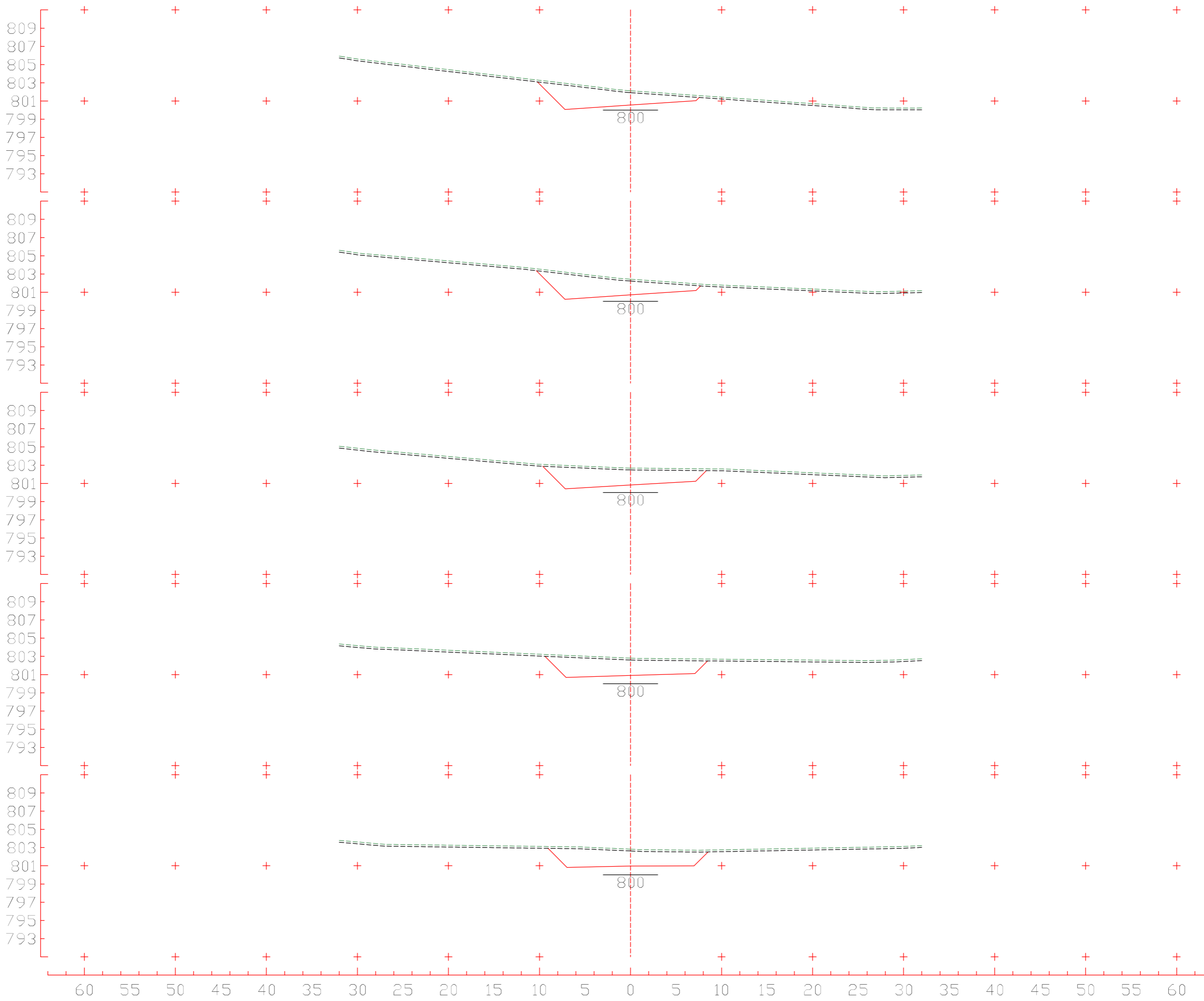
0+260
 CT 802,304 m
 CP 801,100 m

0+240
 CT 802,327 m
 CP 801,167 m

0+220
 CT 801,888 m
 CP 801,233 m

0+200
 CT 801,524 m
 CP 801,300 m

Eixo 01
 Escala 1:400



0+380
 CT 802,120 m
 CP 800,552 m

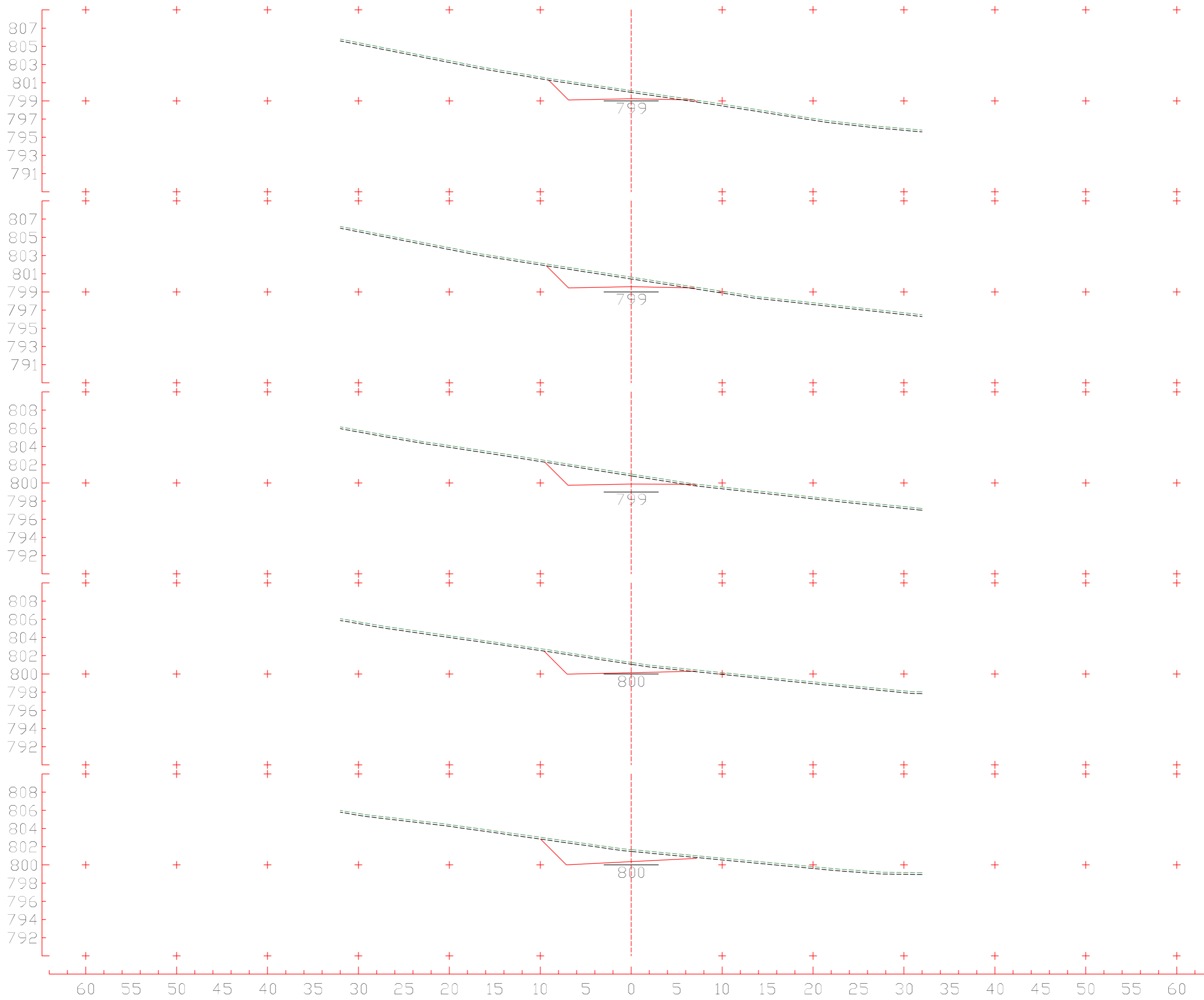
0+360
 CT 802,424 m
 CP 800,705 m

0+340
 CT 802,677 m
 CP 800,821 m

0+320
 CT 802,800 m
 CP 800,901 m

0+300
 CT 802,826 m
 CP 800,968 m

Eixo 1
 Escala 1:400



0+480
CT 800,135 m
CP 799,233 m

0+460
CT 800,621 m
CP 799,570 m

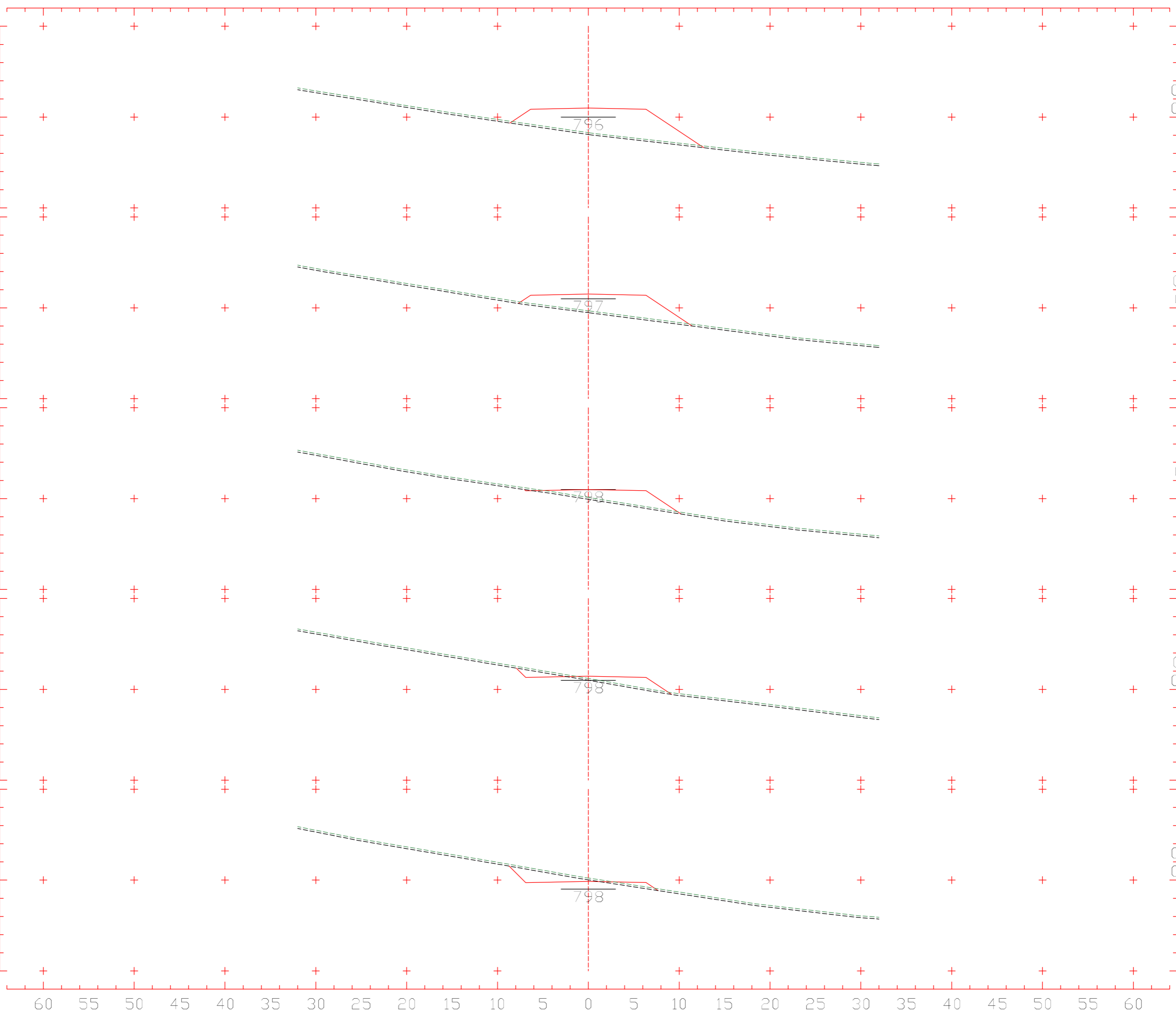
0+440
CT 800,976 m
CP 799,871 m

0+420
CT 801,262 m
CP 800,135 m

0+400
CT 801,684 m
CP 800,362 m

Eixo 01
Escala 1:400

804
802
800
798
796
794
792
790
788
804
802
800
798
796
794
792
790
788
805
803
801
799
797
795
793
791
789
805
803
801
799
797
795
793
791
789
807
805
803
801
799
797
795
793
791



0+580
CT 794,284 m
CP 796,994 m

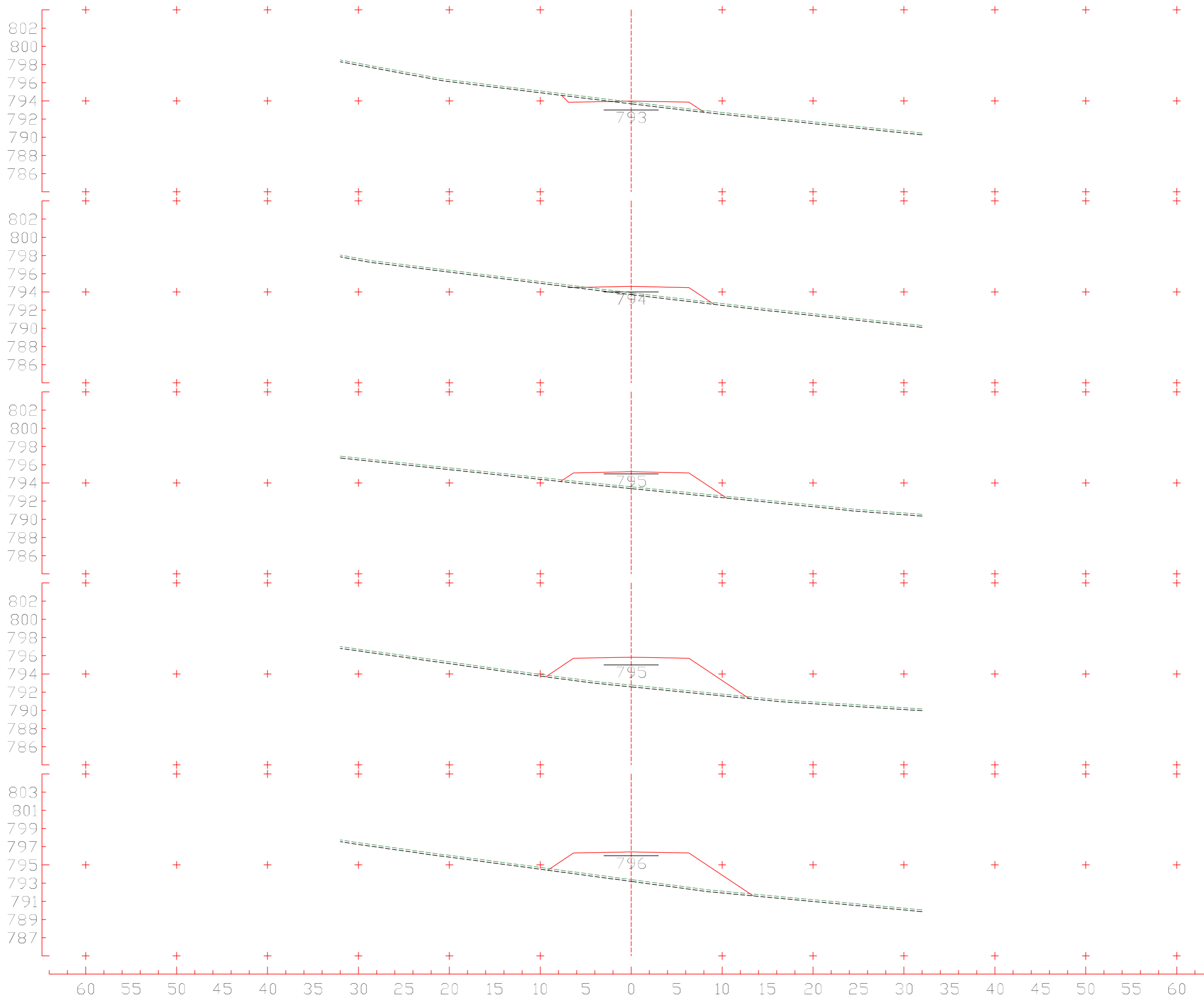
0+560
CT 795,670 m
CP 797,516 m

0+540
CT 797,124 m
CP 798,000 m

0+520
CT 798,202 m
CP 798,448 m

0+500
CT 799,228 m
CP 798,859 m

Eixo 01
Escala 1:400



0+680
 CT 793,875 m
 CP 793,986 m

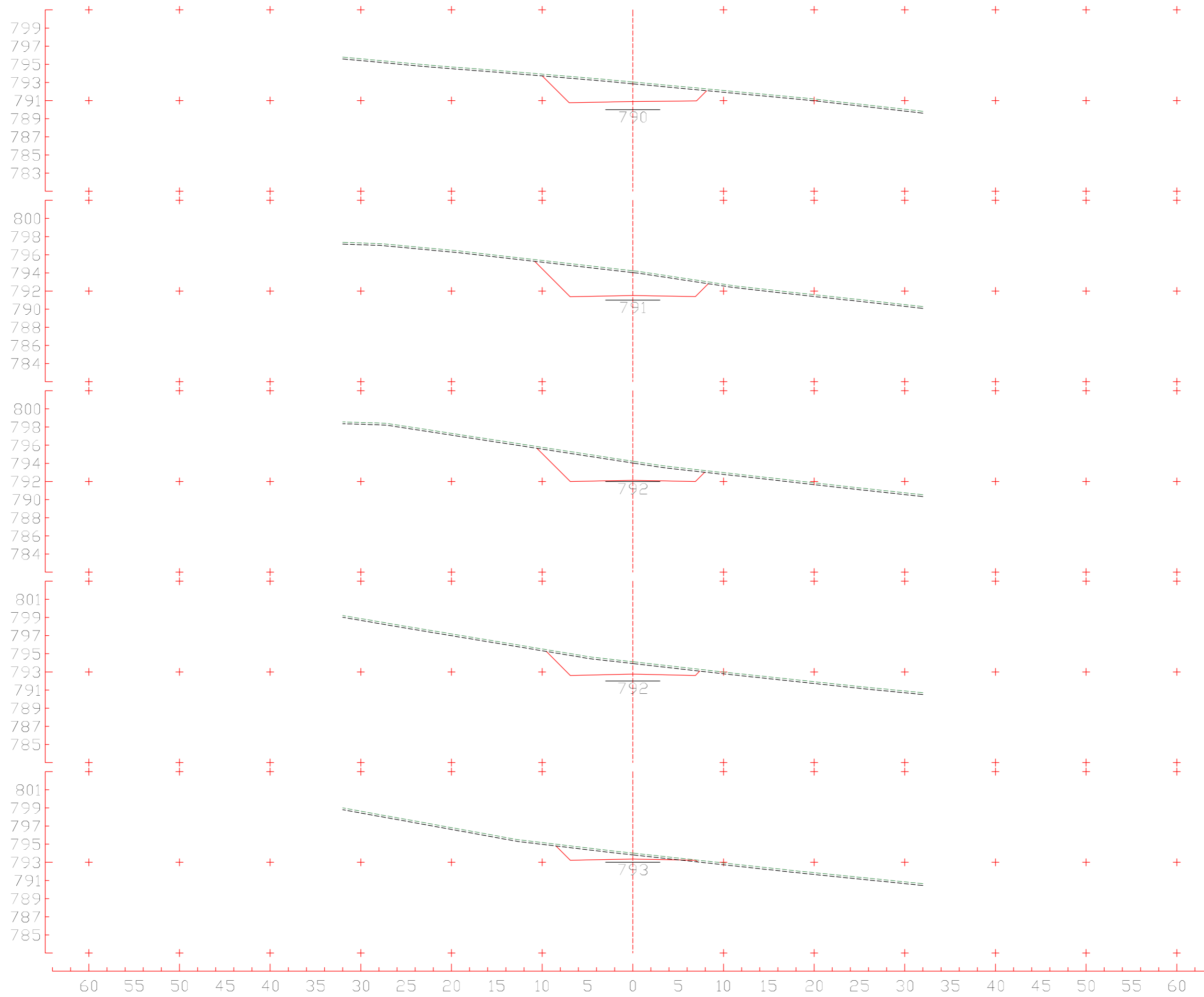
0+660
 CT 793,901 m
 CP 794,604 m

0+640
 CT 793,572 m
 CP 795,223 m

0+620
 CT 792,778 m
 CP 795,841 m

0+600
 CT 793,389 m
 CP 796,436 m

Eixo 01
 Escala 1:400



0+780
 CT 793,049 m
 CP 790,893 m

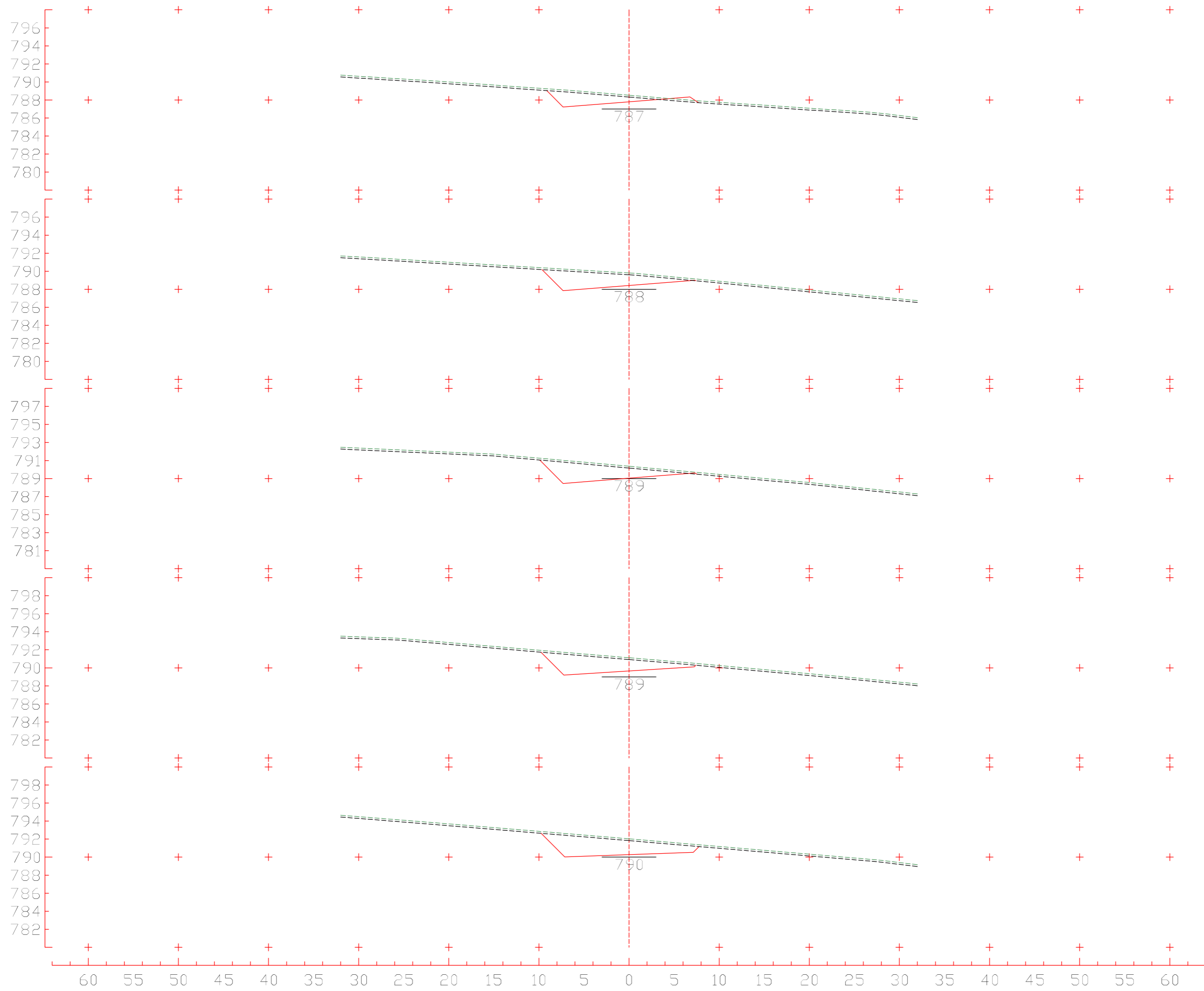
0+760
 CT 794,237 m
 CP 791,512 m

0+740
 CT 794,231 m
 CP 792,130 m

0+720
 CT 794,120 m
 CP 792,749 m

0+700
 CT 794,019 m
 CP 793,367 m

Eixo 01
 Escala 1:400



0+880
 CT 788,525 m
 CP 787,801 m

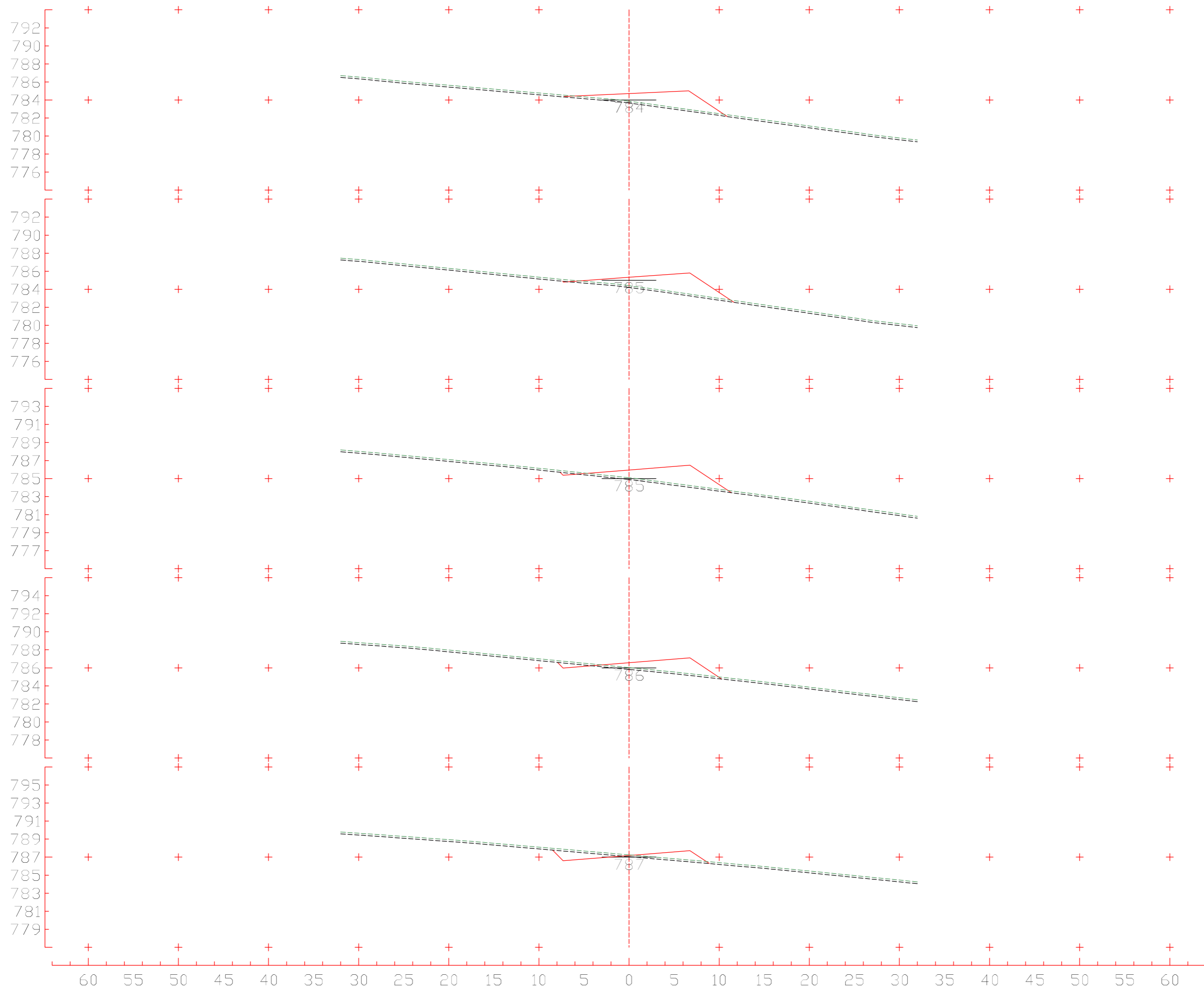
0+860
 CT 789,806 m
 CP 788,419 m

0+840
 CT 790,362 m
 CP 789,038 m

0+820
 CT 791,119 m
 CP 789,656 m

0+800
 CT 792,030 m
 CP 790,275 m

Eixo 1
 Escala 1:400



0+980
 CT 783,859 m
 CP 784,708 m

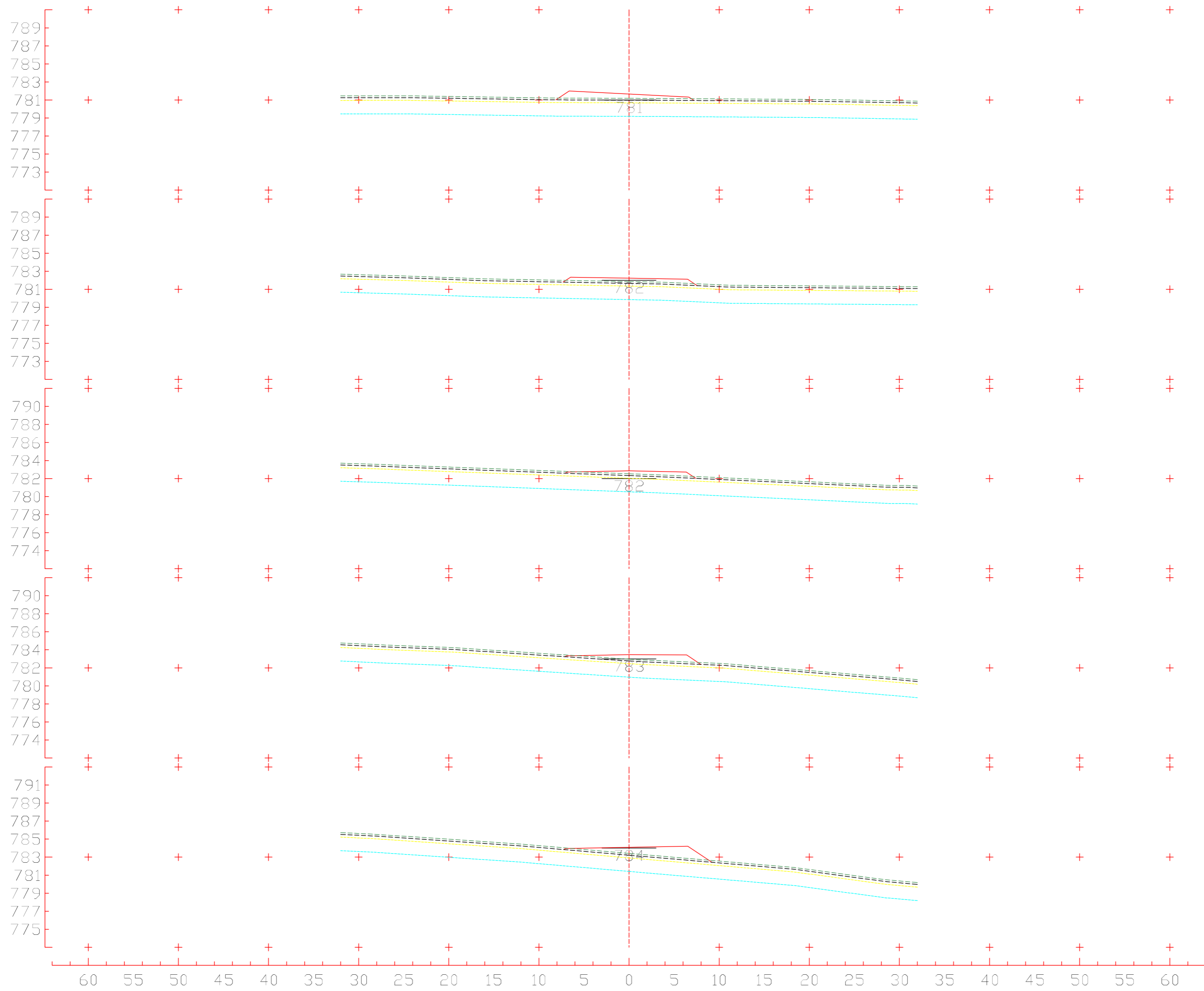
0+960
 CT 784,395 m
 CP 785,327 m

0+940
 CT 785,093 m
 CP 785,945 m

0+920
 CT 786,027 m
 CP 786,564 m

0+900
 CT 787,252 m
 CP 787,182 m

Eixo 01
 Escala 1:400



1+080
 CT 781,180 m
 CP 781,657 m

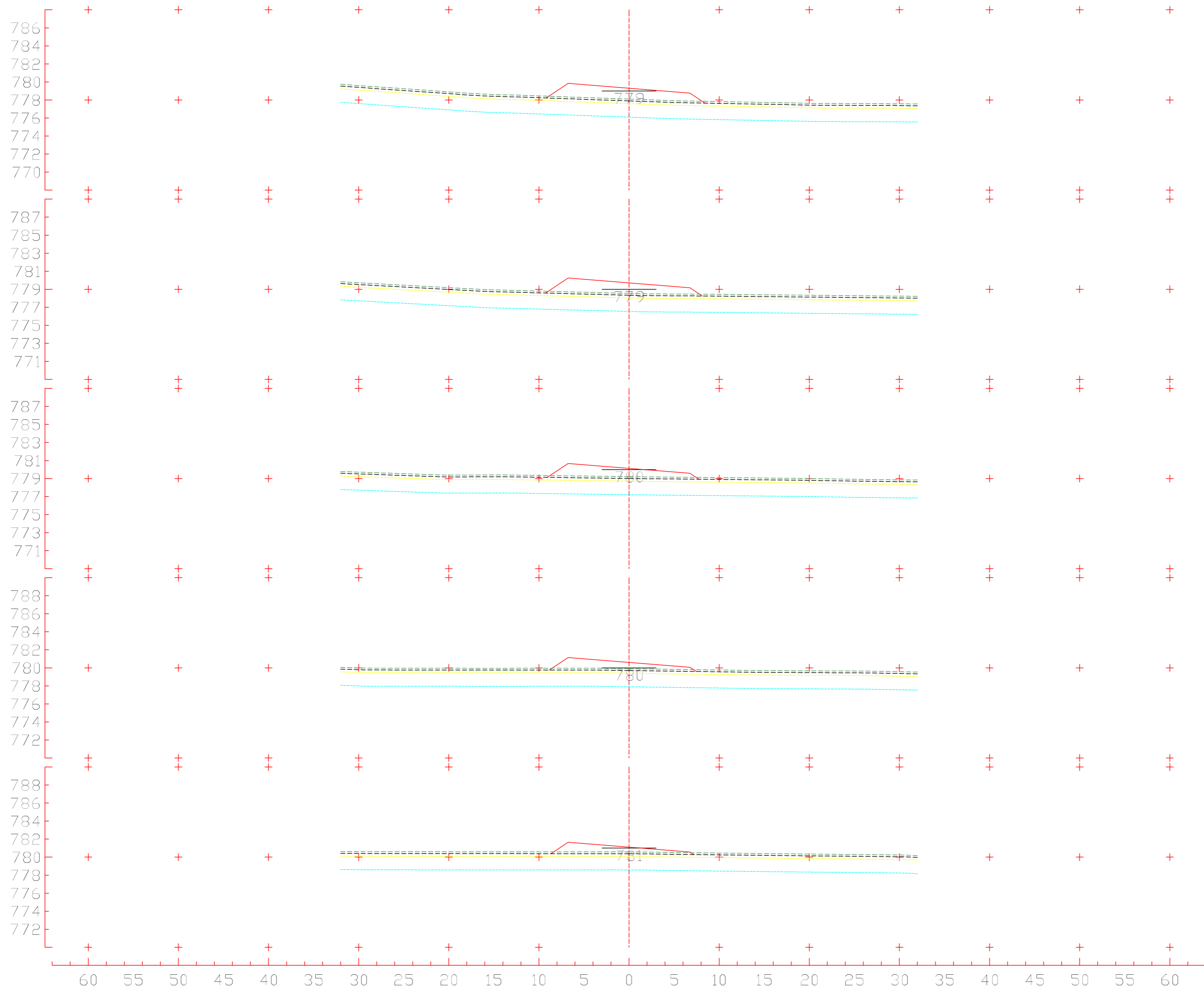
1+060
 CT 781,853 m
 CP 782,239 m

1+040
 CT 782,529 m
 CP 782,853 m

1+020
 CT 782,966 m
 CP 783,471 m

1+000
 CT 783,414 m
 CP 784,090 m

Eixo 01
 Escala 1:400



1+180
 CT 778,095 m
 CP 779,304 m

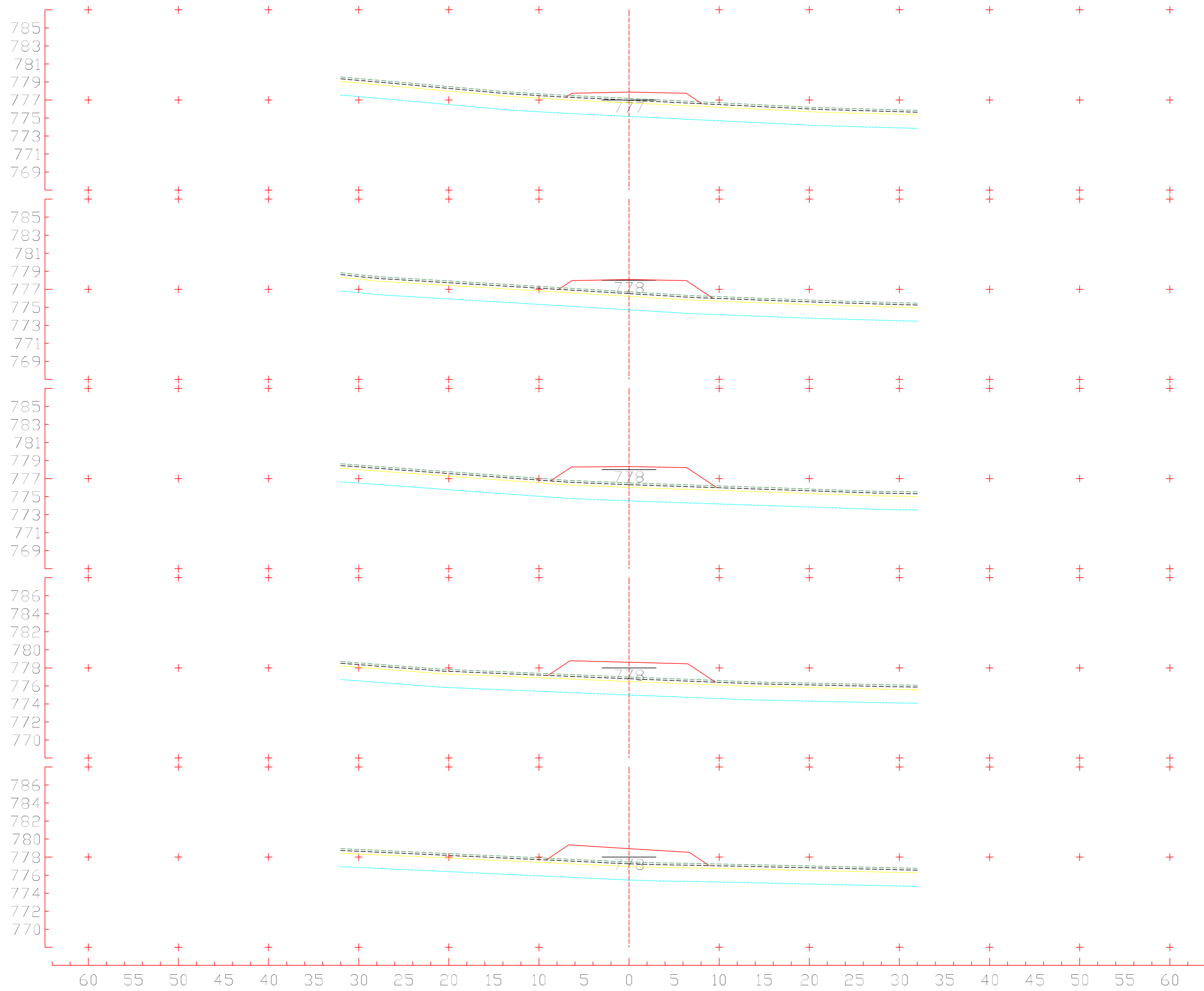
1+160
 CT 778,538 m
 CP 779,701 m

1+140
 CT 779,205 m
 CP 780,134 m

1+120
 CT 779,901 m
 CP 780,605 m

1+100
 CT 780,575 m
 CP 781,113 m

Eixol
 Escala 1:400



1+280
 CT 777,177 m
 CP 777,876 m

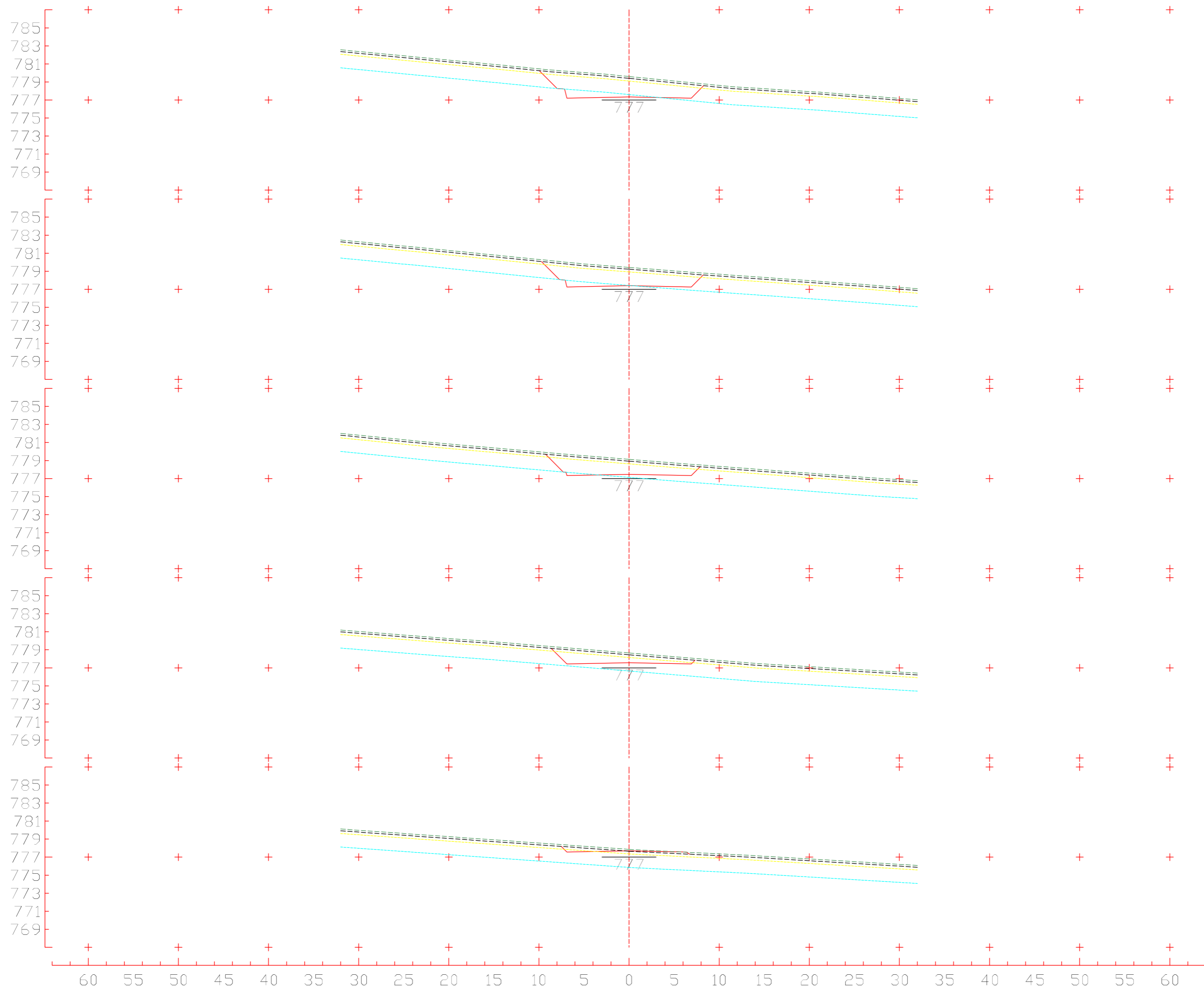
1+260
 CT 776,717 m
 CP 778,088 m

1+240
 CT 776,523 m
 CP 778,336 m

1+220
 CT 776,987 m
 CP 778,622 m

1+200
 CT 777,464 m
 CP 778,945 m

Eixo 01
 Escala 1:400



1+380
 CT 779,599 m
 CP 777,331 m

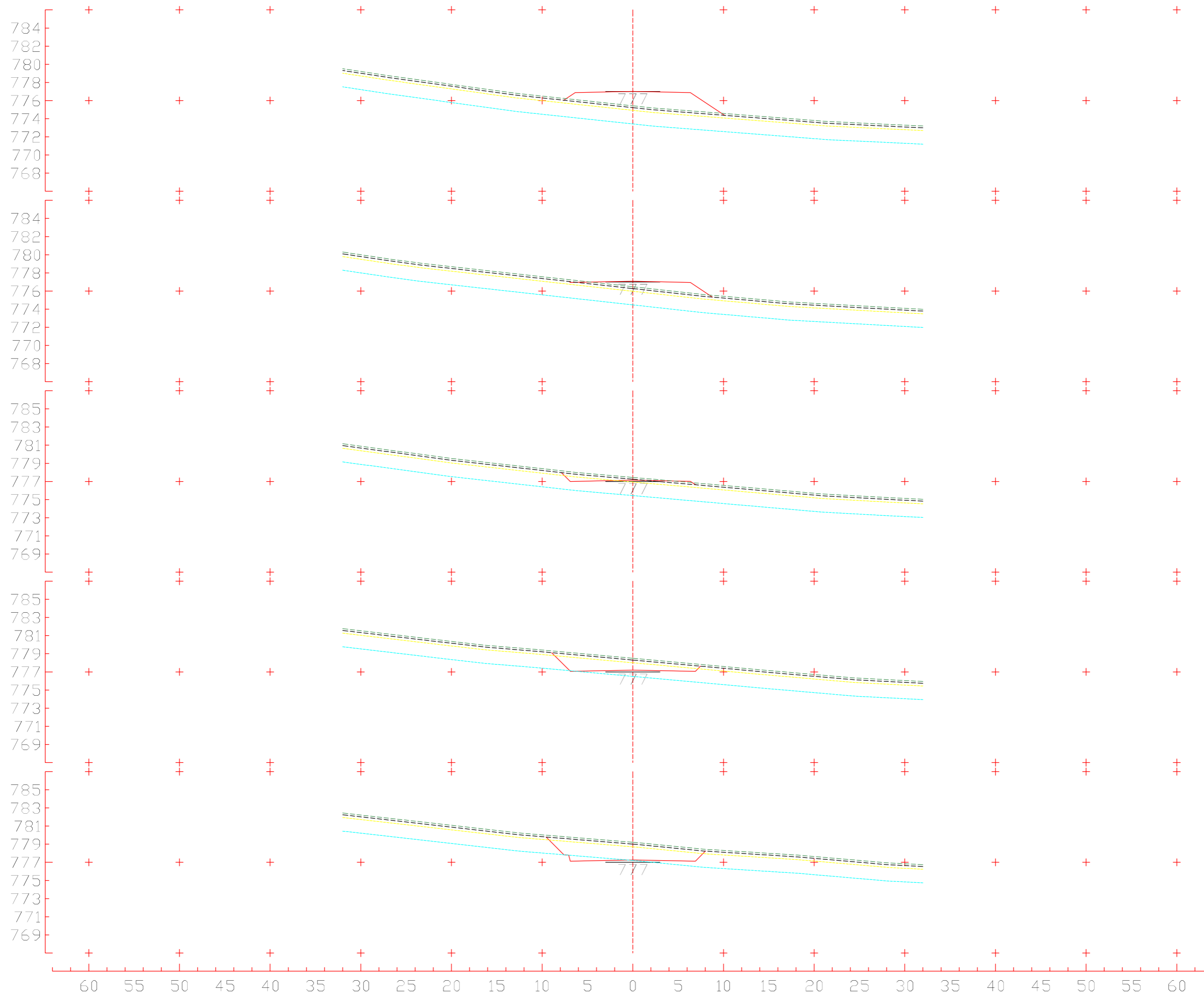
1+360
 CT 779,424 m
 CP 777,395 m

1+340
 CT 779,130 m
 CP 777,463 m

1+320
 CT 778,650 m
 CP 777,564 m

1+300
 CT 777,859 m
 CP 777,701 m

Eixo 01
 Escala 1:400



1+480
 CT 775,423 m
 CP 777,013 m

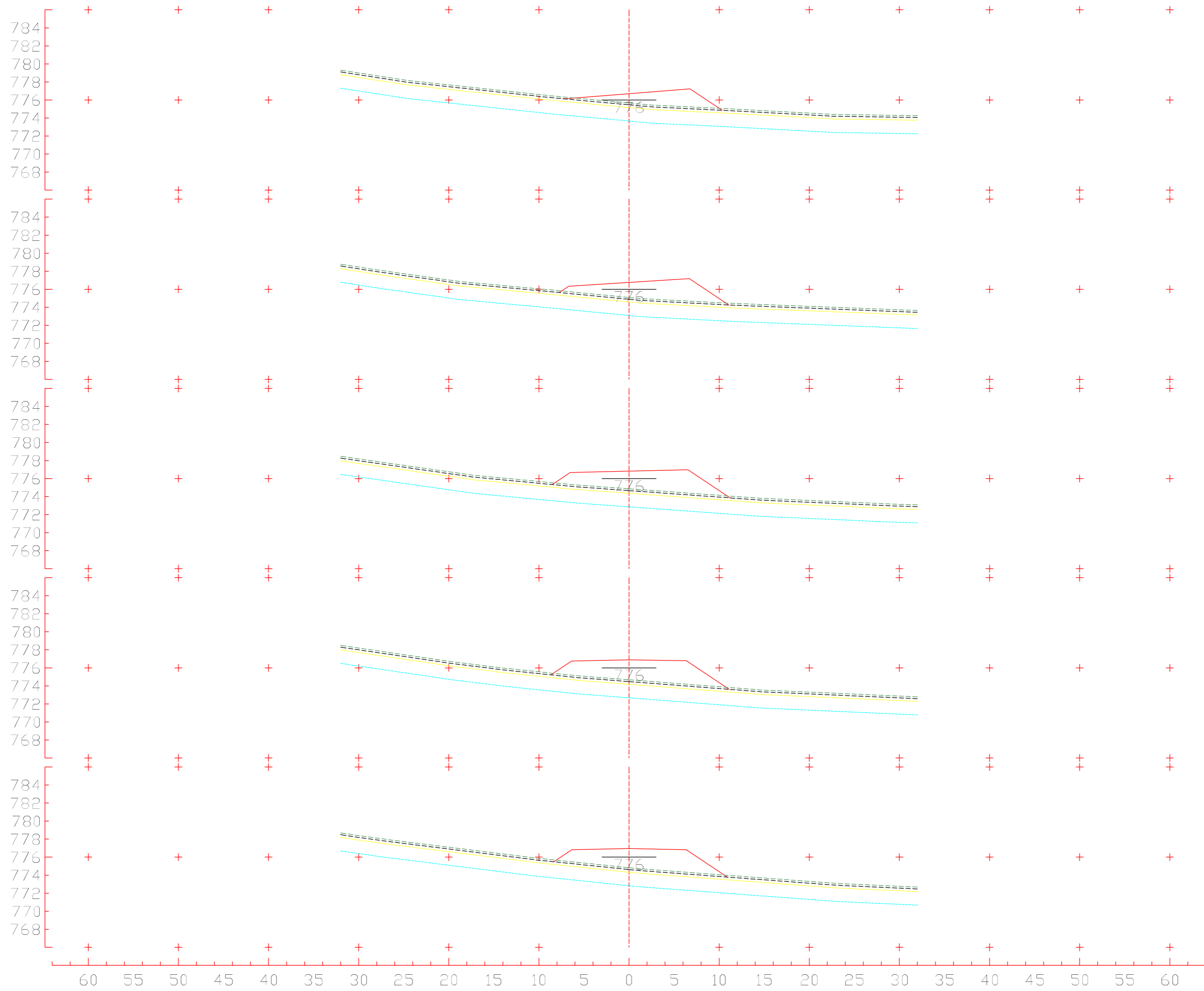
1+460
 CT 776,471 m
 CP 777,077 m

1+440
 CT 777,442 m
 CP 777,140 m

1+420
 CT 778,505 m
 CP 777,204 m

1+400
 CT 779,209 m
 CP 777,268 m

Eixo 01
 Escala 1:400



1+580
 CT 775,665 m
 CP 776,695 m

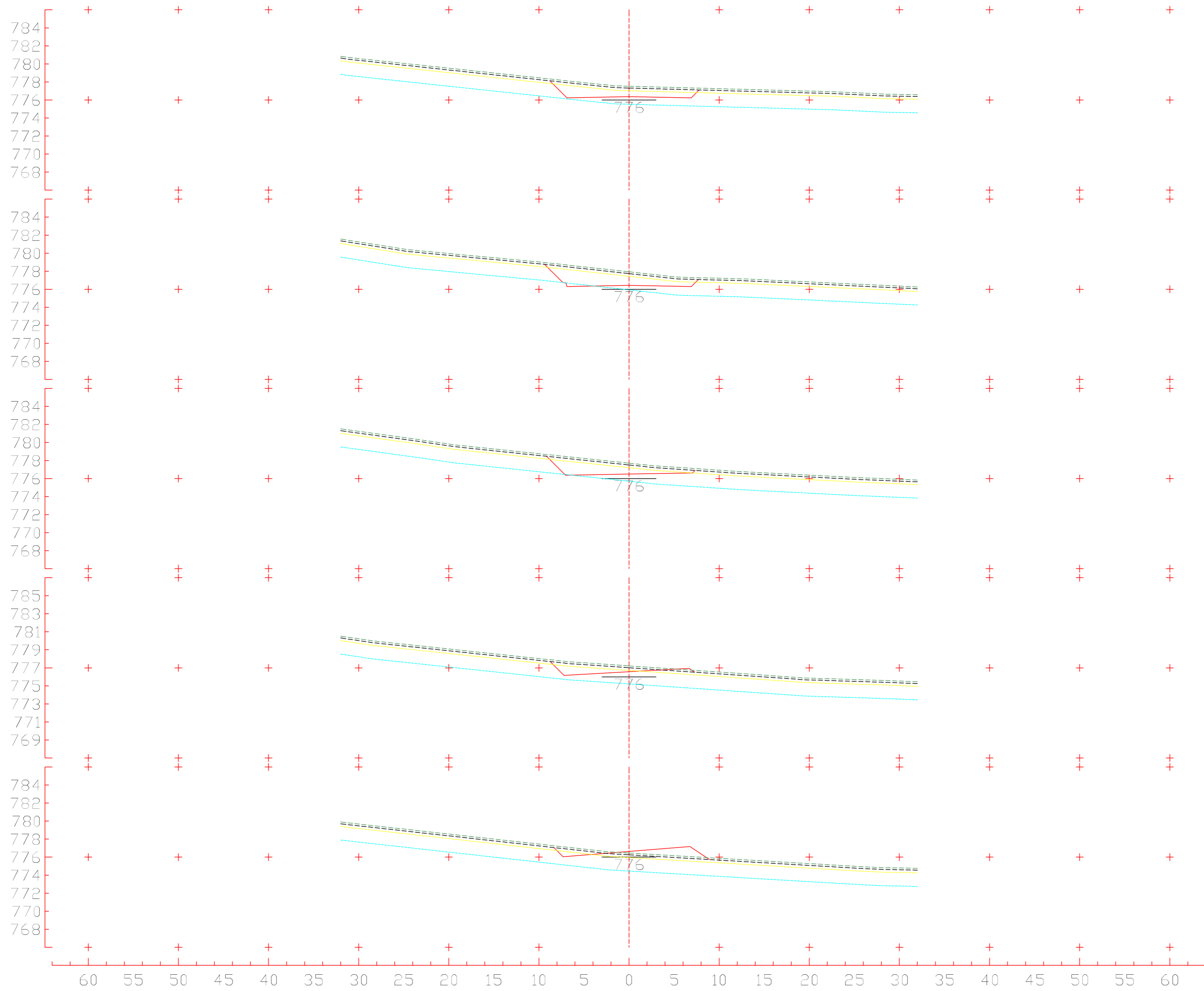
1+560
 CT 775,089 m
 CP 776,759 m

1+540
 CT 774,863 m
 CP 776,822 m

1+520
 CT 774,676 m
 CP 776,886 m

1+500
 CT 774,824 m
 CP 776,949 m

Eixo 01
 Escala 1:400



1+680
 CT 777,525 m
 CP 776,377 m

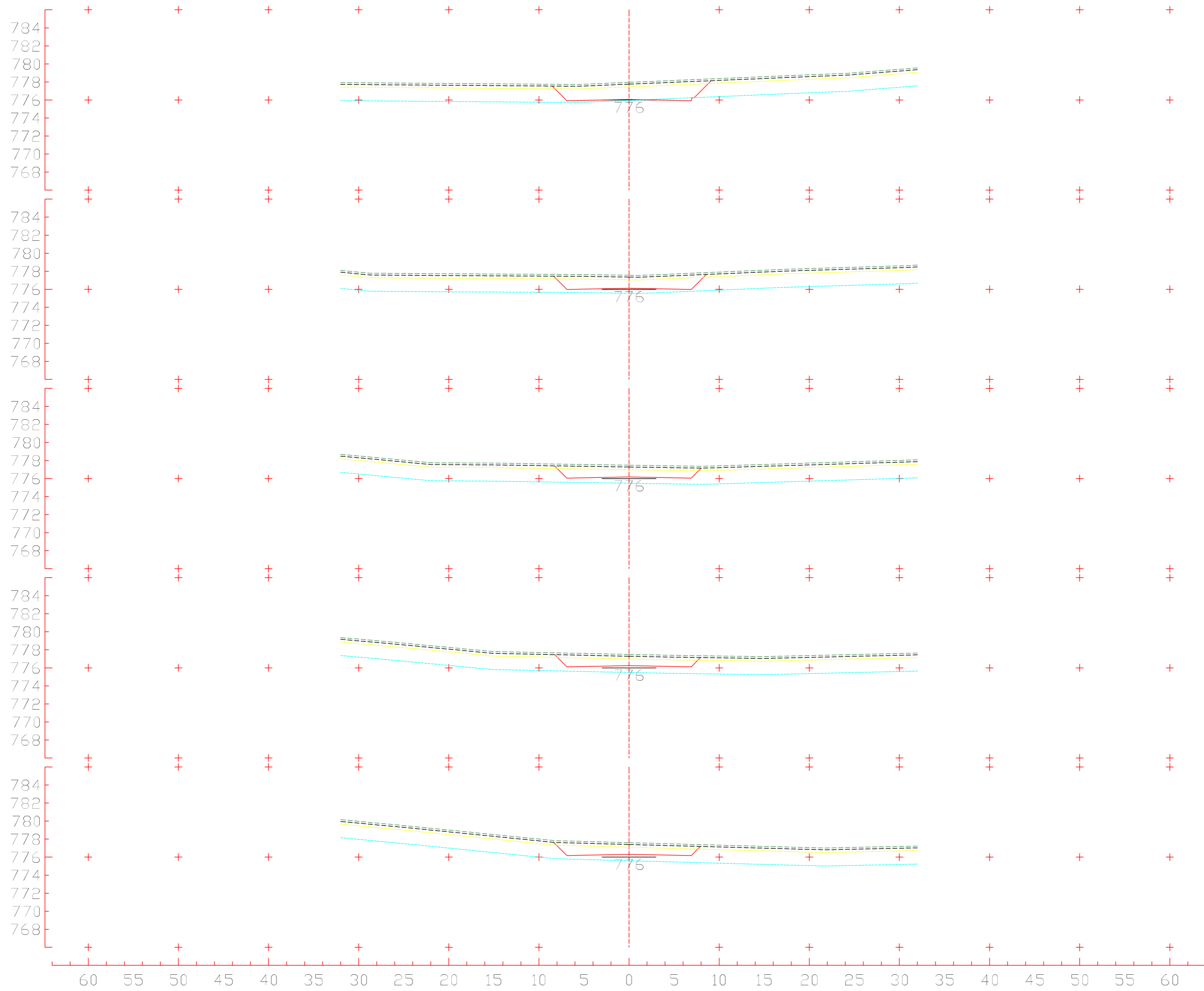
1+660
 CT 777,936 m
 CP 776,440 m

1+640
 CT 777,708 m
 CP 776,504 m

1+620
 CT 777,217 m
 CP 776,568 m

1+600
 CT 776,454 m
 CP 776,631 m

Eixo 01
 Escala 1:400



1+780
 CT 777,954 m
 CP 776,059 m

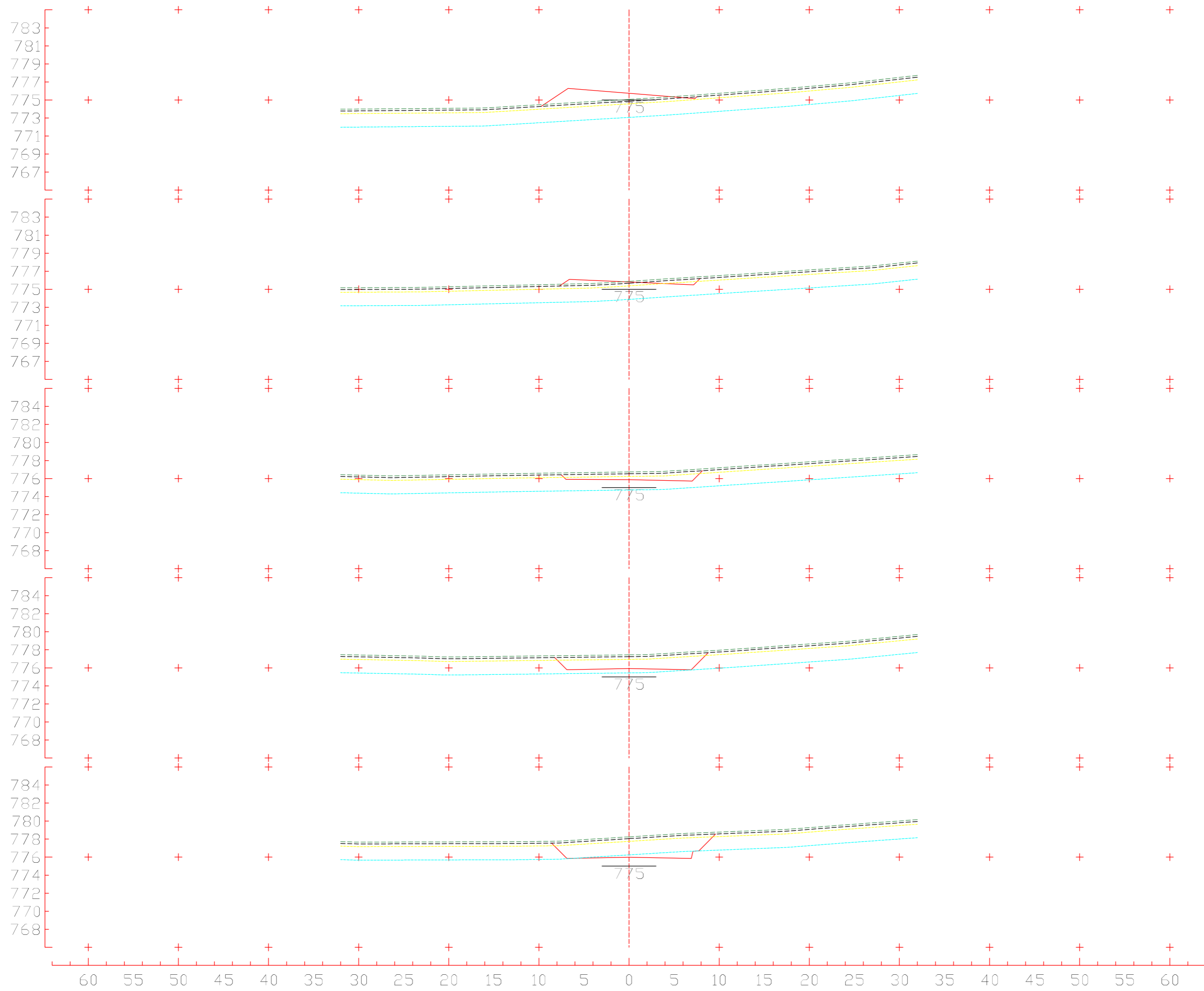
1+760
 CT 777,552 m
 CP 776,122 m

1+740
 CT 777,480 m
 CP 776,186 m

1+720
 CT 777,488 m
 CP 776,250 m

1+700
 CT 777,602 m
 CP 776,313 m

Eixo 01
 Escala 1:400



1+880
 CT 775,068 m
 CP 775,741 m

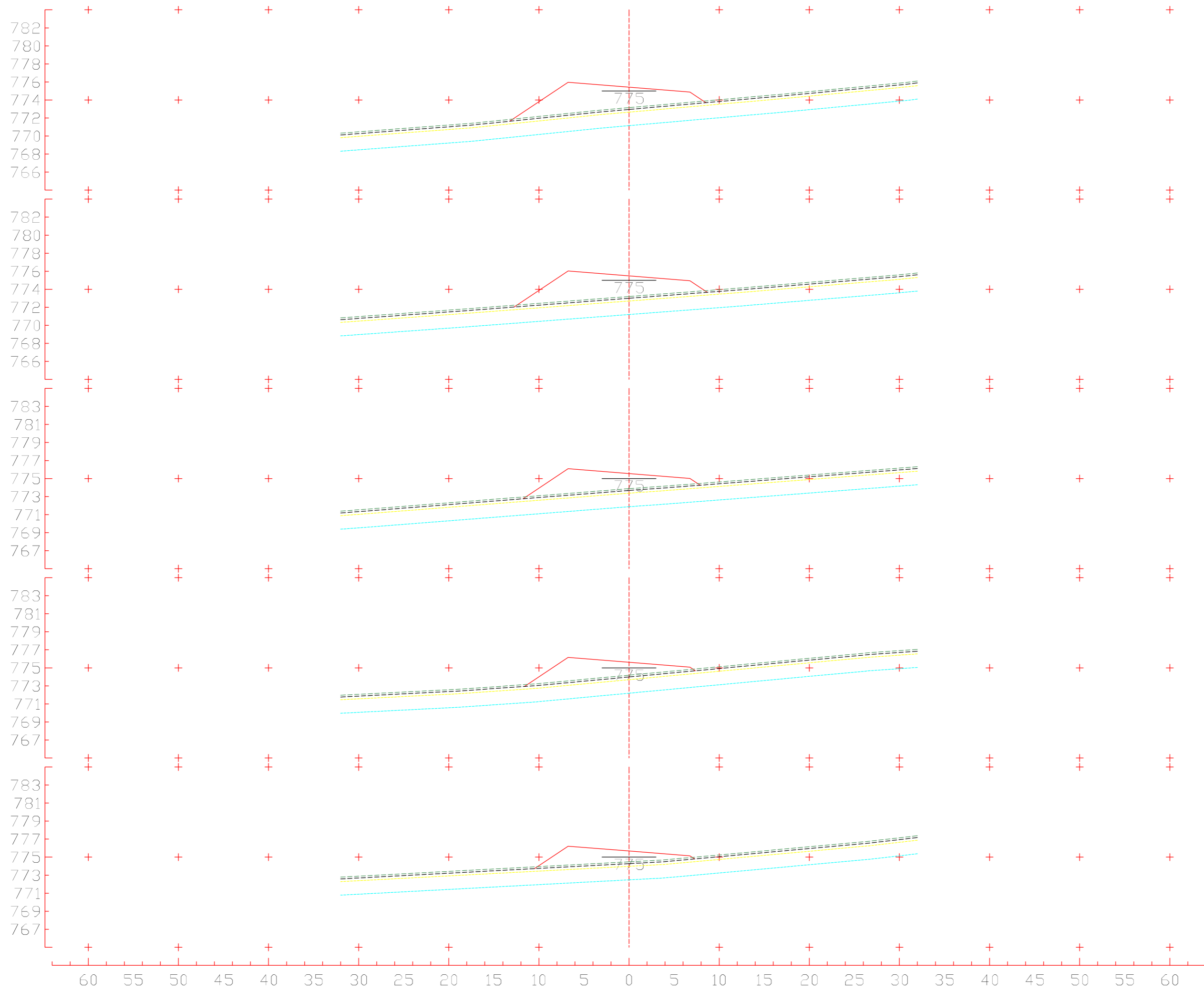
1+860
 CT 775,879 m
 CP 775,804 m

1+840
 CT 776,732 m
 CP 775,868 m

1+820
 CT 777,441 m
 CP 775,931 m

1+800
 CT 778,251 m
 CP 775,995 m

Eixo 01
 Escala 1:400



1+980
 CT 773,150 m
 CP 775,422 m

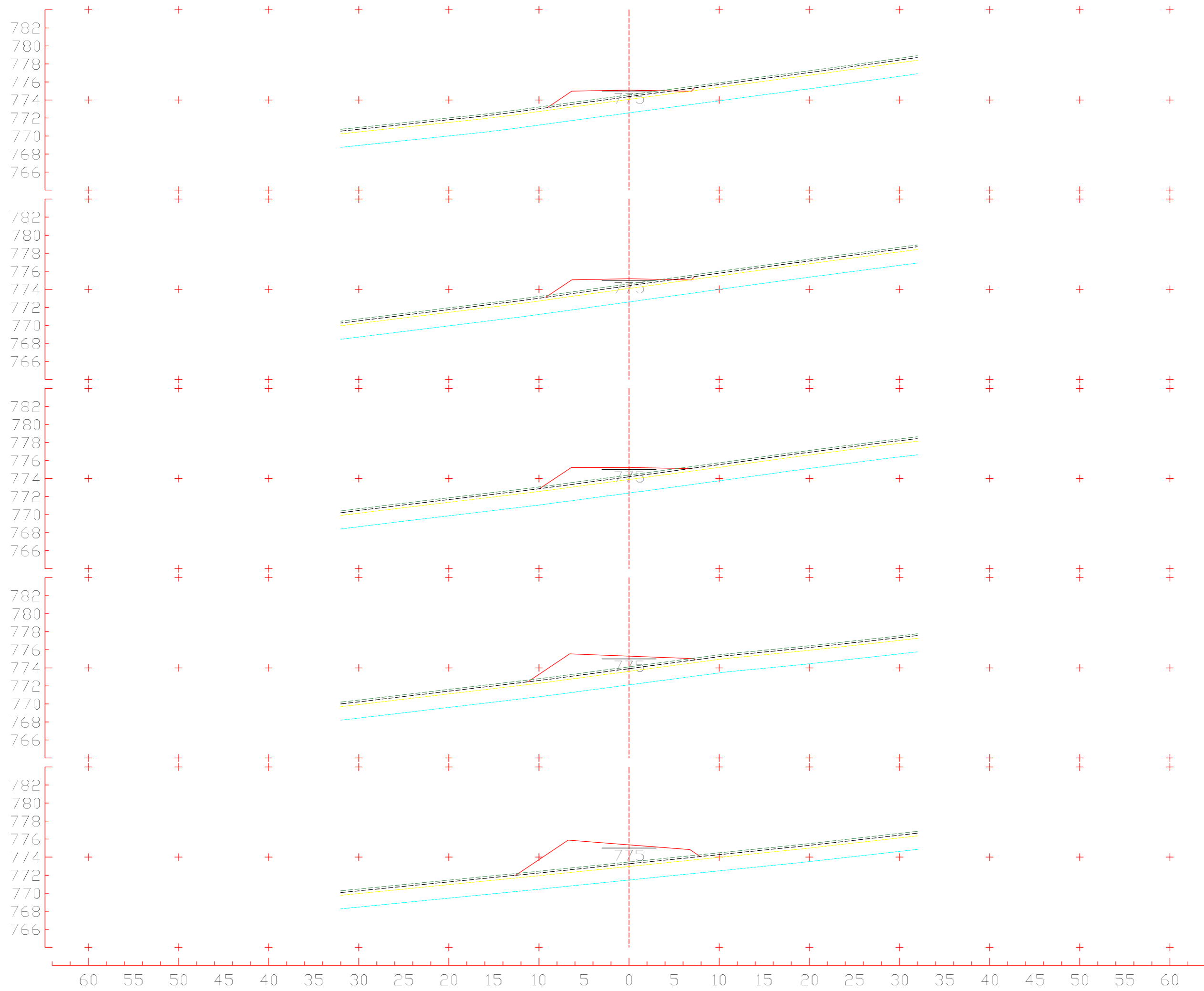
1+960
 CT 773,198 m
 CP 775,486 m

1+940
 CT 773,877 m
 CP 775,550 m

1+920
 CT 774,187 m
 CP 775,613 m

1+900
 CT 774,481 m
 CP 775,677 m

Eixo 01
 Escala 1:400



2+080
 CT 774,568 m
 CP 775,104 m

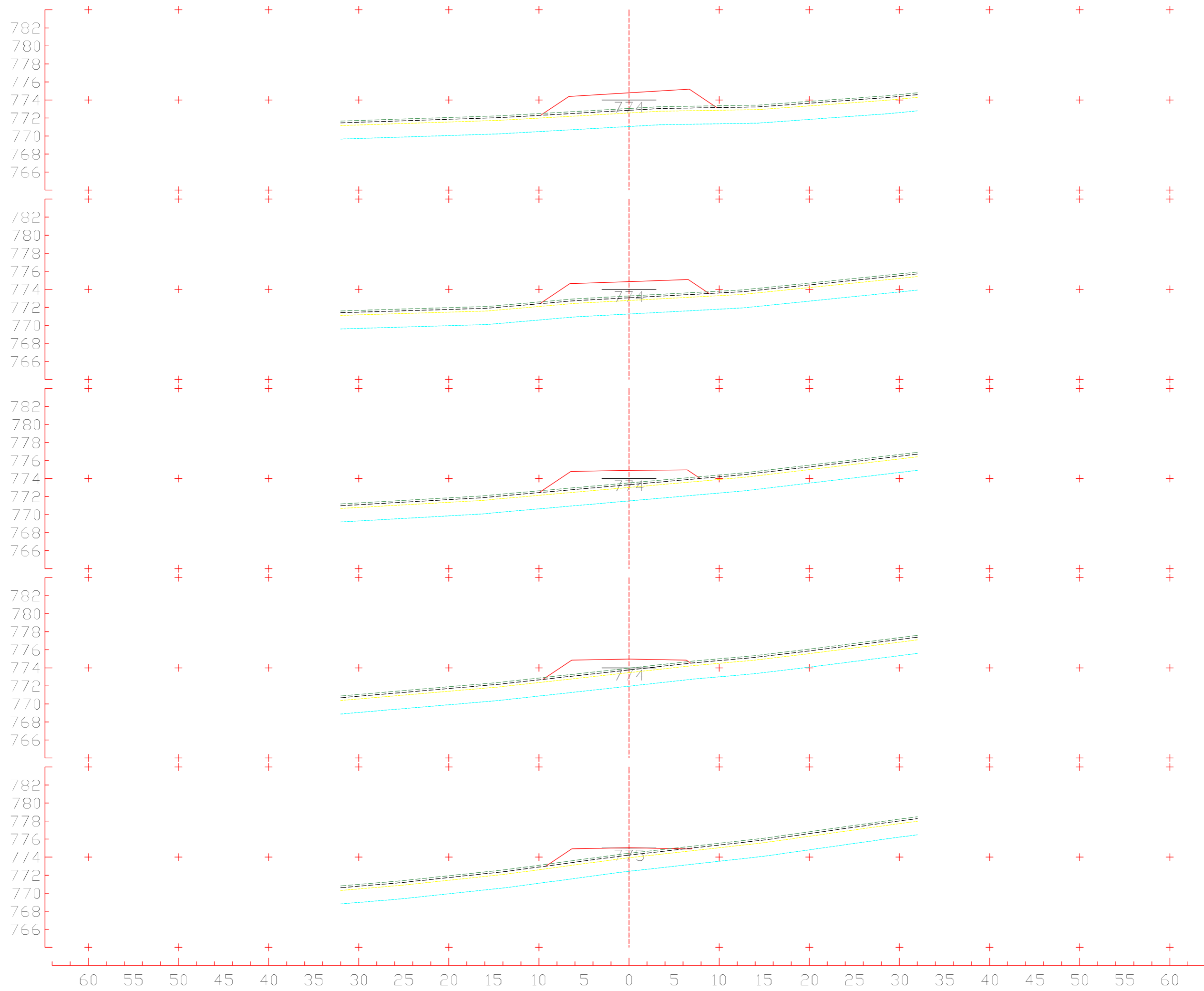
2+060
 CT 774,594 m
 CP 775,168 m

2+040
 CT 774,395 m
 CP 775,232 m

2+020
 CT 774,112 m
 CP 775,295 m

2+000
 CT 773,462 m
 CP 775,359 m

Eixo 1
 Escala 1:400



2+180
 CT 773,056 m
 CP 774,786 m

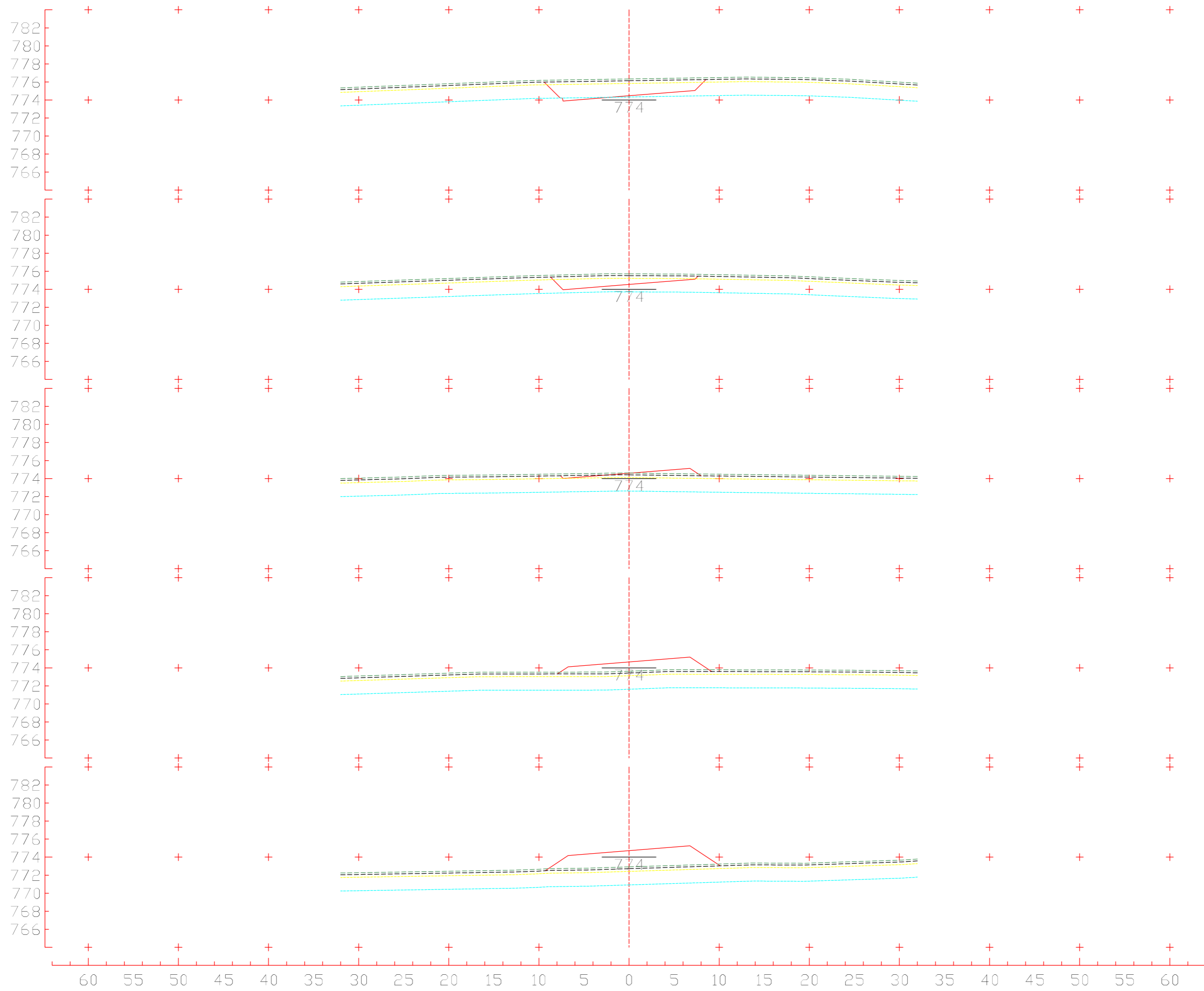
2+160
 CT 773,255 m
 CP 774,850 m

2+140
 CT 773,516 m
 CP 774,914 m

2+120
 CT 773,968 m
 CP 774,977 m

2+100
 CT 774,430 m
 CP 775,041 m

Eixo 01
 Escala 1:400



2+280
 CT 776,332 m
 CP 774,468 m

2+260
 CT 775,710 m
 CP 774,532 m

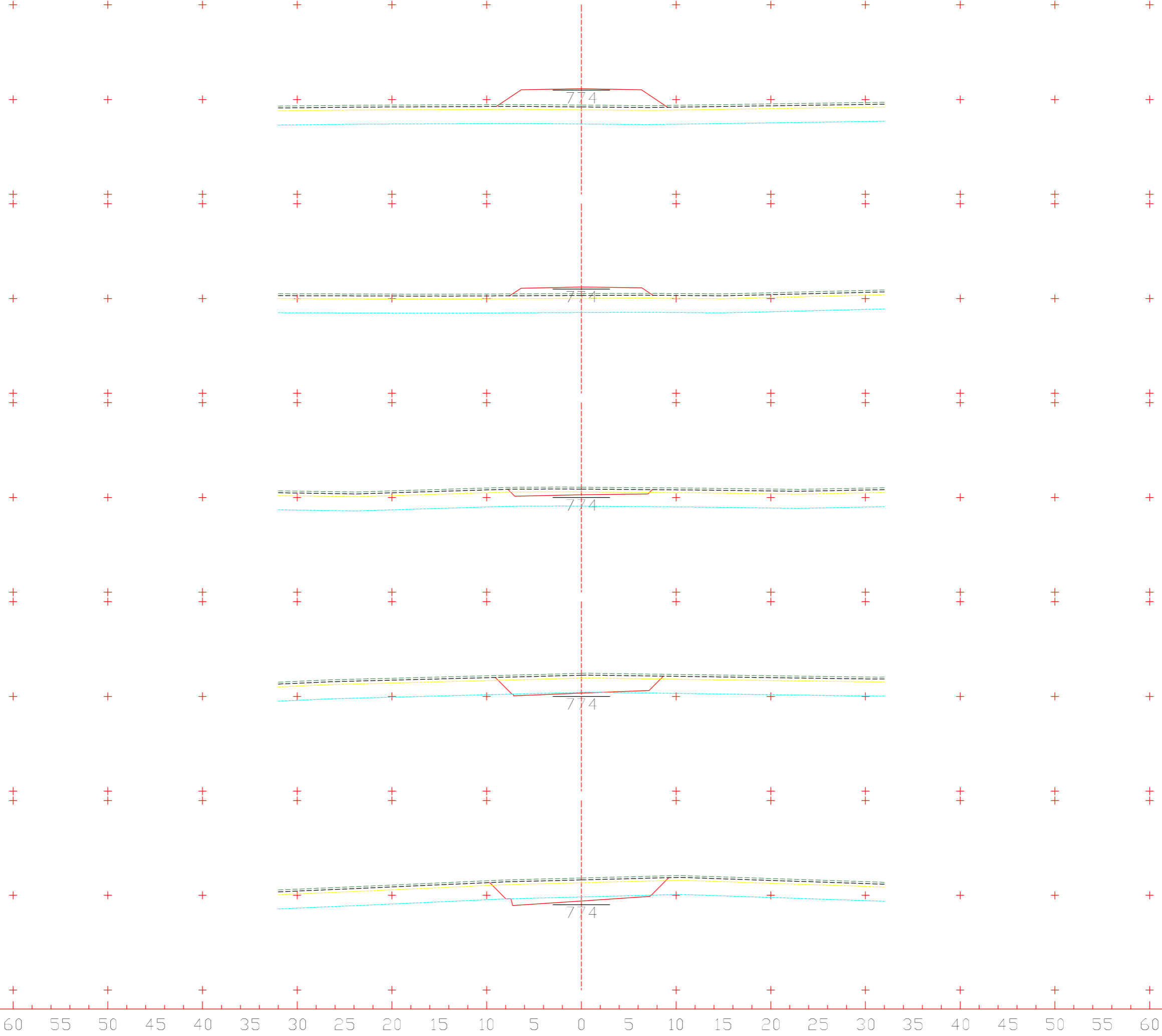
2+240
 CT 774,615 m
 CP 774,595 m

2+220
 CT 773,626 m
 CP 774,659 m

2+200
 CT 772,919 m
 CP 774,723 m

Eixo1
 Escala 1:400

781
779
777
775
773
771
769
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765
781
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775
773
771
769
767
765
782
780
778
776
774
772
770
768
766
782
780
778
776
774
772
770
768
766
783
781
779
777
775
773
771
769
767



2+380
CT 772,419 m
CP 774,150 m

2+360
CT 773,517 m
CP 774,214 m

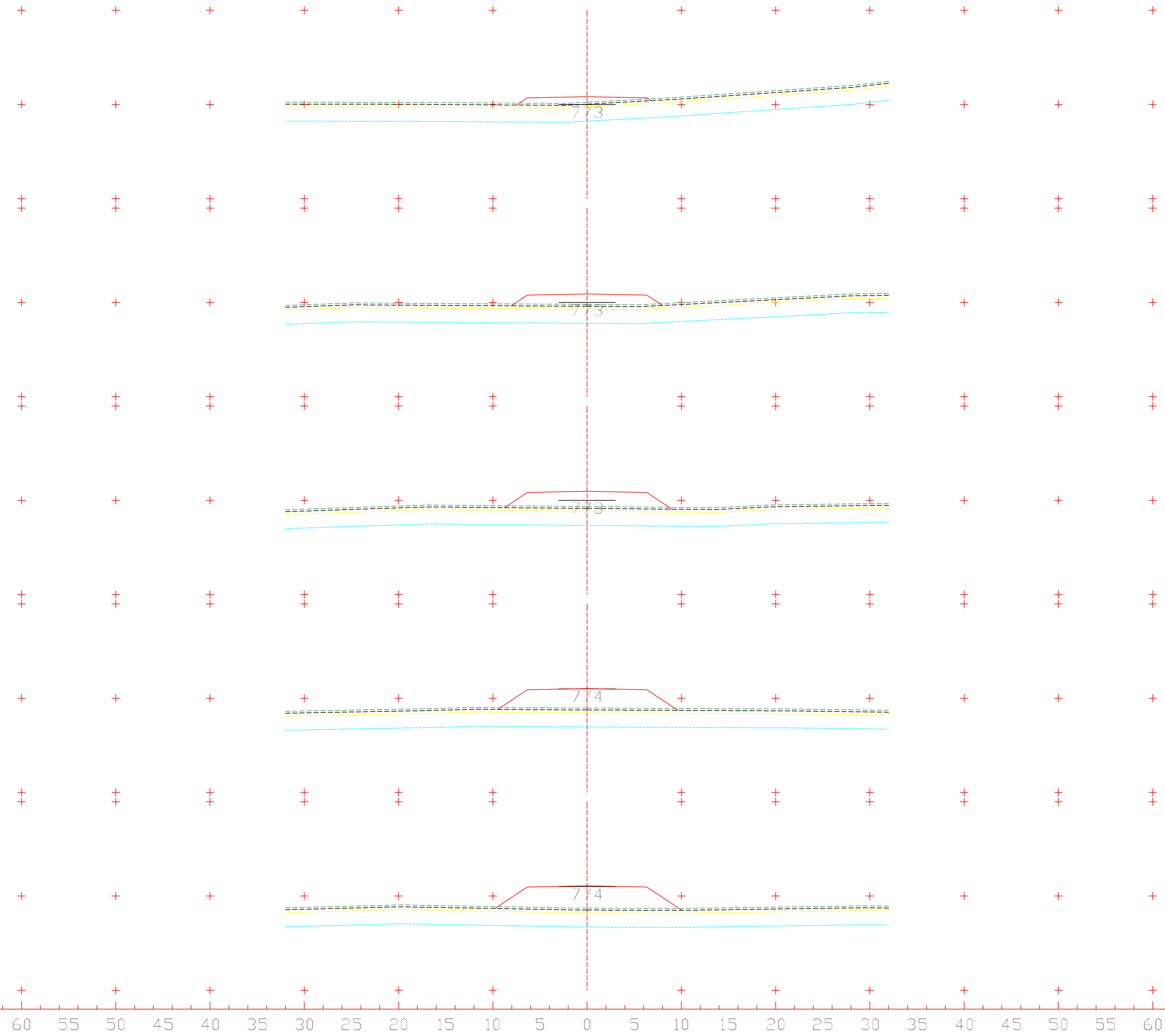
2+340
CT 775,077 m
CP 774,277 m

2+320
CT 776,430 m
CP 774,341 m

2+300
CT 776,827 m
CP 774,405 m

Eixo 01
Escala 1:400

781
779
777
775
773
771
769
767
765



2+480
CT 773,238 m
CP 773,832 m

2+460
CT 772,785 m
CP 773,896 m

2+440
CT 772,337 m
CP 773,959 m

2+420
CT 771,948 m
CP 774,023 m

2+400
CT 771,716 m
CP 774,086 m

Eixo 01
Escala 1:400

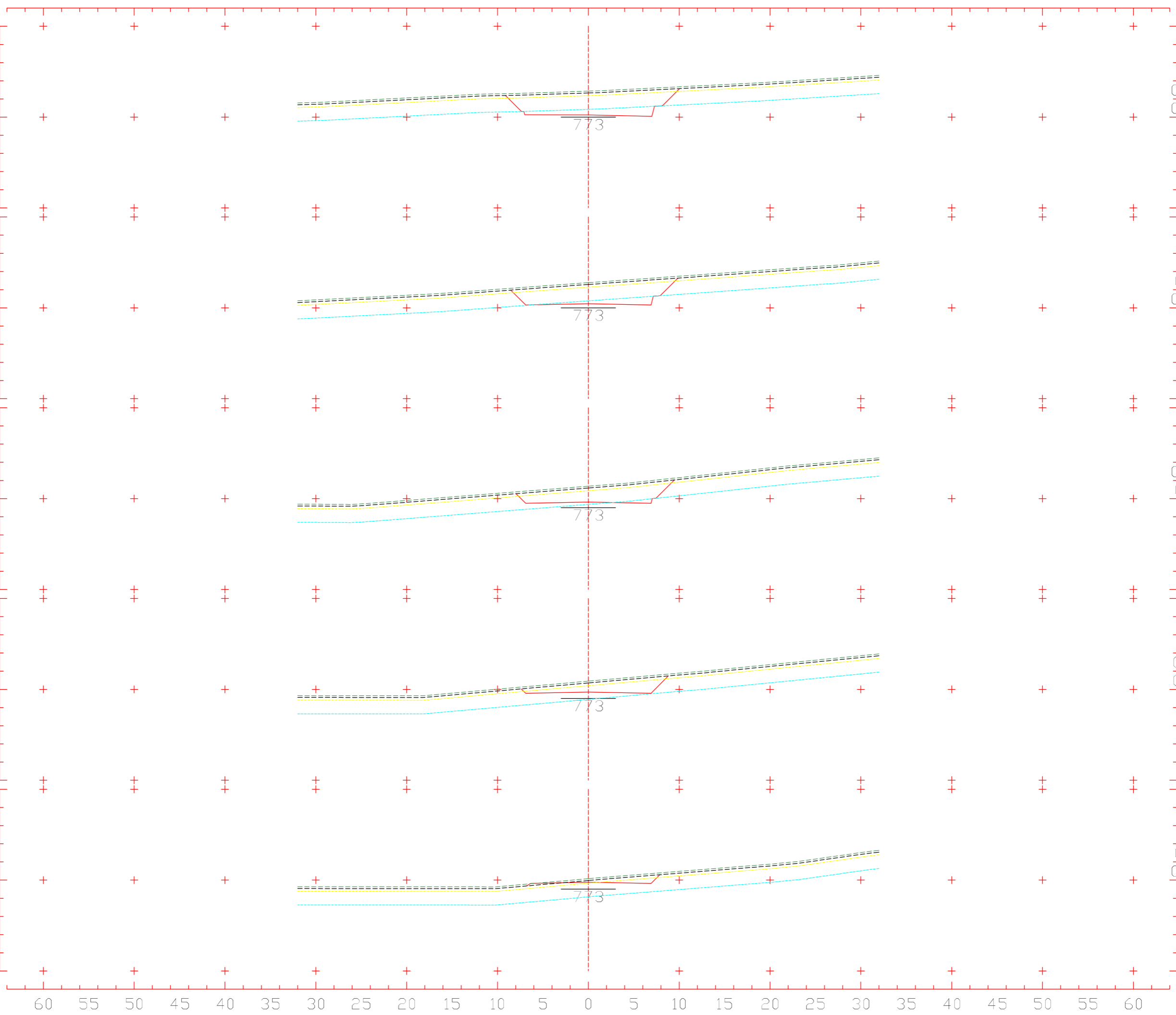
781
779
777
775
773
771
769
767
765

781
779
777
775
773
771
769
767
765

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778
776
774
772
770
768
766

782
780
778
776
774
772
770
768
766

782
780
778
776
774
772
770
768
766



2+580
CT 775,856 m
CP 773,228 m

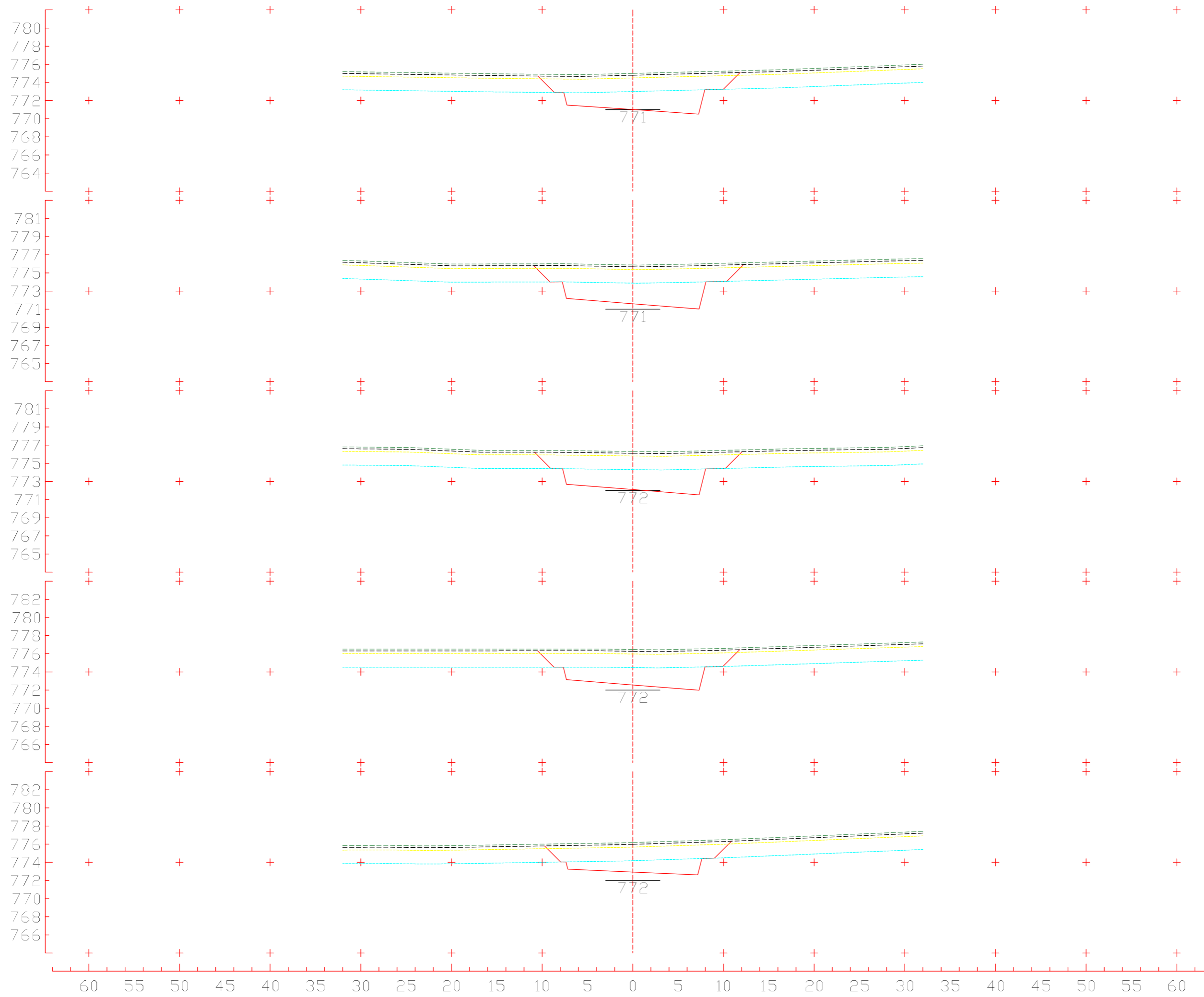
2+560
CT 775,771 m
CP 773,458 m

2+540
CT 775,363 m
CP 773,617 m

2+520
CT 774,902 m
CP 773,705 m

2+500
CT 774,156 m
CP 773,768 m

Eixo1
Escala 1:400



2+680
 CT 774,998 m
 CP 771,011 m

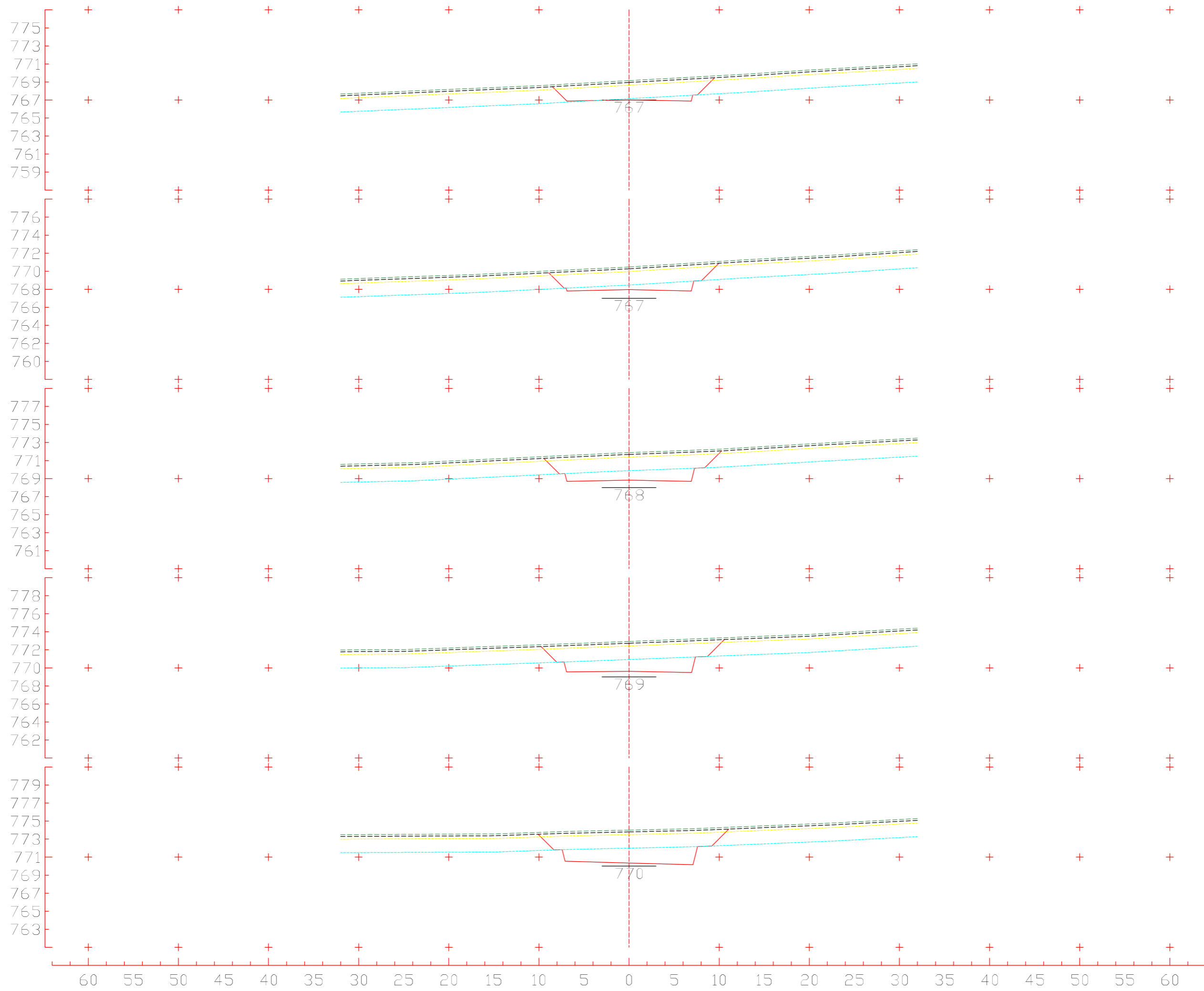
2+660
 CT 775,869 m
 CP 771,597 m

2+640
 CT 776,309 m
 CP 772,112 m

2+620
 CT 776,474 m
 CP 772,555 m

2+600
 CT 776,182 m
 CP 772,928 m

Eixo 01
 Escala 1:400



2+780
 CT 769,143 m
 CP 767,013 m

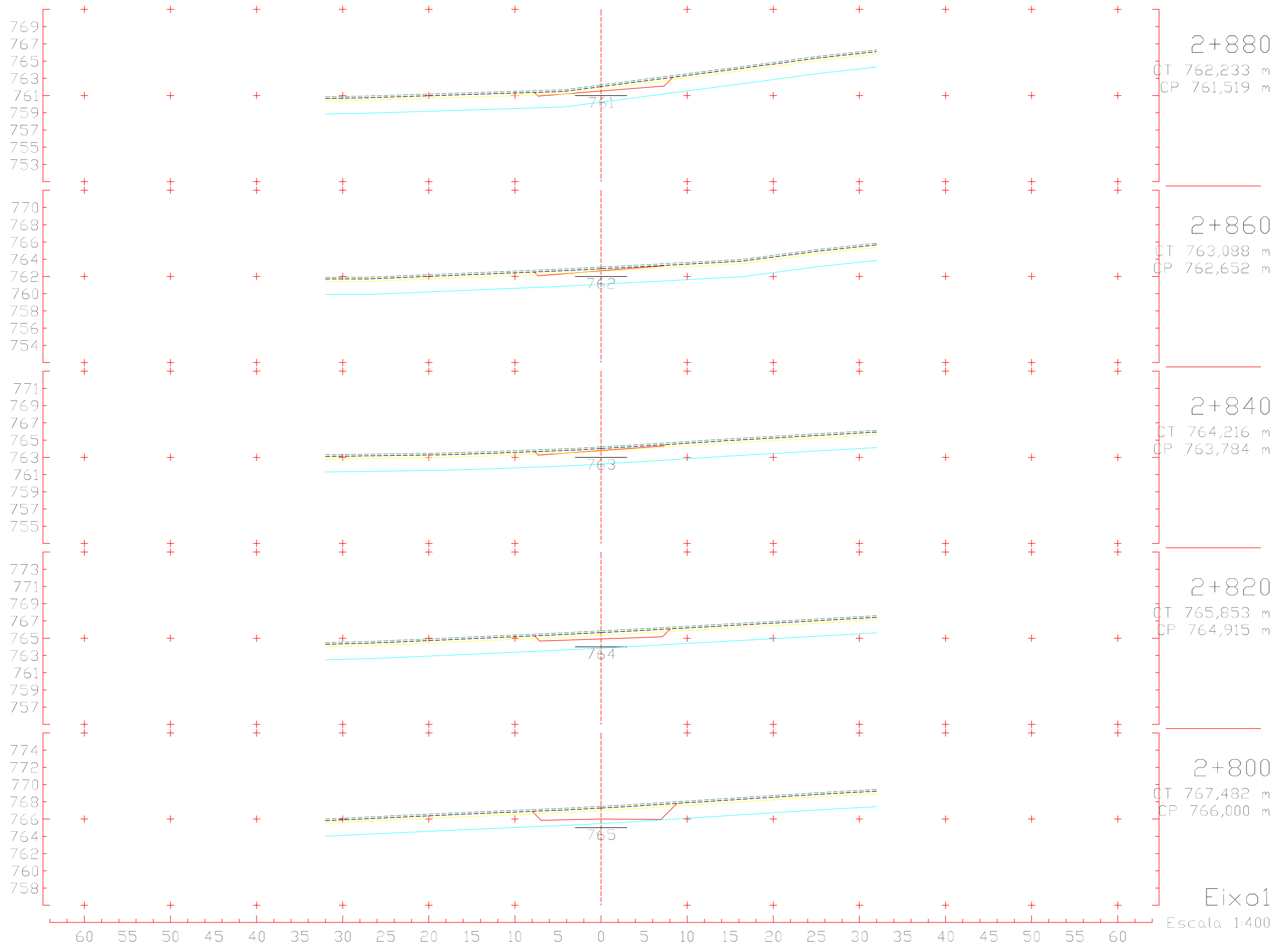
2+760
 CT 770,468 m
 CP 767,955 m

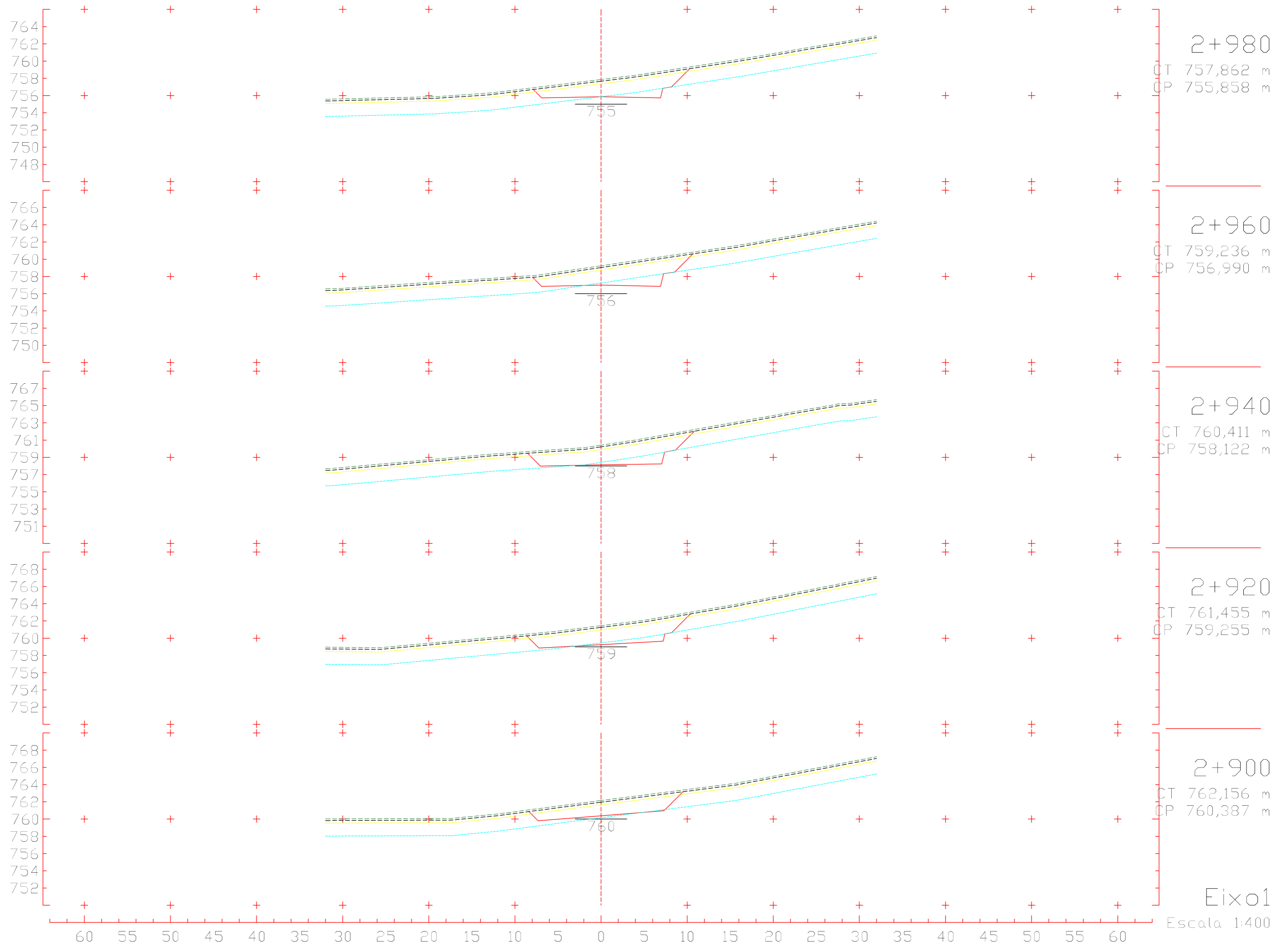
2+740
 CT 771,874 m
 CP 768,826 m

2+720
 CT 772,925 m
 CP 769,626 m

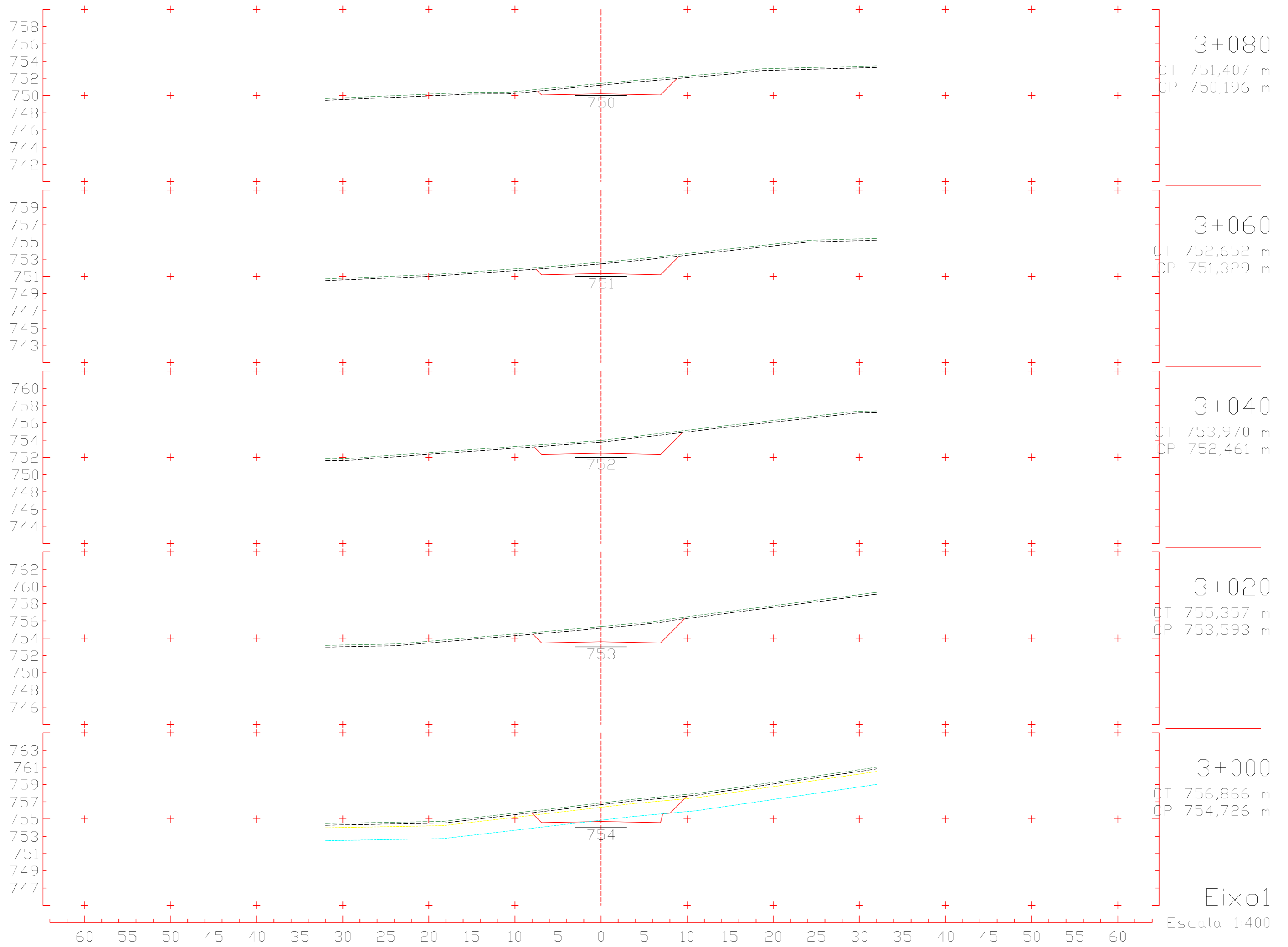
2+700
 CT 773,997 m
 CP 770,354 m

Eixo 01
 Escala 1:400





Escala 1:400



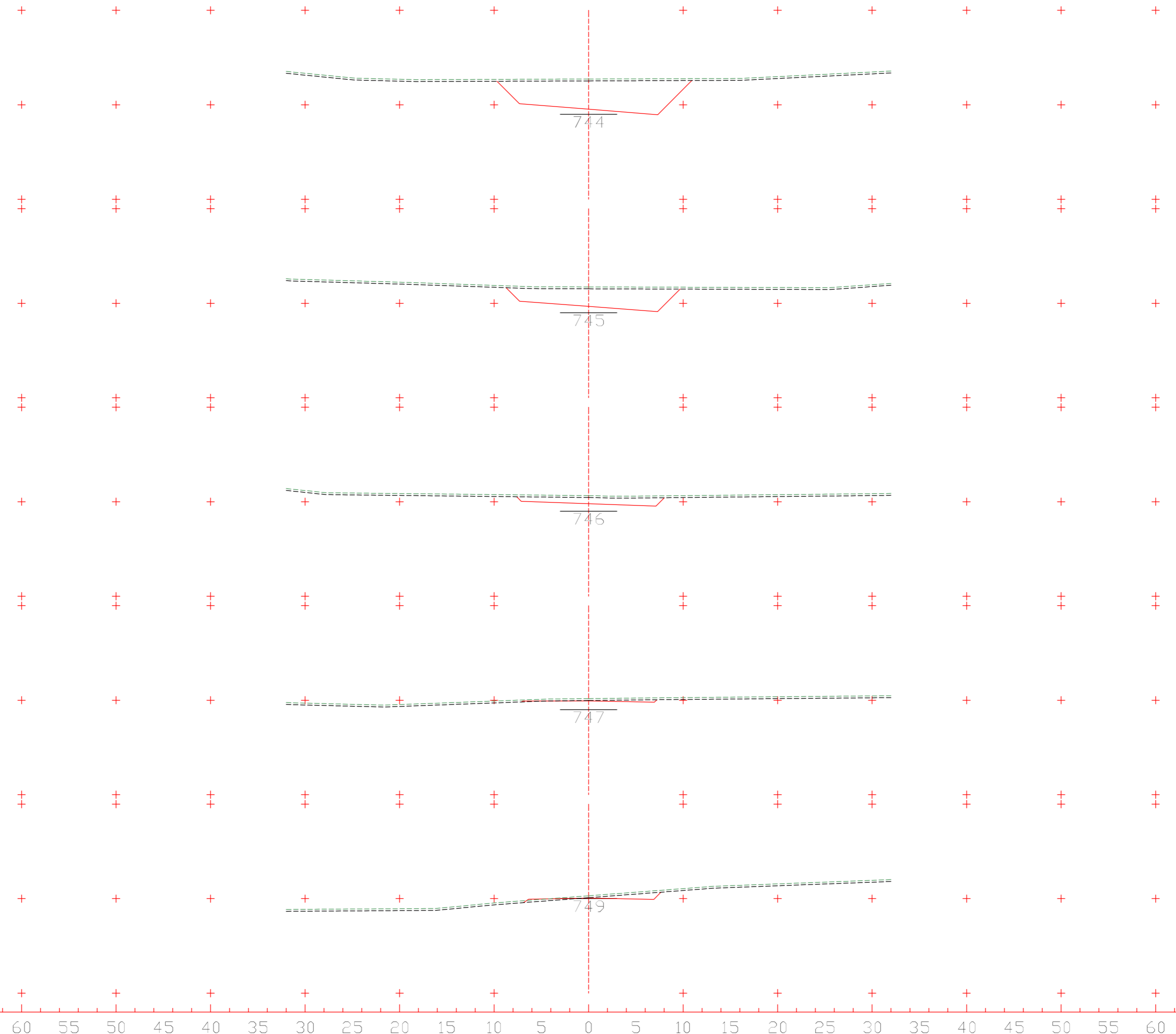
753
751
749
747
745
743
741
739
737

754
752
750
748
746
744
742
740
738

755
753
751
749
747
745
743
741
739

756
754
752
750
748
746
744
742
740

757
755
753
751
749
747
745
743
741



3+180
CT 747,728 m
CP 744,535 m

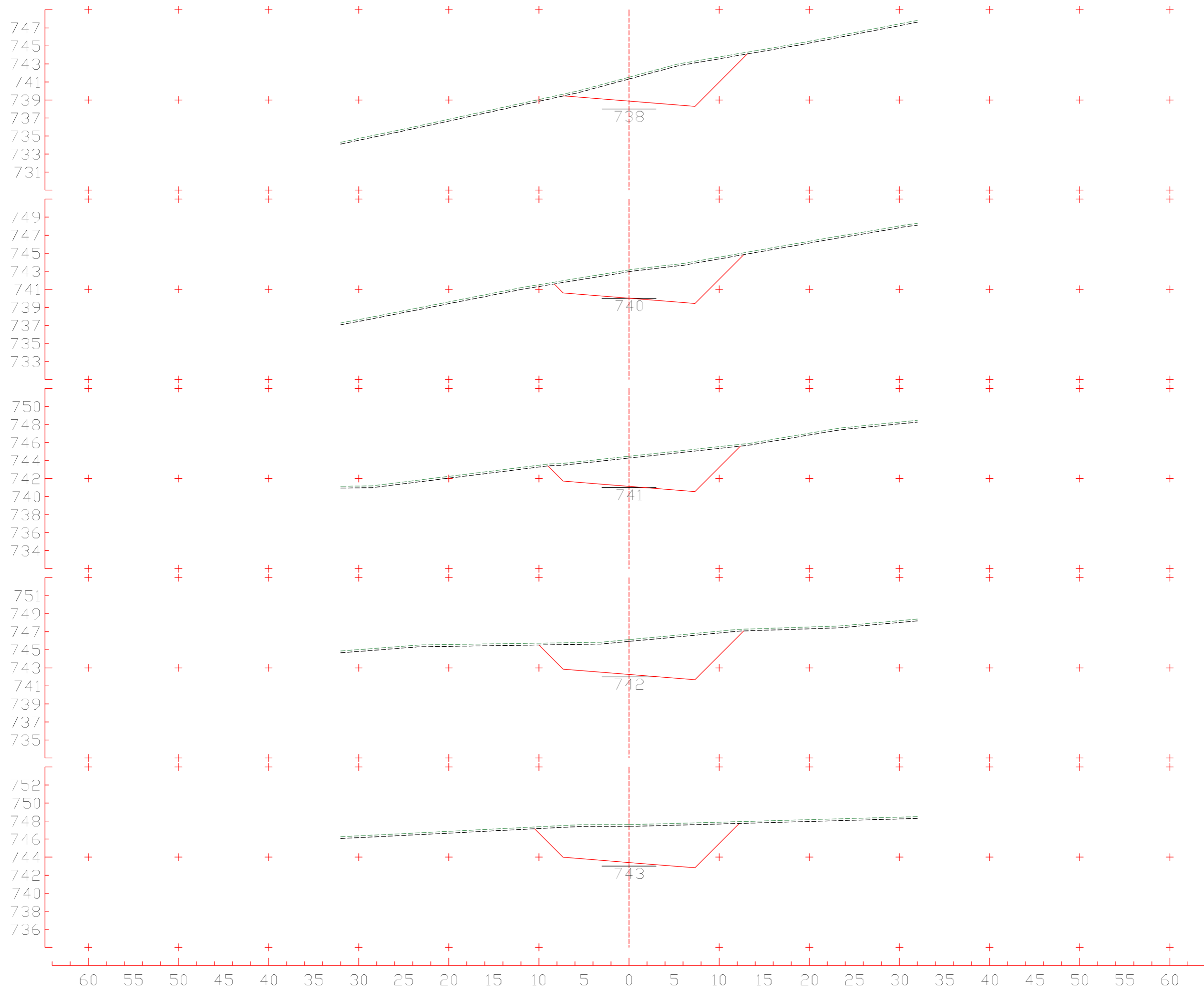
3+160
CT 747,729 m
CP 745,667 m

3+140
CT 747,644 m
CP 746,799 m

3+120
CT 748,168 m
CP 747,932 m

3+100
CT 749,303 m
CP 749,064 m

Eixo 01
Escala 1:400



3+280
 CT 741,529 m
 CP 738,873 m

3+260
 CT 743,150 m
 CP 740,005 m

3+240
 CT 744,473 m
 CP 741,138 m

3+220
 CT 746,132 m
 CP 742,270 m

3+200
 CT 747,625 m
 CP 743,402 m

Eixo 01
 Escala 1:400

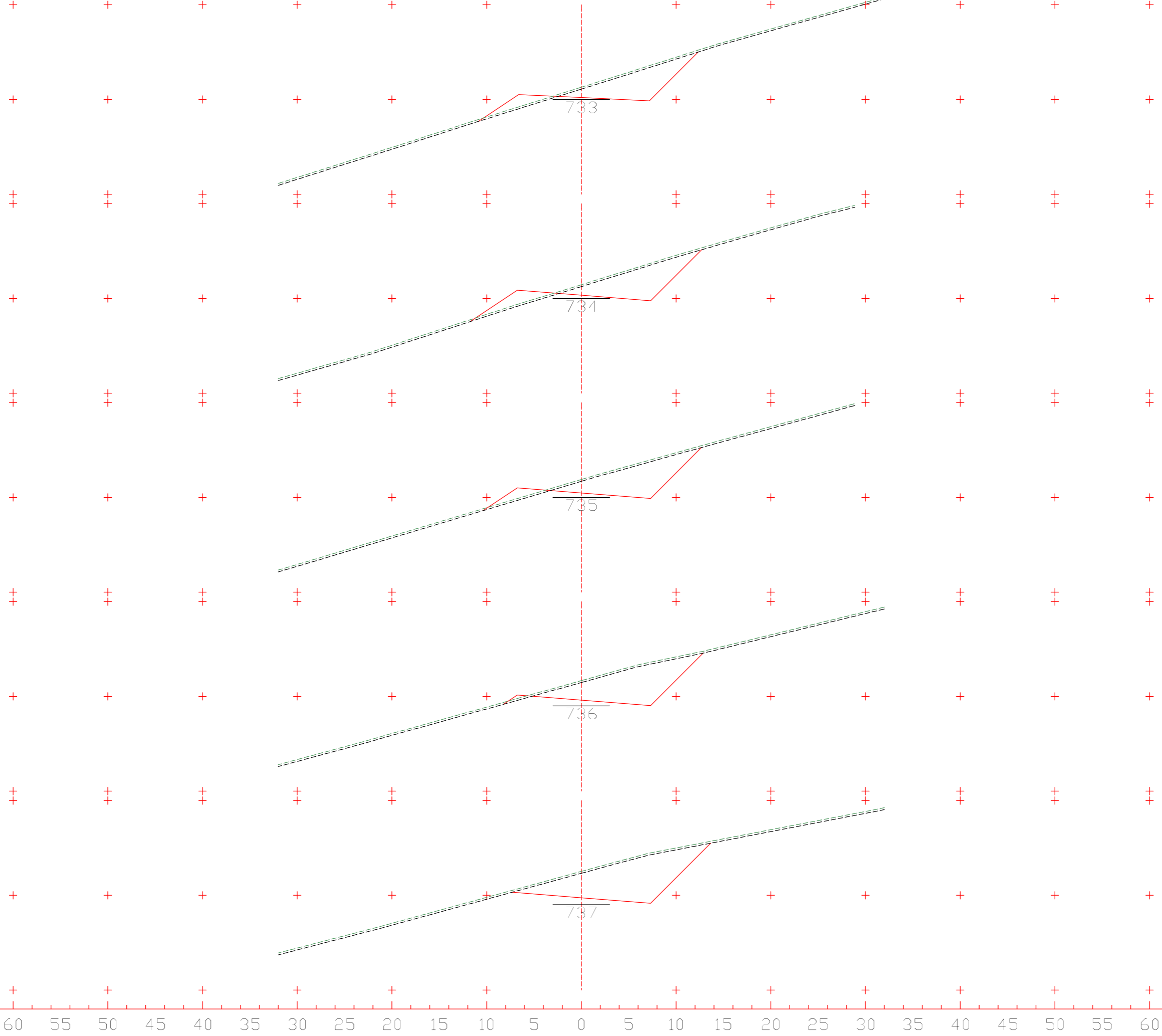
741
739
737
735
733
731
729
727
725

742
740
738
736
734
732
730
728
726

743
741
739
737
735
733
731
729
727

745
743
741
739
737
735
733
731
729

746
744
742
740
738
736
734
732
730



3+380
CT 734,304 m
CP 733,212 m

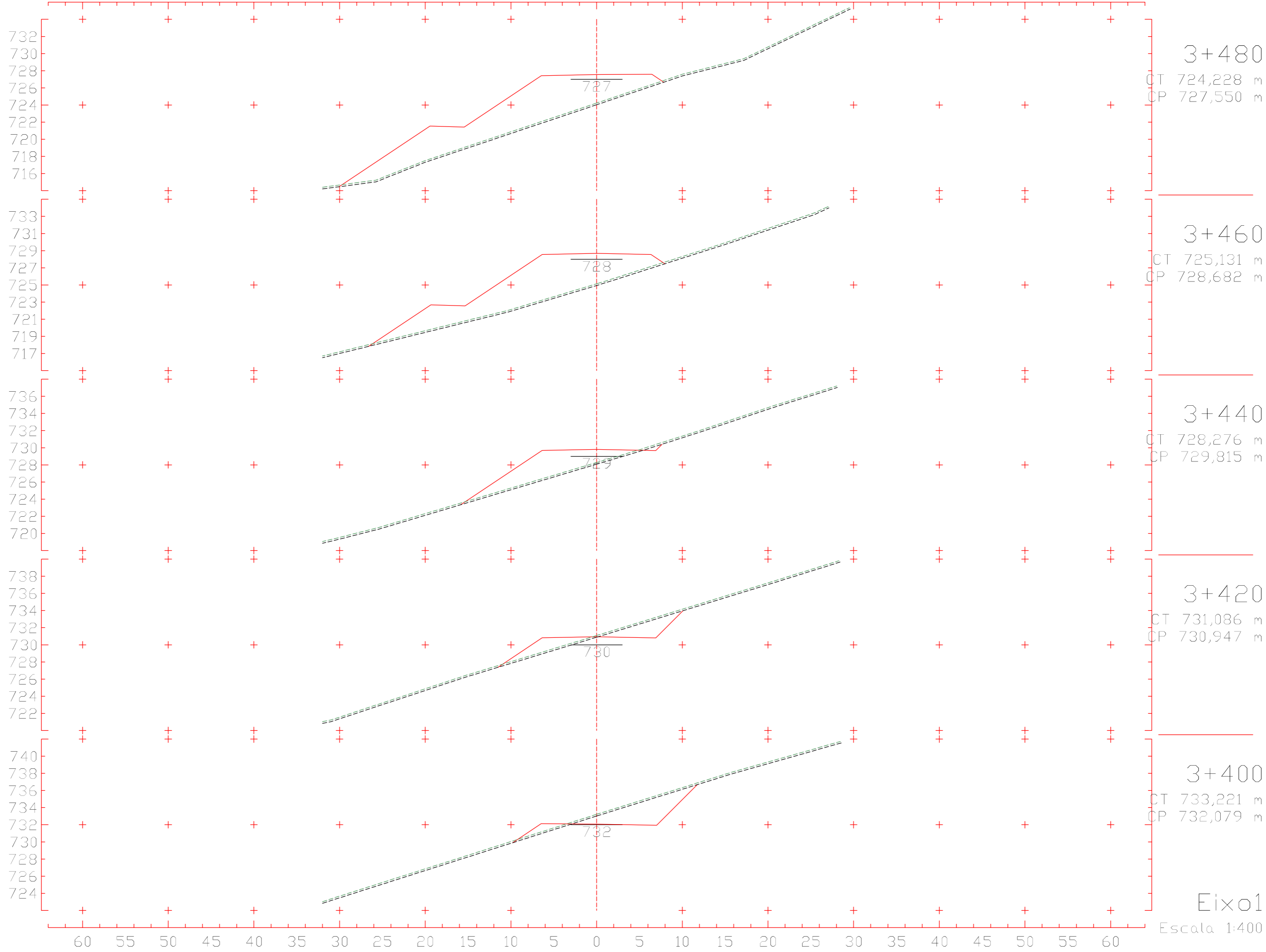
3+360
CT 735,456 m
CP 734,344 m

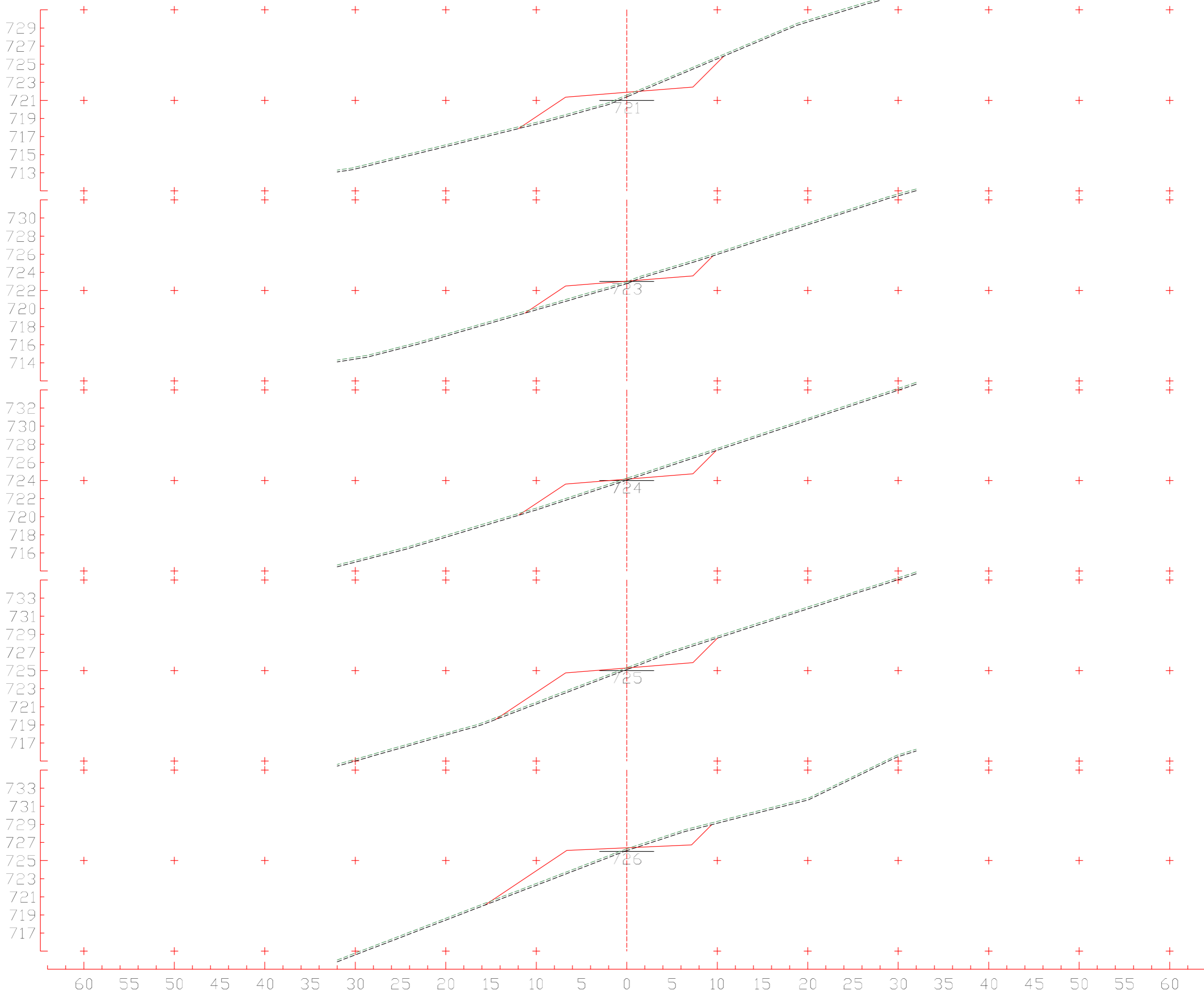
3+340
CT 736,898 m
CP 735,476 m

3+320
CT 738,663 m
CP 736,608 m

3+300
CT 740,524 m
CP 737,741 m

Eixo1
Escala 1:400





3+580
 CT 721,582 m
 CP 721,888 m

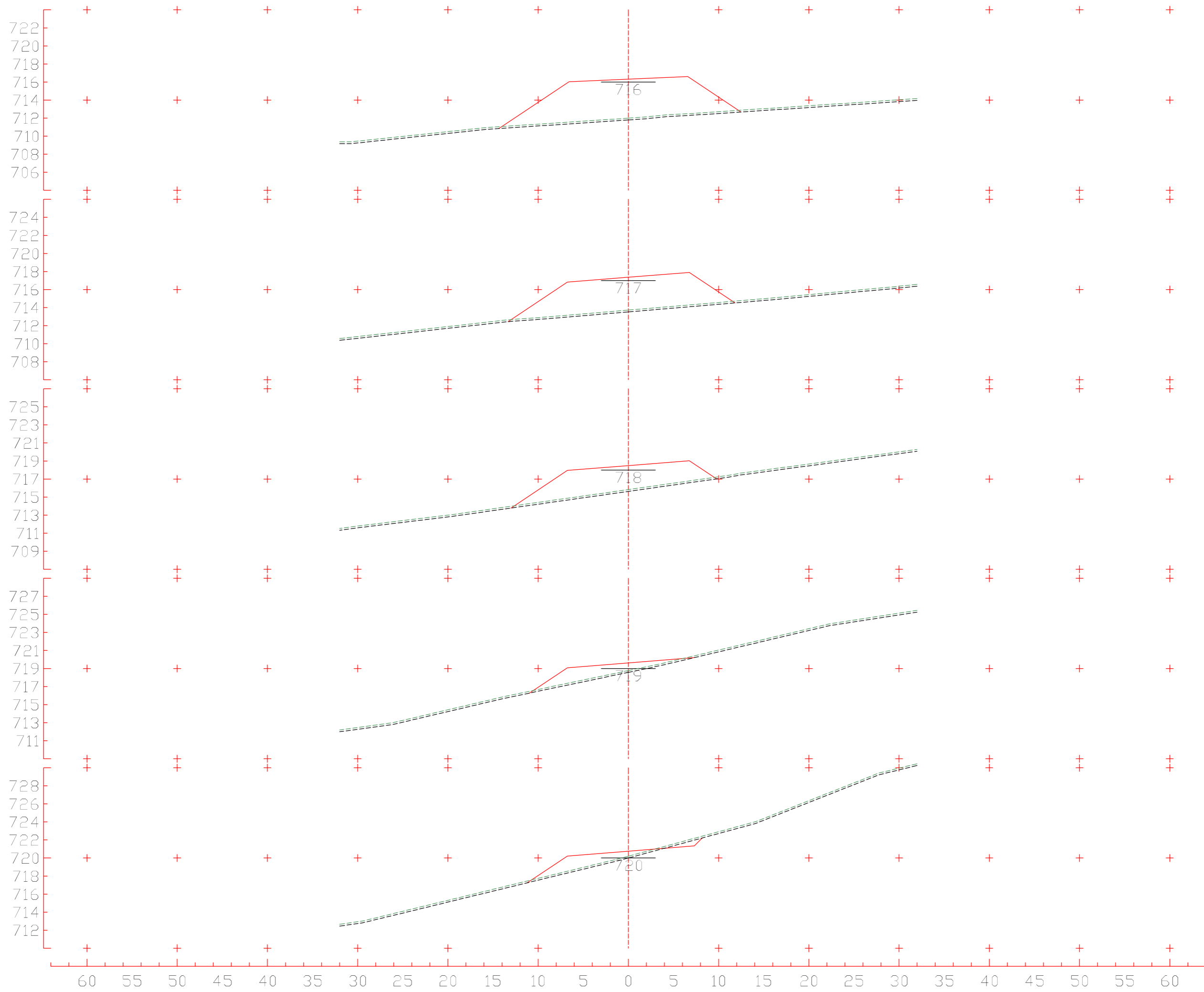
3+560
 CT 722,950 m
 CP 723,021 m

3+540
 CT 724,240 m
 CP 724,153 m

3+520
 CT 725,306 m
 CP 725,285 m

3+500
 CT 726,307 m
 CP 726,418 m

Eixo 01
 Escala 1:400



3+680
 CT 711,992 m
 CP 716,315 m

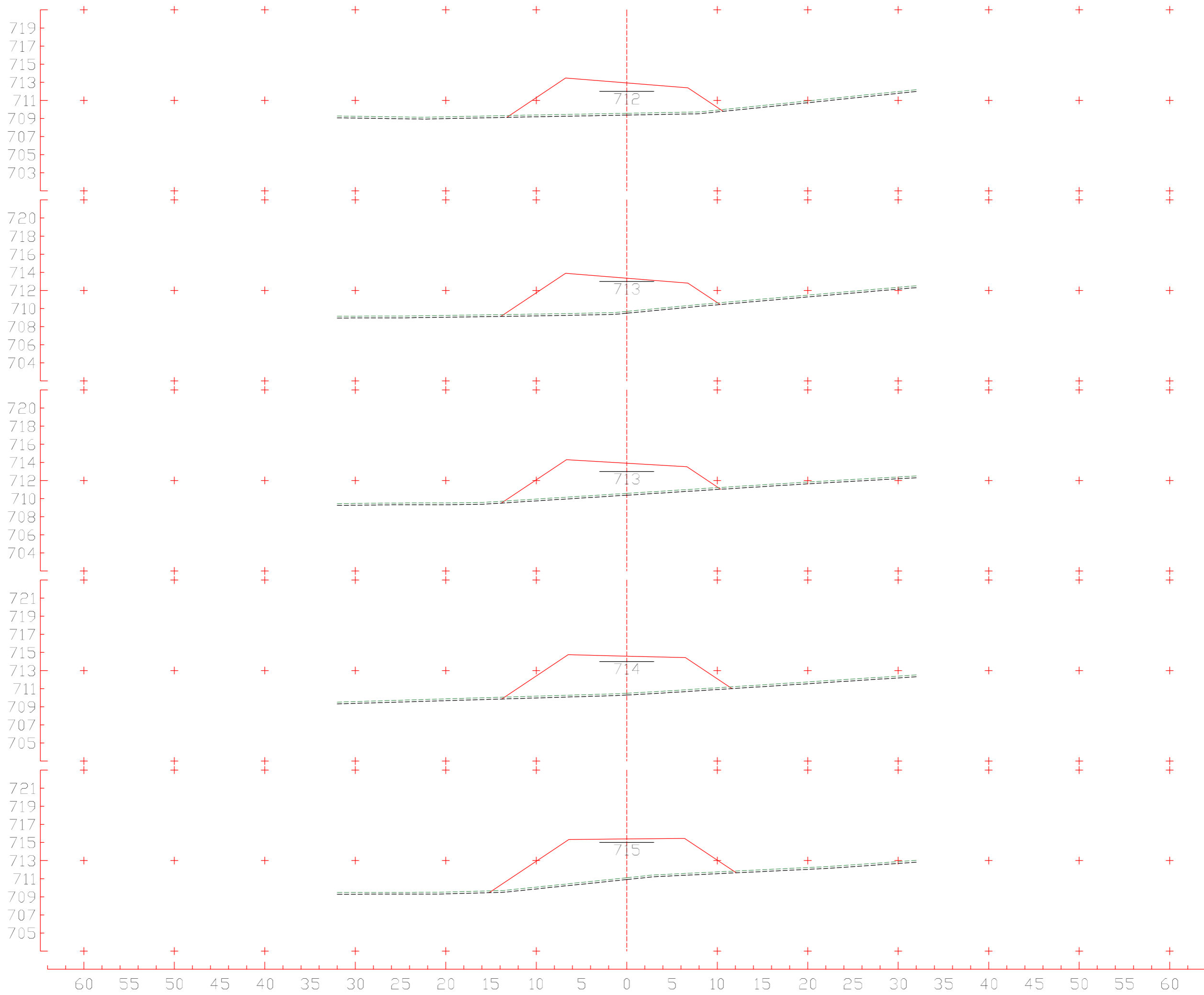
3+660
 CT 713,721 m
 CP 717,362 m

3+640
 CT 715,829 m
 CP 718,491 m

3+620
 CT 718,776 m
 CP 719,624 m

3+600
 CT 720,199 m
 CP 720,756 m

Eixo 01
 Escala 1:400



3+780
CT 709,573 m
CP 712,923 m

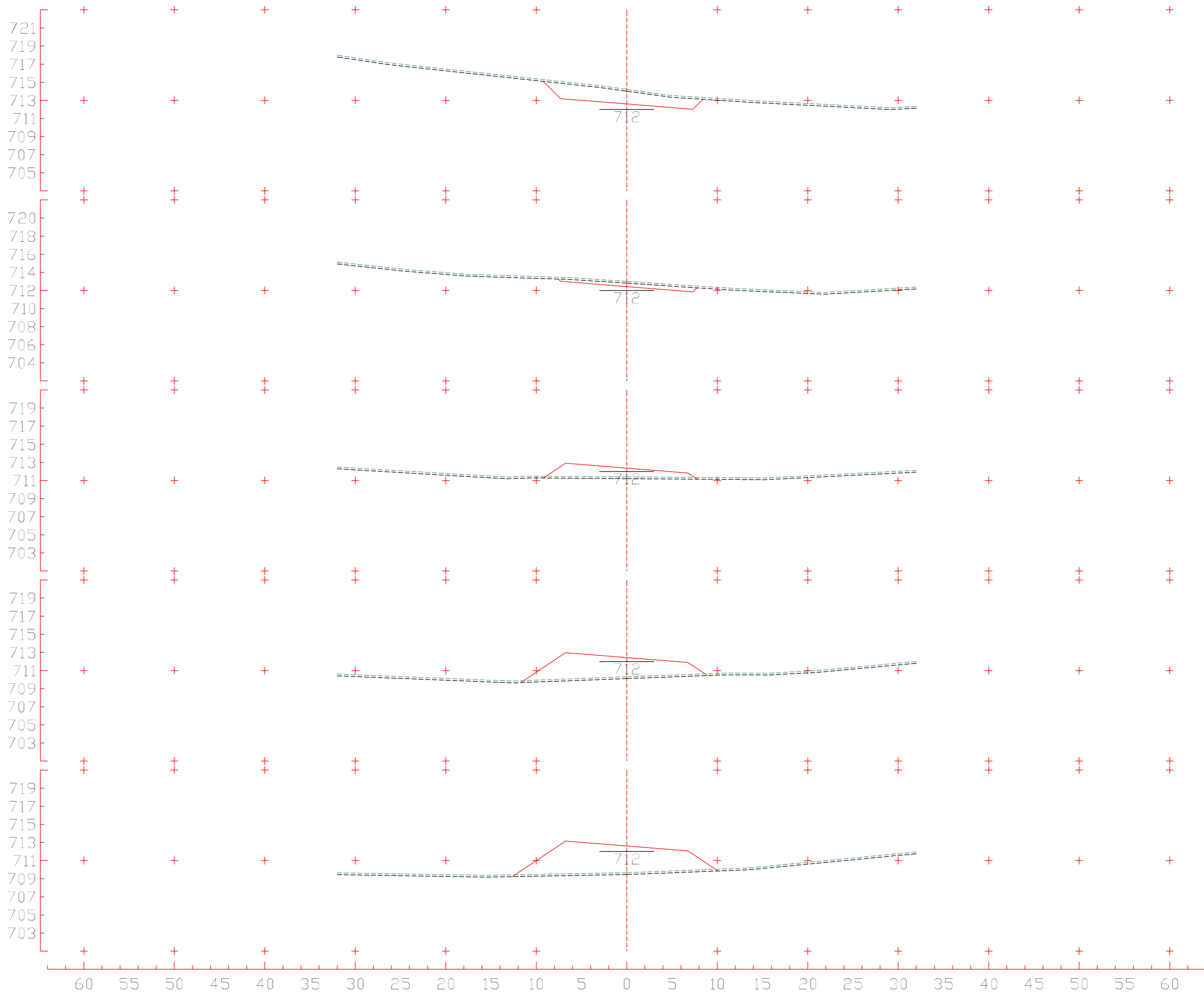
3+760
CT 709,683 m
CP 713,356 m

3+740
CT 710,576 m
CP 713,911 m

3+720
CT 710,492 m
CP 714,589 m

3+700
CT 711,105 m
CP 715,391 m

Eixo 01
Escala 1:400



3+880
 CT 714,214 m
 CP 712,604 m

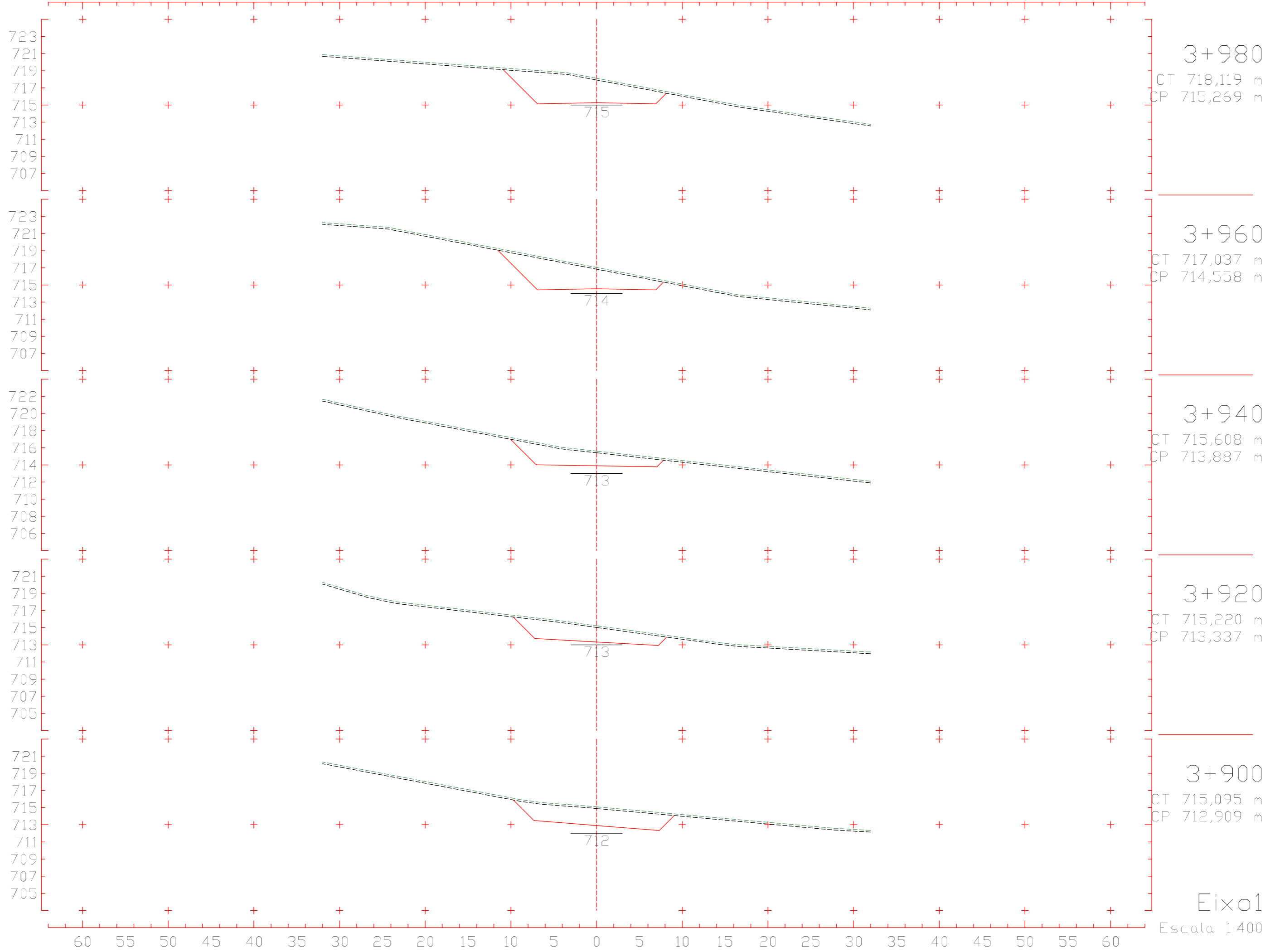
3+860
 CT 713,003 m
 CP 712,422 m

3+840
 CT 711,401 m
 CP 712,363 m

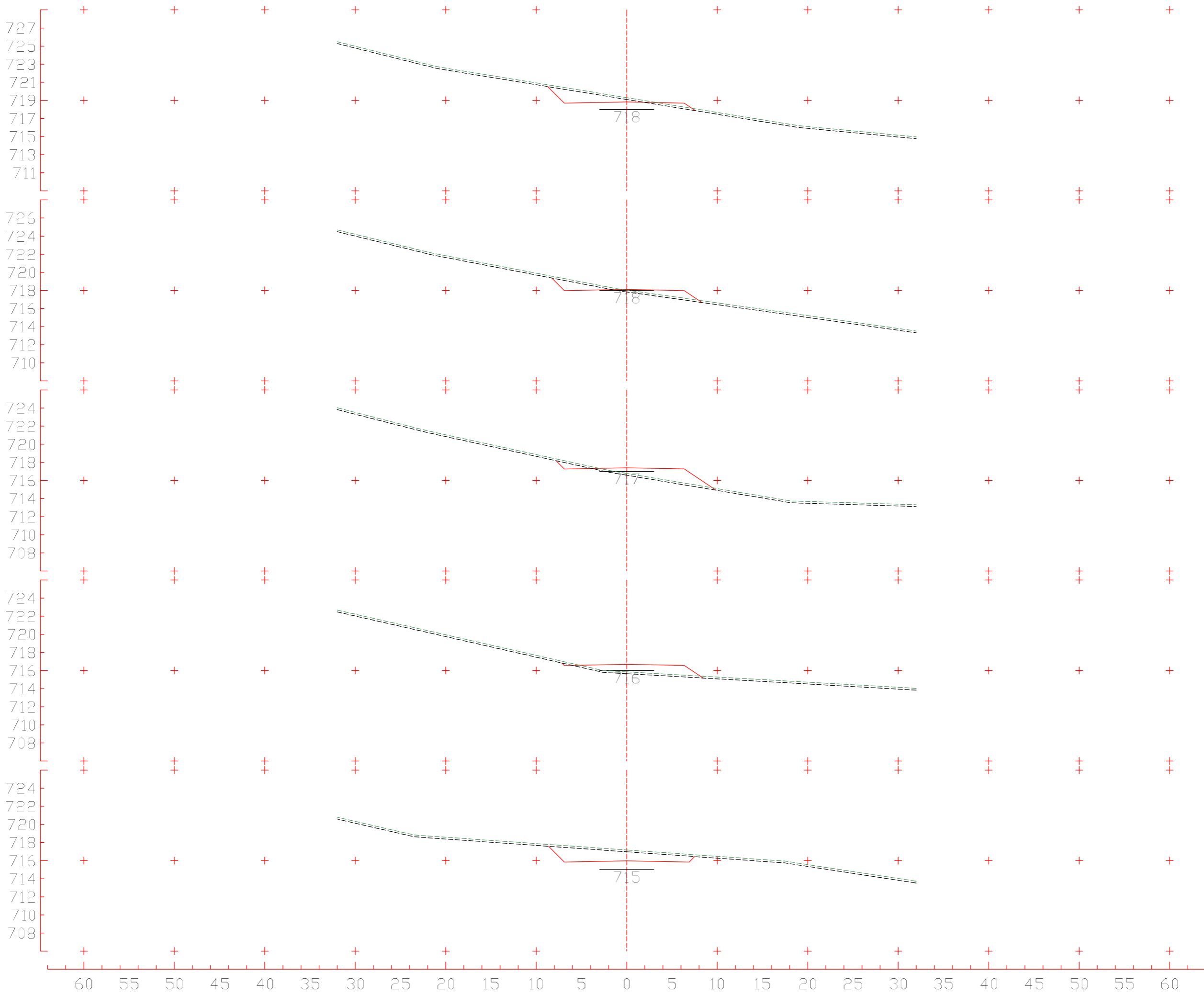
3+820
 CT 710,310 m
 CP 712,427 m

3+800
 CT 709,664 m
 CP 712,614 m

Eixo 01
 Escala 1:400



Eixo 01
Escala 1:400



4+080
 CT 719,298 m
 CP 718,824 m

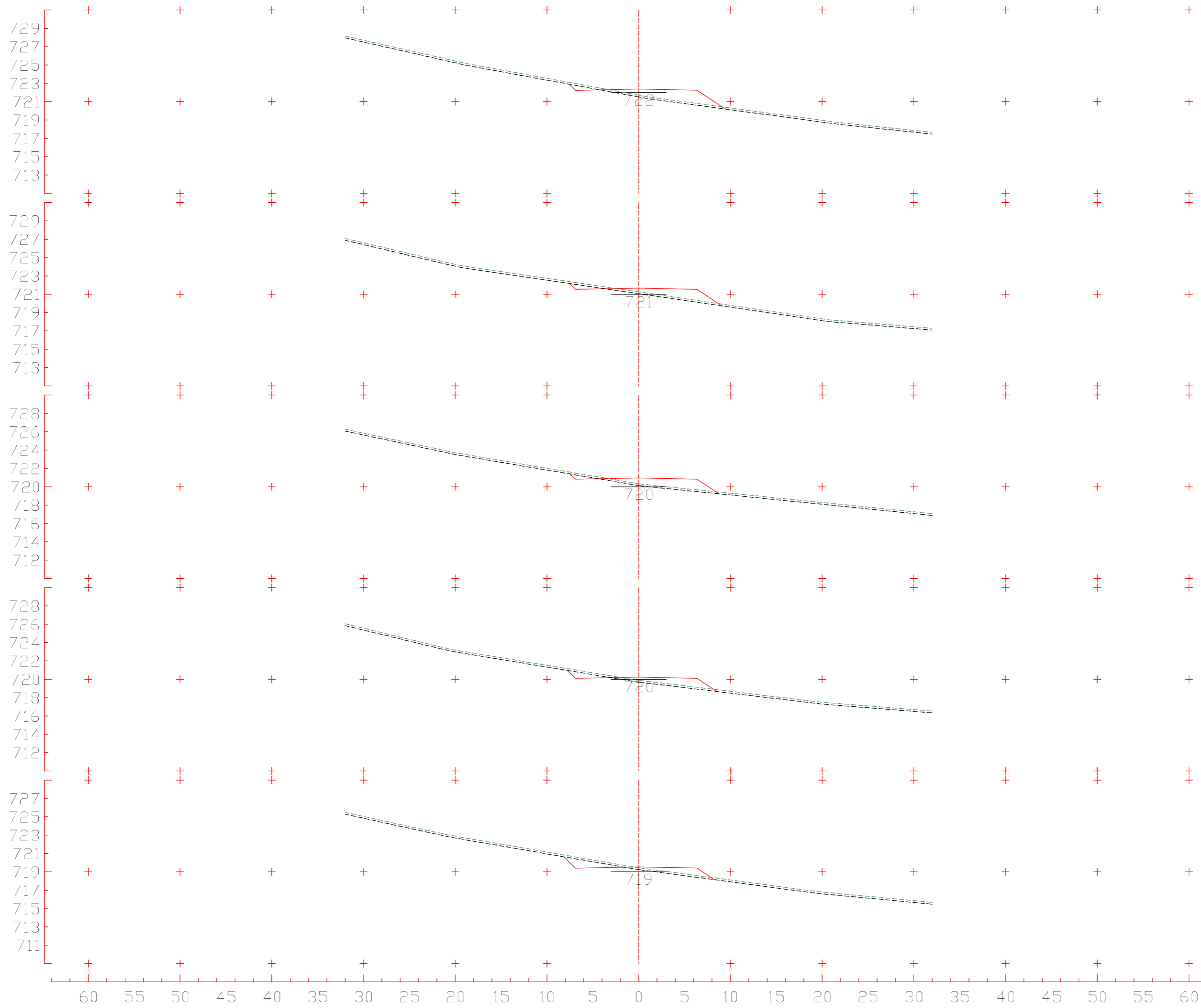
4+060
 CT 718,034 m
 CP 718,113 m

4+040
 CT 716,779 m
 CP 717,402 m

4+020
 CT 715,850 m
 CP 716,691 m

4+000
 CT 717,173 m
 CP 715,980 m

Eixo 01
 Escala 1:400



4+180
 CT 721,720 m
 CP 722,379 m

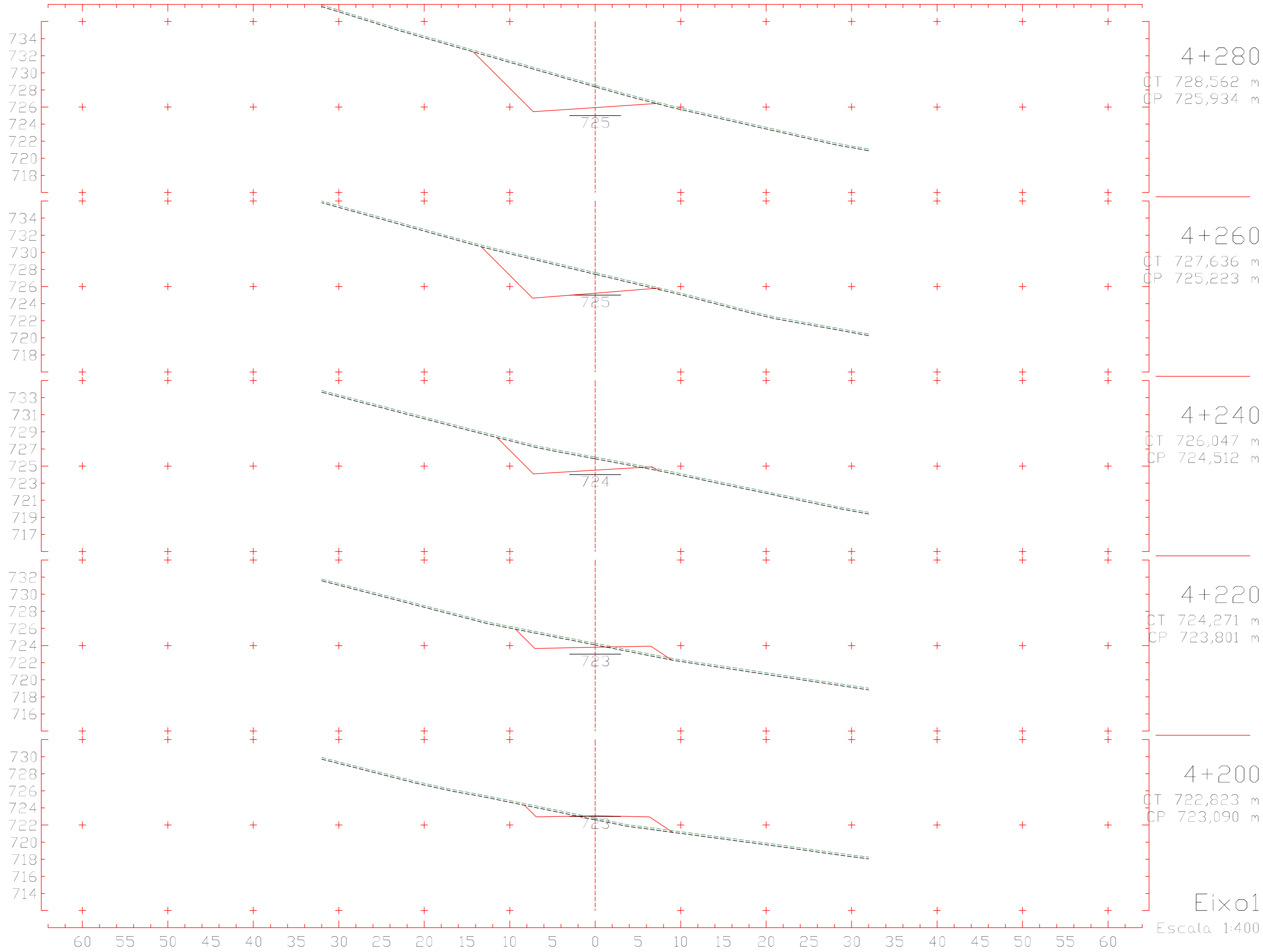
4+160
 CT 721,258 m
 CP 721,668 m

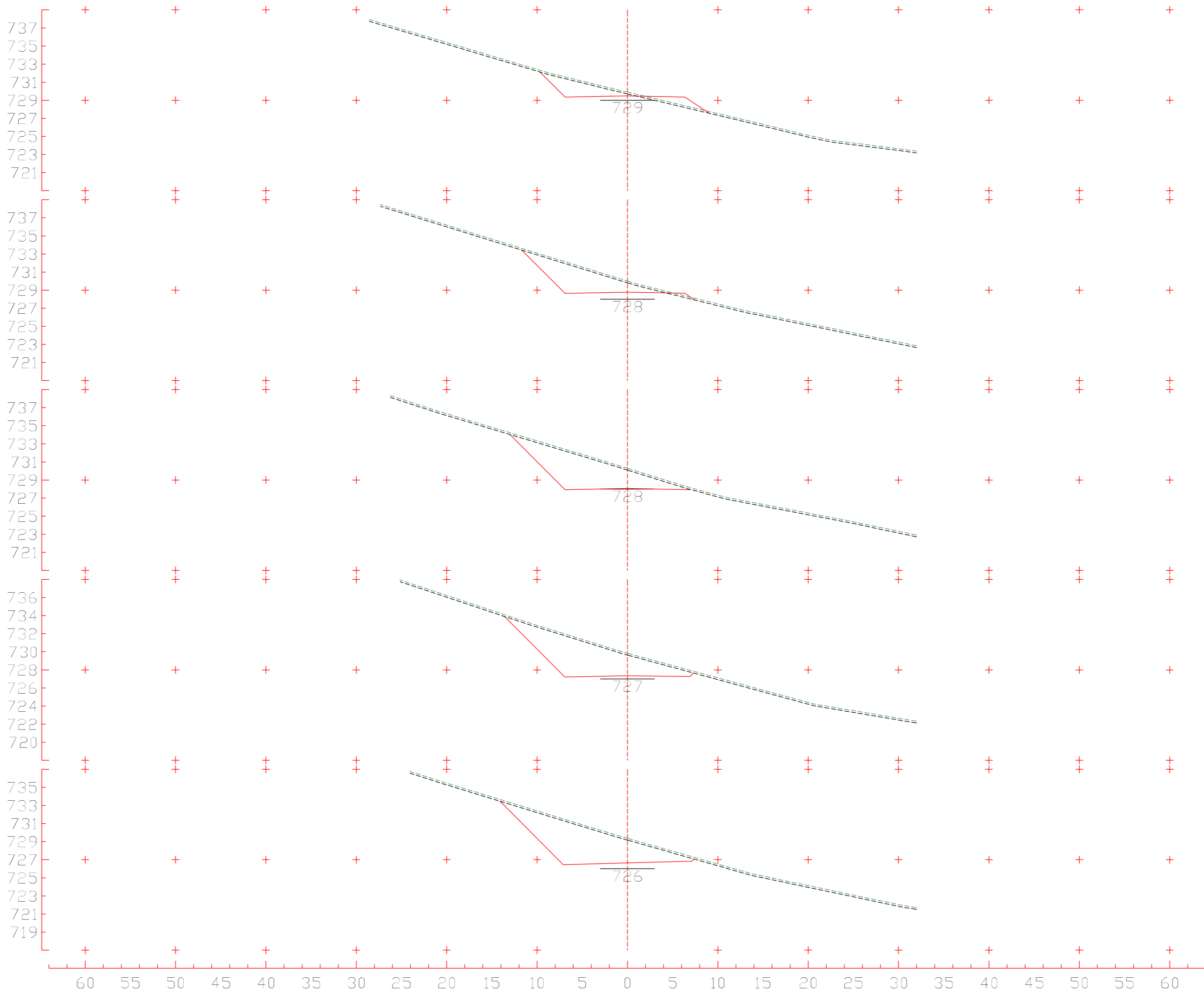
4+140
 CT 720,331 m
 CP 720,957 m

4+120
 CT 719,894 m
 CP 720,246 m

4+100
 CT 719,447 m
 CP 719,535 m

Eixo 01
 Escala 1:400





4+380
 CT 729,907 m
 CP 729,489 m

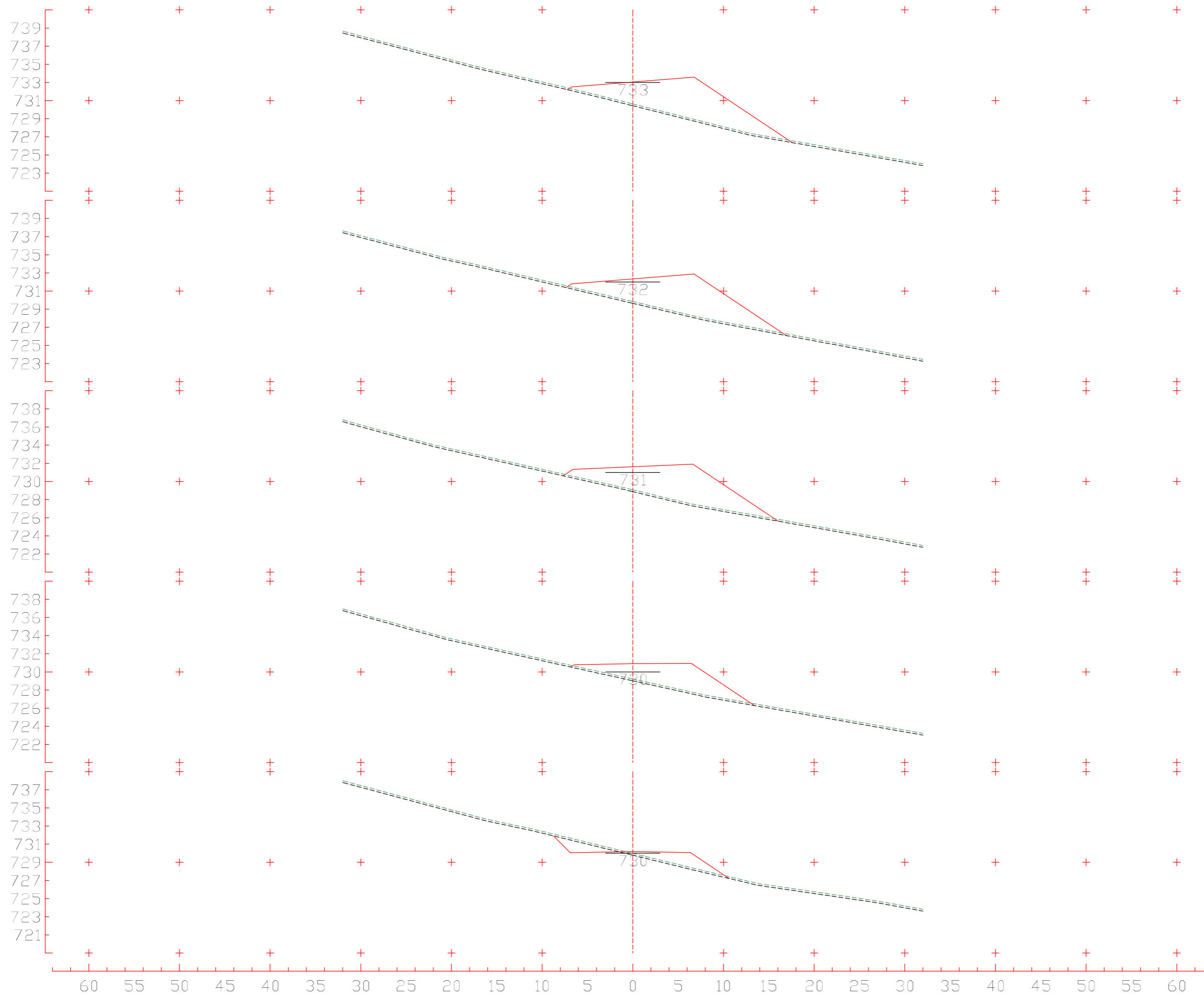
4+360
 CT 730,006 m
 CP 728,778 m

4+340
 CT 730,295 m
 CP 728,067 m

4+320
 CT 729,837 m
 CP 727,356 m

4+300
 CT 729,371 m
 CP 726,645 m

Eixo 01
 Escala 1:400



4+480
 CT 730,630 m
 CP 733,044 m

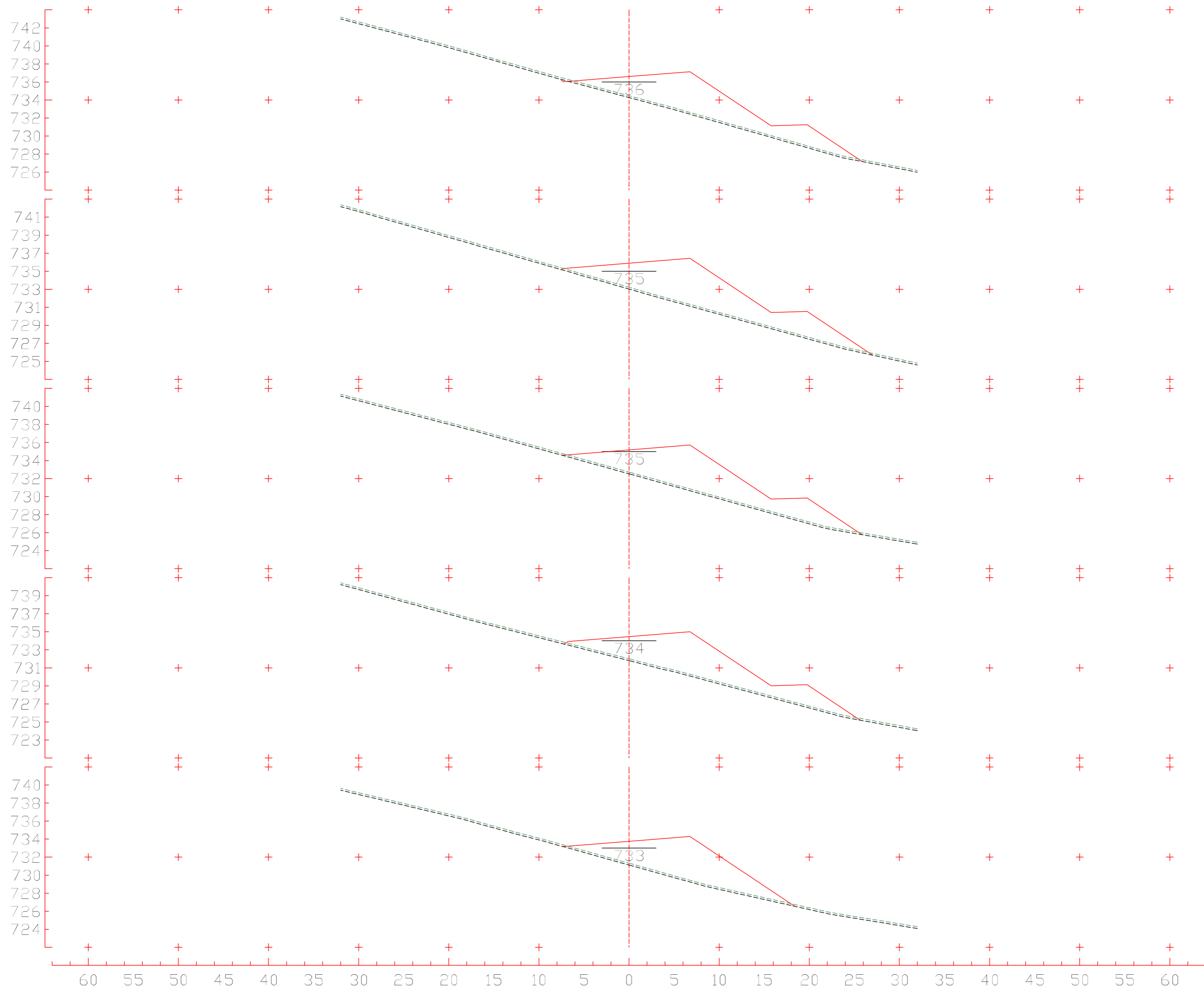
4+460
 CT 729,841 m
 CP 732,333 m

4+440
 CT 729,077 m
 CP 731,622 m

4+420
 CT 729,215 m
 CP 730,911 m

4+400
 CT 729,984 m
 CP 730,200 m

Eixo 01
 Escala 1:400



4+580
 CT 734,466 m
 CP 736,599 m

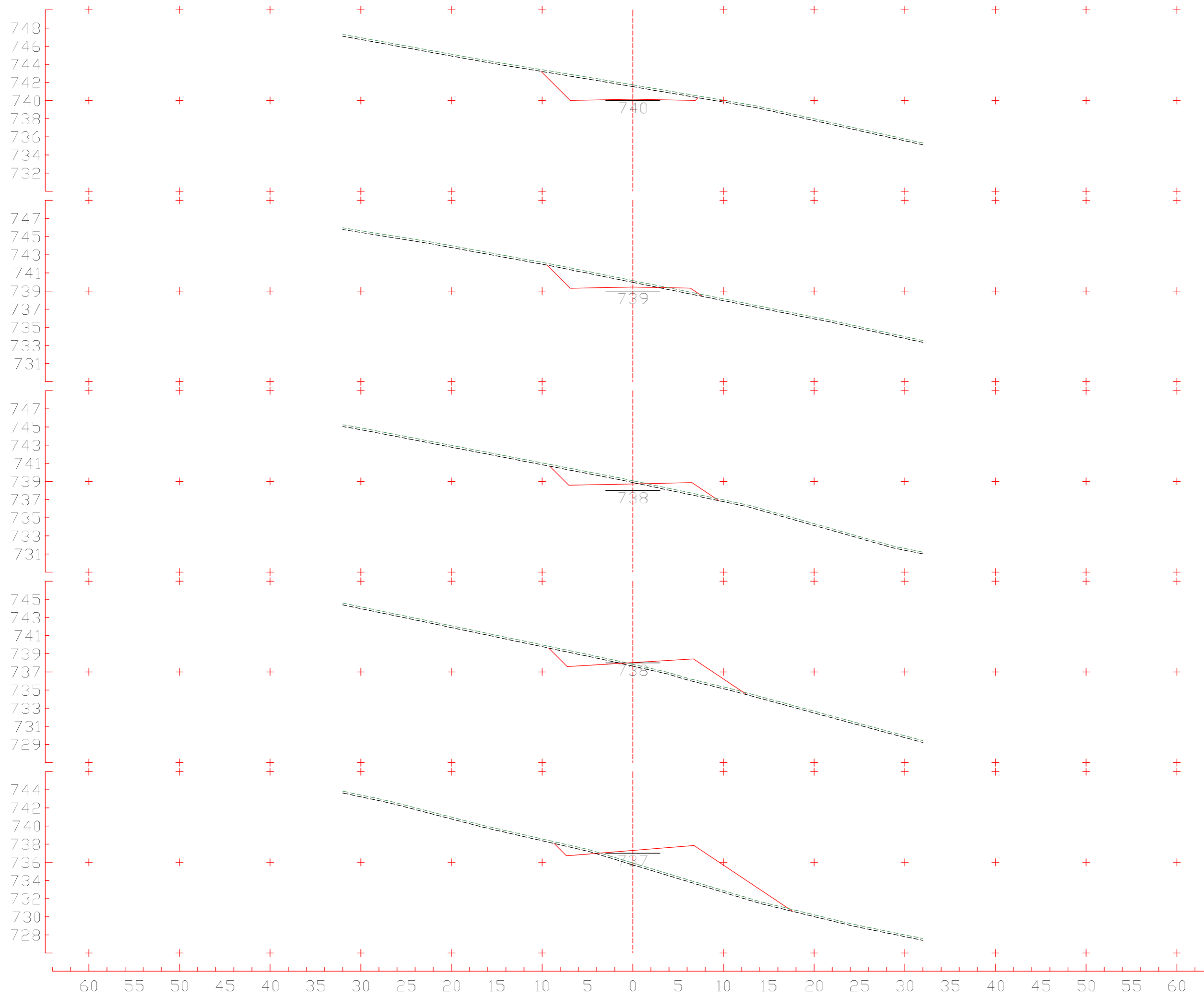
4+560
 CT 733,223 m
 CP 735,888 m

4+540
 CT 732,722 m
 CP 735,177 m

4+520
 CT 732,004 m
 CP 734,466 m

4+500
 CT 731,327 m
 CP 733,755 m

Eixo 01
 Escala 1:400



4+680
 CT 741,739 m
 CP 740,154 m

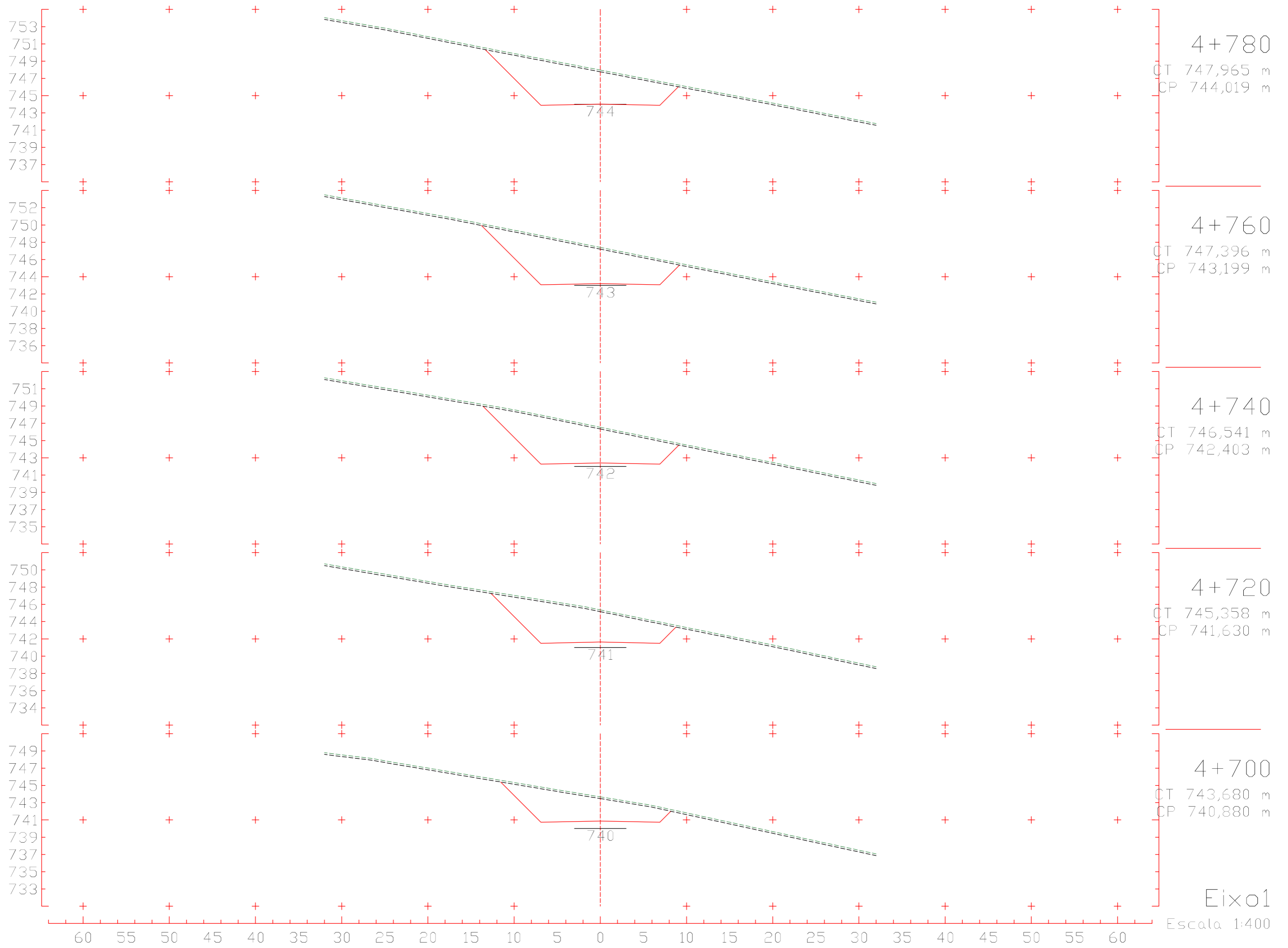
4+660
 CT 740,156 m
 CP 739,442 m

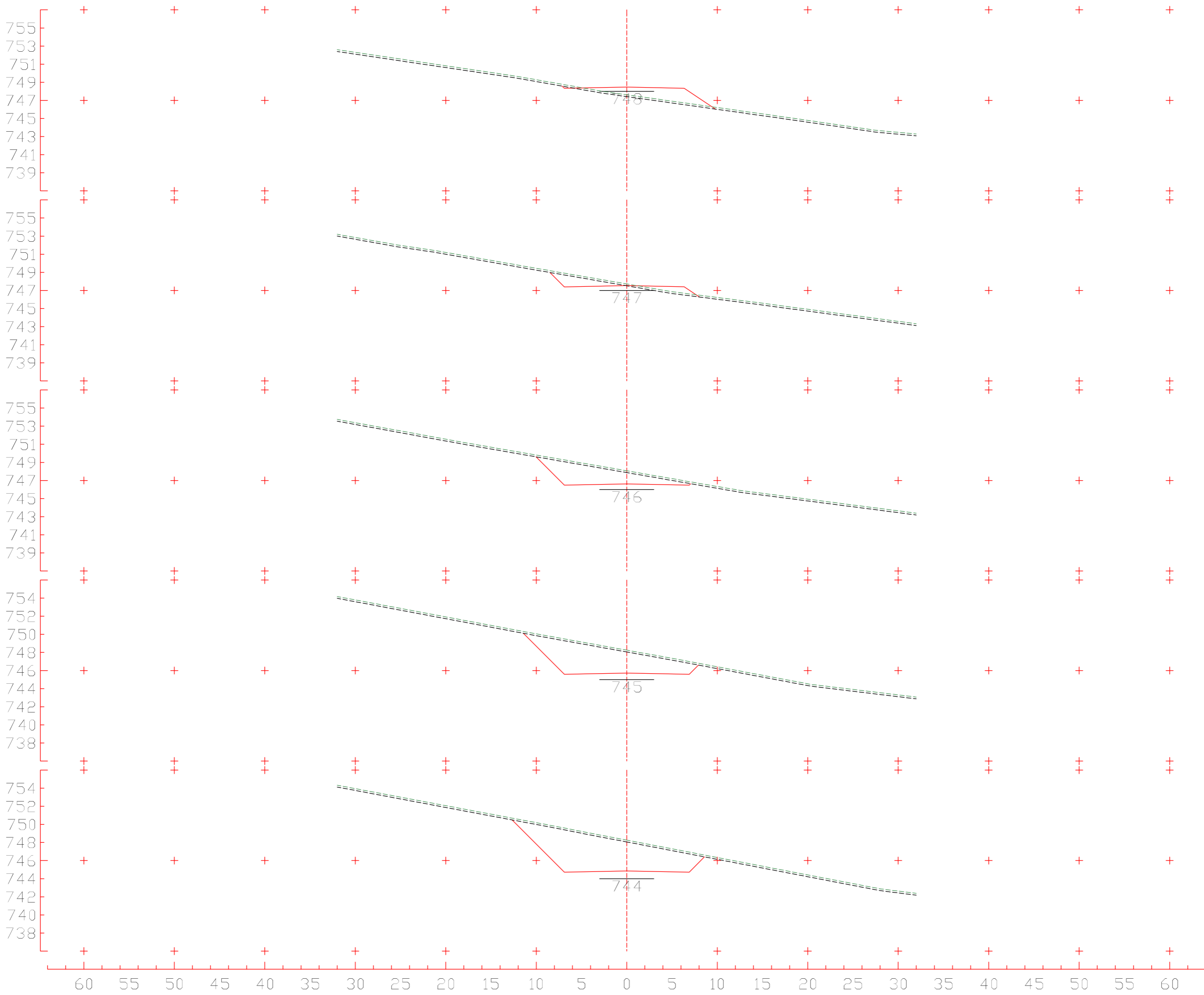
4+640
 CT 739,084 m
 CP 738,731 m

4+620
 CT 737,839 m
 CP 738,020 m

4+600
 CT 735,927 m
 CP 737,309 m

Eixo 01
 Escala 1:400





4+880
 CT 747,617 m
 CP 748,467 m

4+860
 CT 747,717 m
 CP 747,531 m

4+840
 CT 748,072 m
 CP 746,618 m

4+820
 CT 748,254 m
 CP 745,728 m

4+800
 CT 748,262 m
 CP 744,862 m

Eixo 01
 Escala 1:400

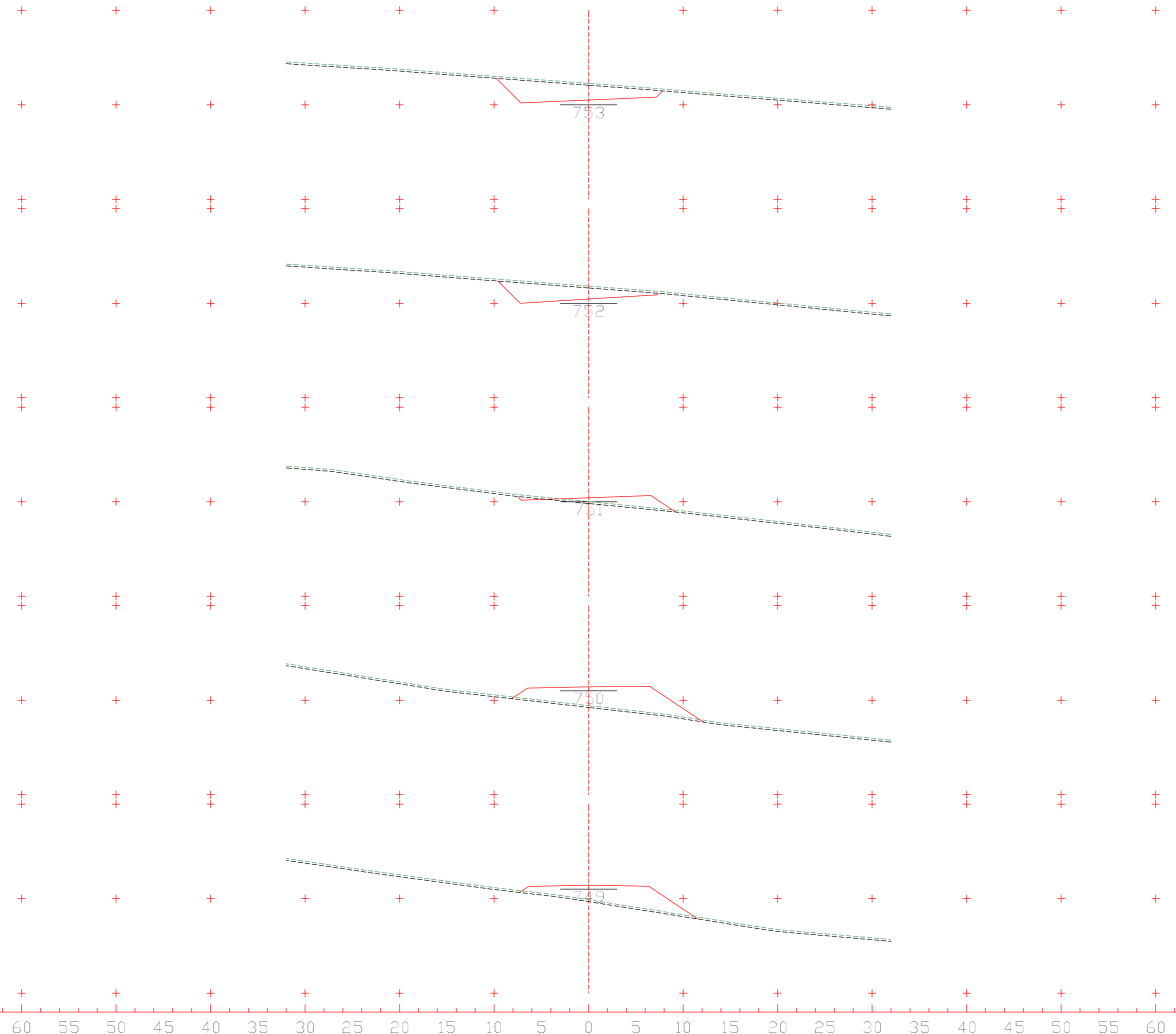
761
759
757
755
753
751
749
747
745

760
758
756
754
752
750
748
746
744

759
757
755
753
751
749
747
745
743

757
755
753
751
749
747
745
743
741

756
754
752
750
748
746
744
742
740



4+980
CT 755,269 m
CP 753,499 m

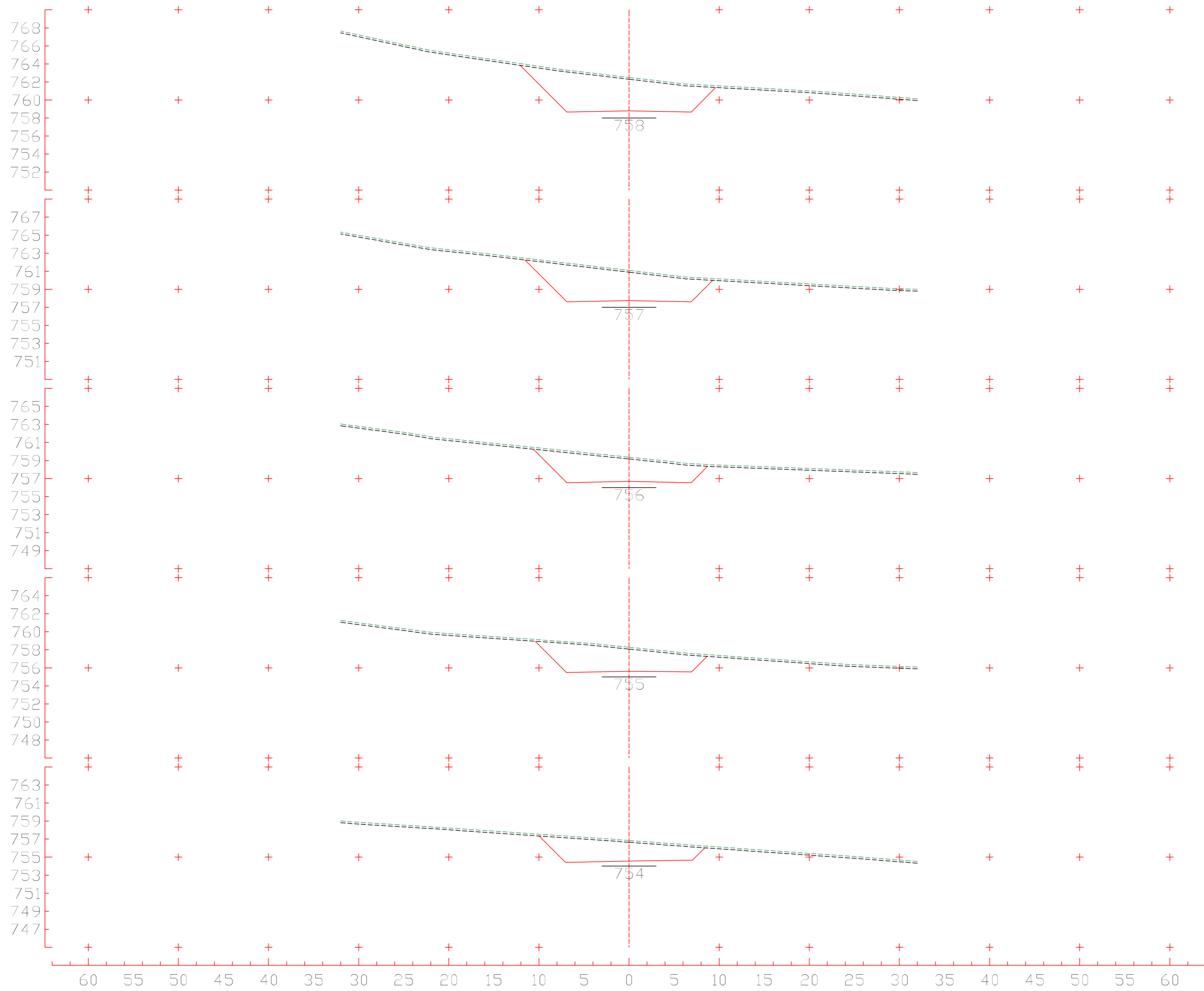
4+960
CT 753,820 m
CP 752,446 m

4+940
CT 751,013 m
CP 751,416 m

4+920
CT 748,433 m
CP 750,410 m

4+900
CT 747,884 m
CP 749,427 m

Eixo 01
Escala 1:400



5+080
 CT 762,503 m
 CP 758,803 m

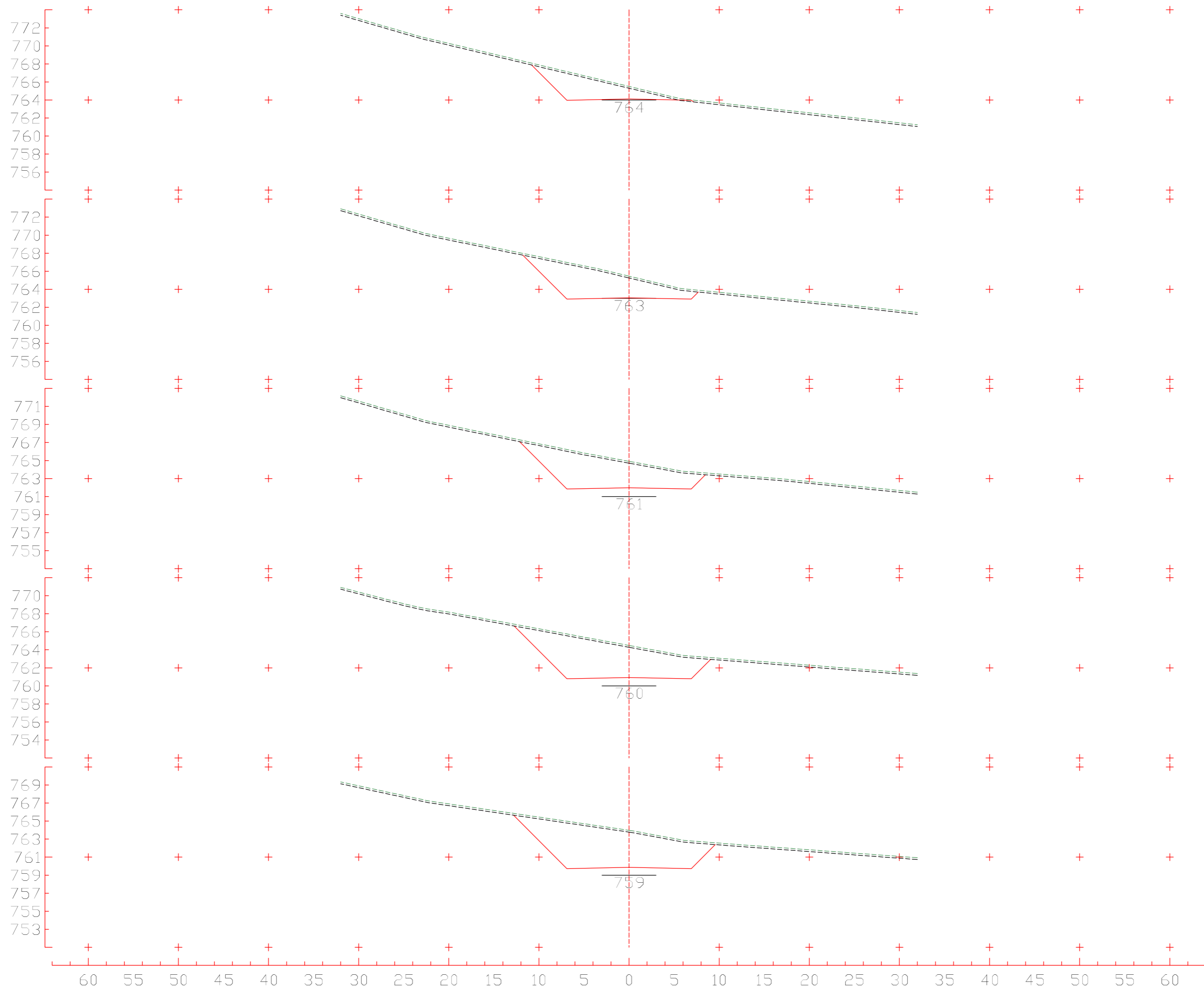
5+060
 CT 761,095 m
 CP 757,742 m

5+040
 CT 759,373 m
 CP 756,682 m

5+020
 CT 758,283 m
 CP 755,621 m

5+000
 CT 756,849 m
 CP 754,560 m

Eixo 1
 Escala 1:400



5+180
 CT 765,502 m
 CP 764,108 m

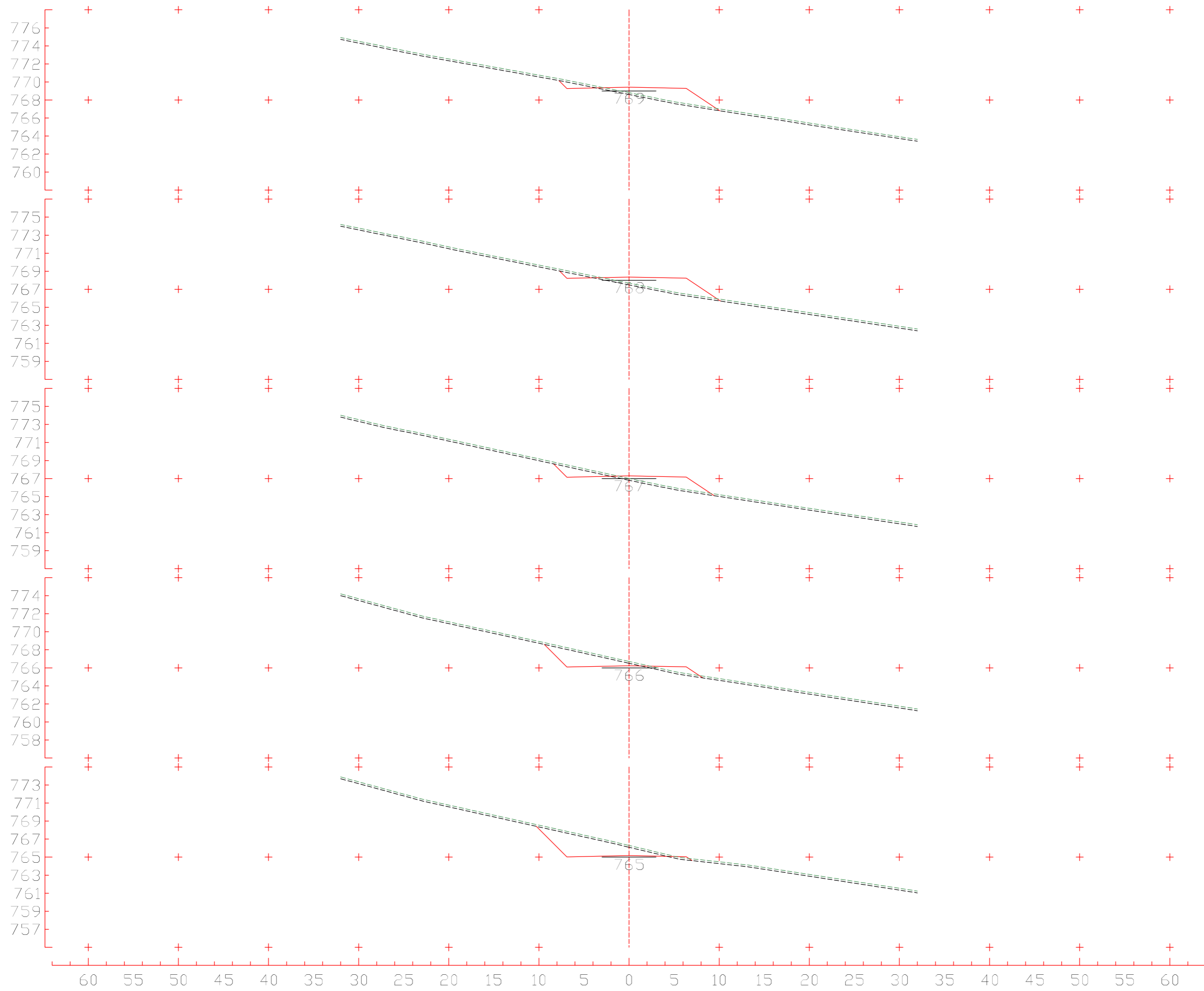
5+160
 CT 765,455 m
 CP 763,047 m

5+140
 CT 764,910 m
 CP 761,986 m

5+120
 CT 764,485 m
 CP 760,925 m

5+100
 CT 763,976 m
 CP 759,864 m

Eixo 01
 Escala 1:400



5+280
 CT 768,806 m
 CP 769,413 m

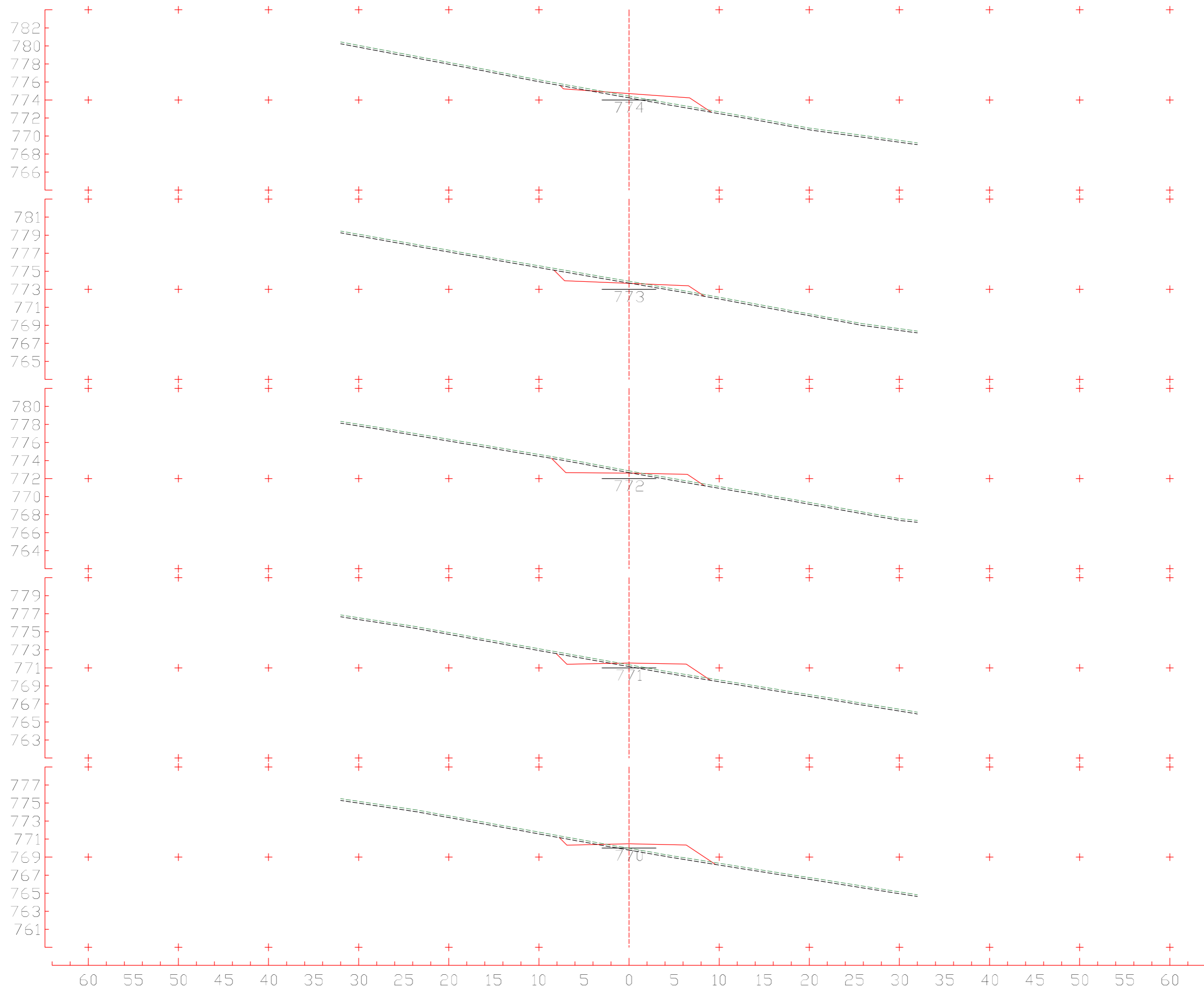
5+260
 CT 767,683 m
 CP 768,352 m

5+240
 CT 767,011 m
 CP 767,291 m

5+220
 CT 766,709 m
 CP 766,230 m

5+200
 CT 766,298 m
 CP 765,169 m

Eixo 1
 Escala 1:400



5+380
 CT 774,432 m
 CP 774,718 m

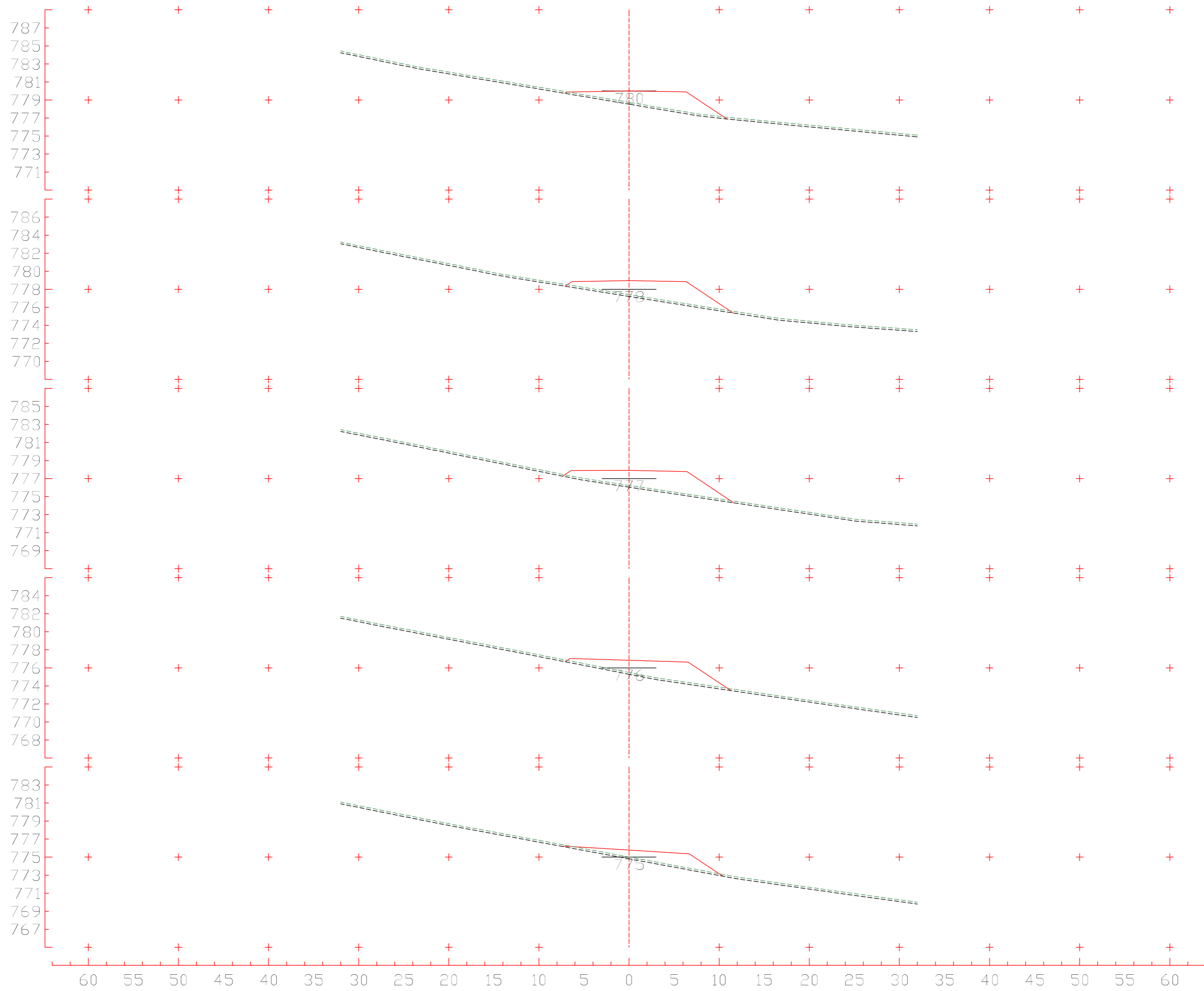
5+360
 CT 773,887 m
 CP 773,657 m

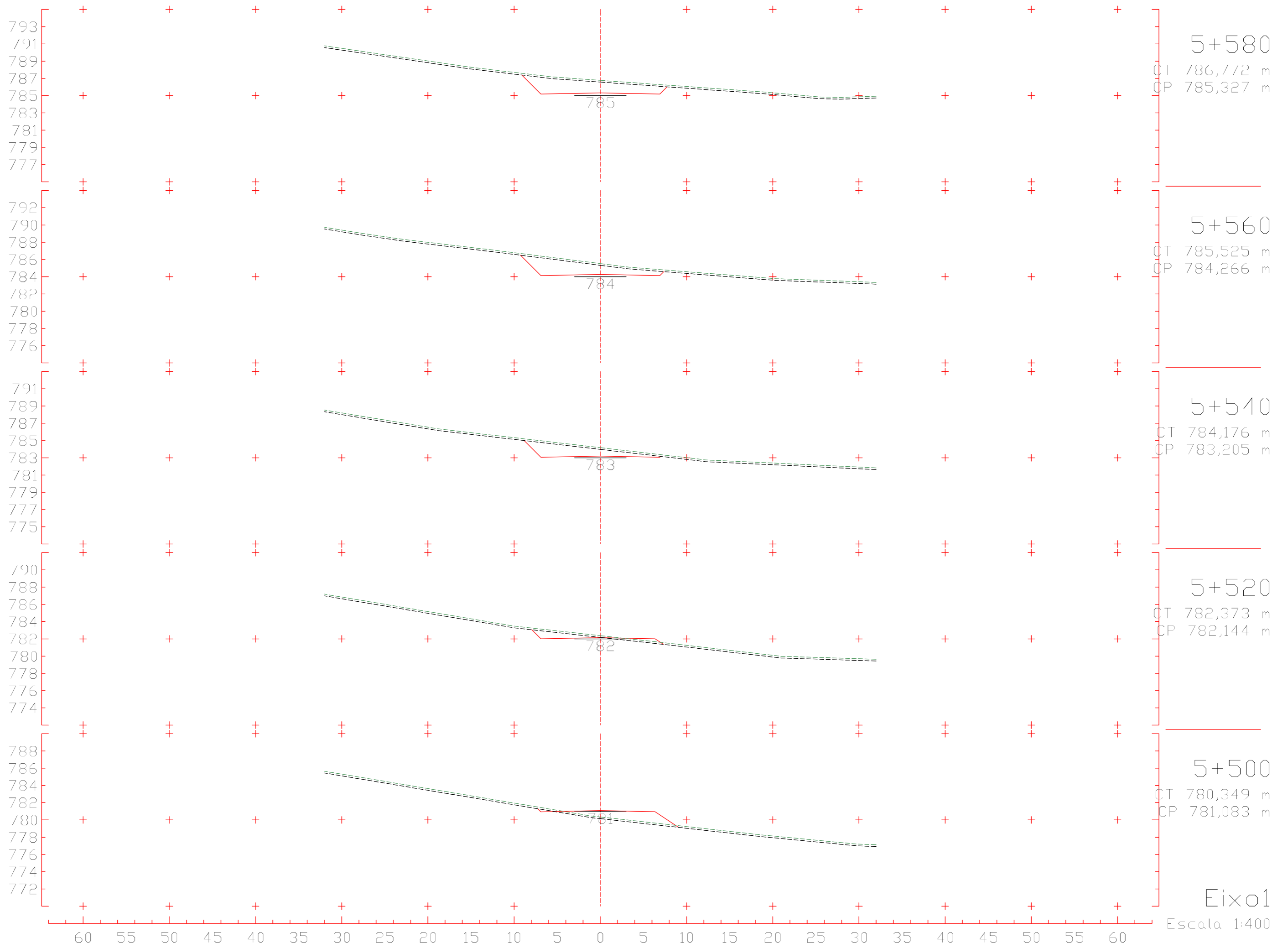
5+340
 CT 772,858 m
 CP 772,596 m

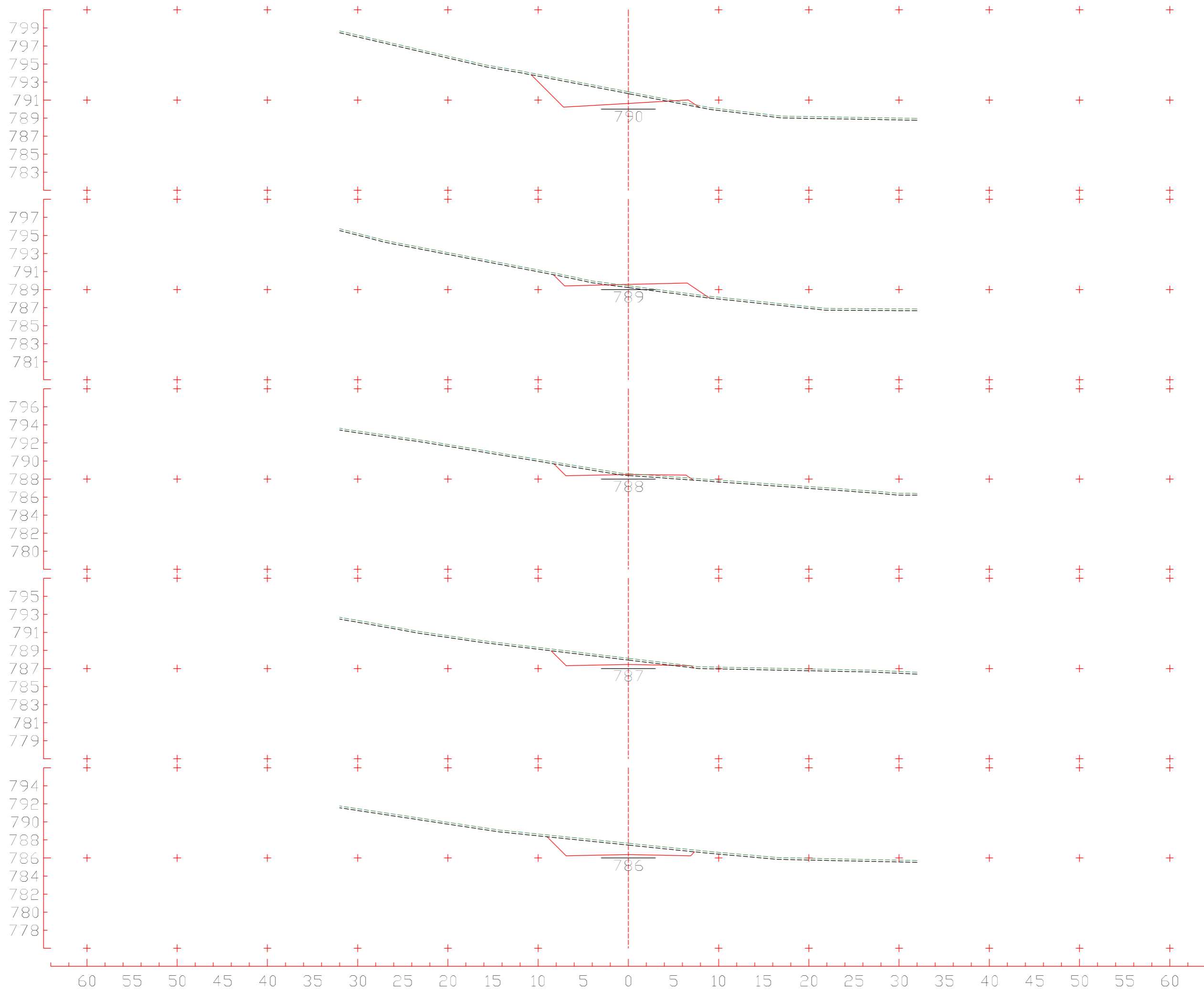
5+320
 CT 771,342 m
 CP 771,535 m

5+300
 CT 769,984 m
 CP 770,474 m

Eixo 01
 Escala 1:400







5+680
 CT 791,915 m
 CP 790,632 m

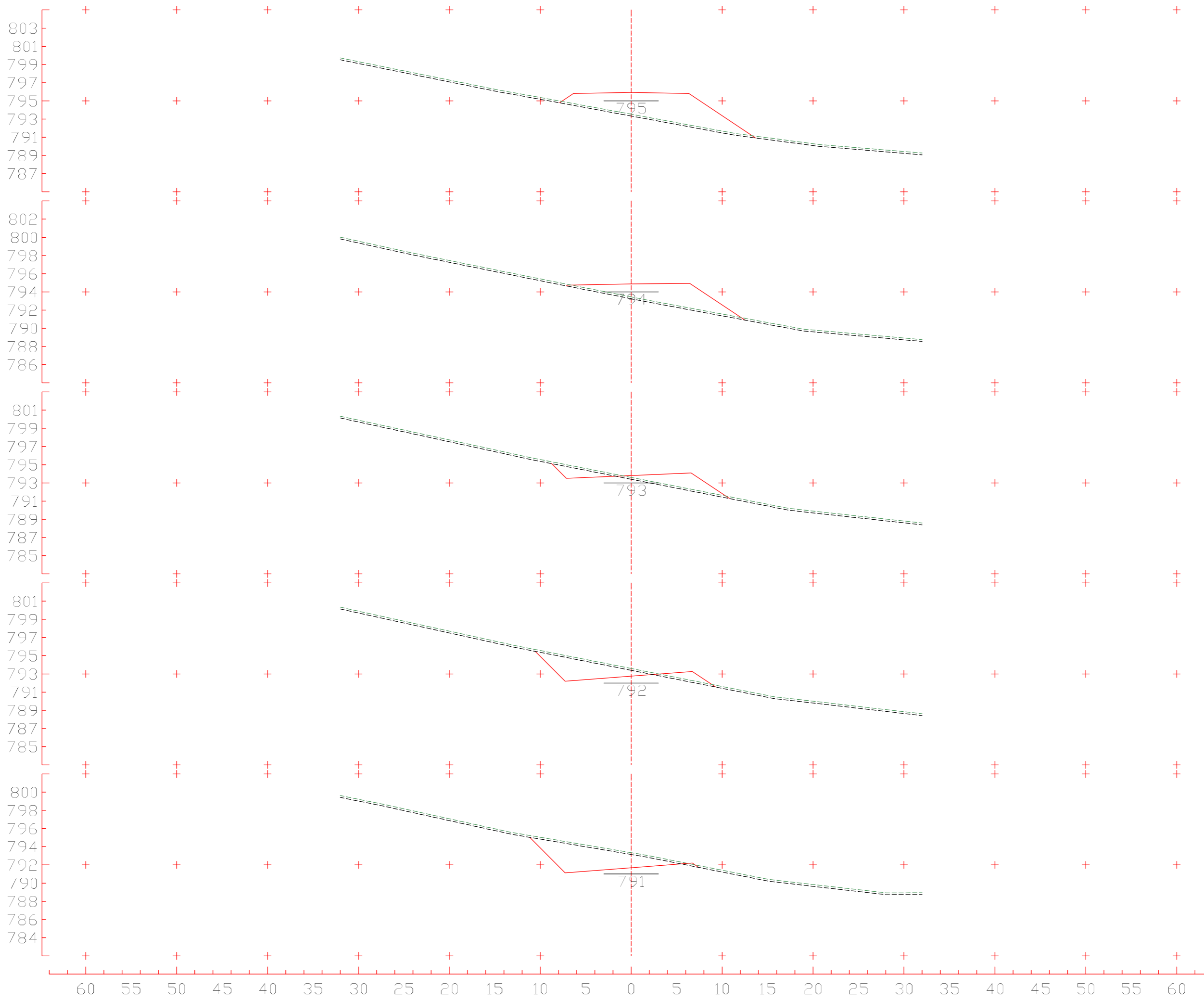
5+660
 CT 789,422 m
 CP 789,571 m

5+640
 CT 788,591 m
 CP 788,510 m

5+620
 CT 788,135 m
 CP 787,449 m

5+600
 CT 787,634 m
 CP 786,388 m

Eixo 1
 Escala 1:400



5+780
 CT 793,533 m
 CP 795,936 m

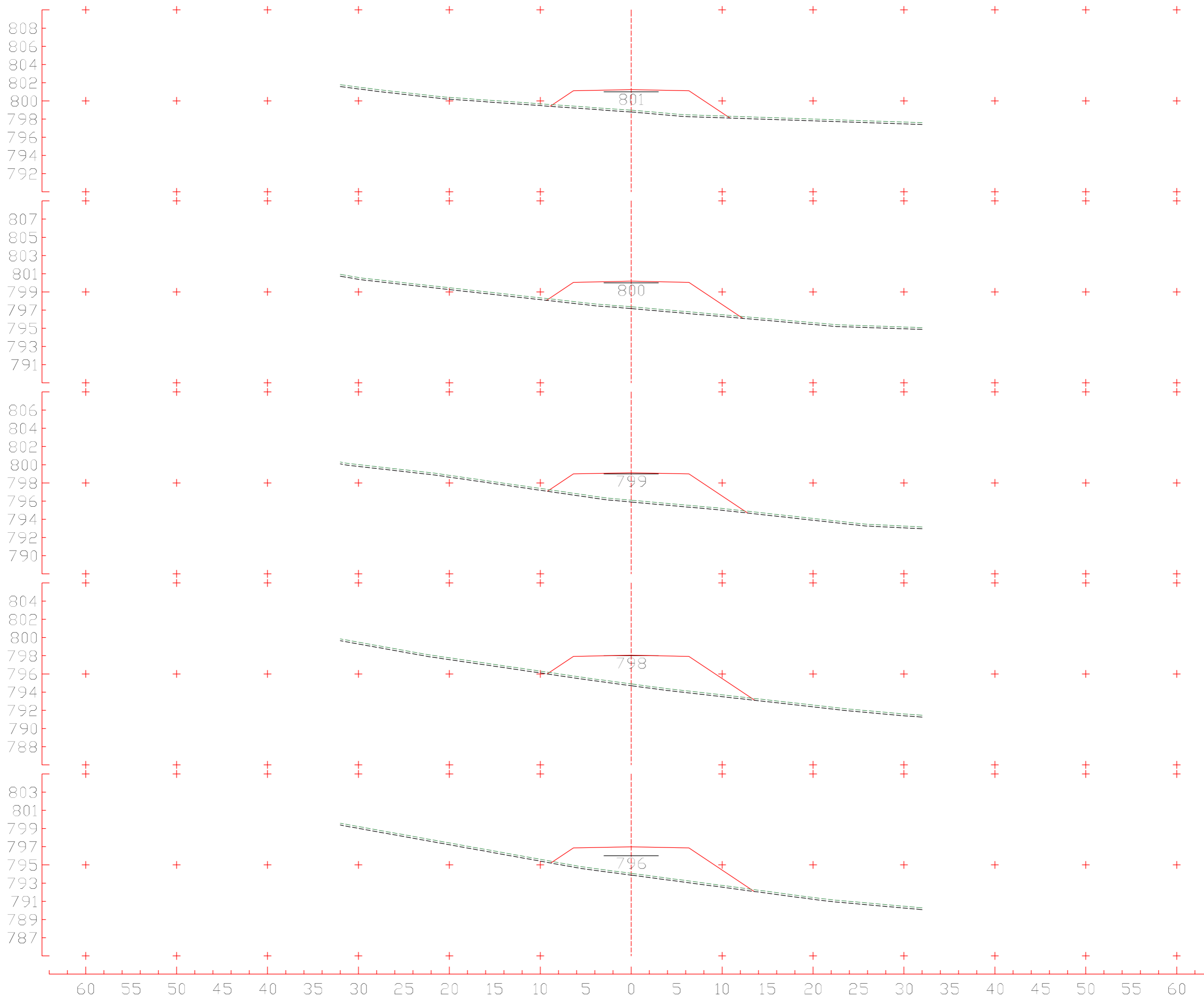
5+760
 CT 793,450 m
 CP 794,875 m

5+740
 CT 793,602 m
 CP 793,815 m

5+720
 CT 793,596 m
 CP 792,754 m

5+700
 CT 793,347 m
 CP 791,693 m

Eixo 01
 Escala 1:400



5+880
 CT 798,974 m
 CP 801,241 m

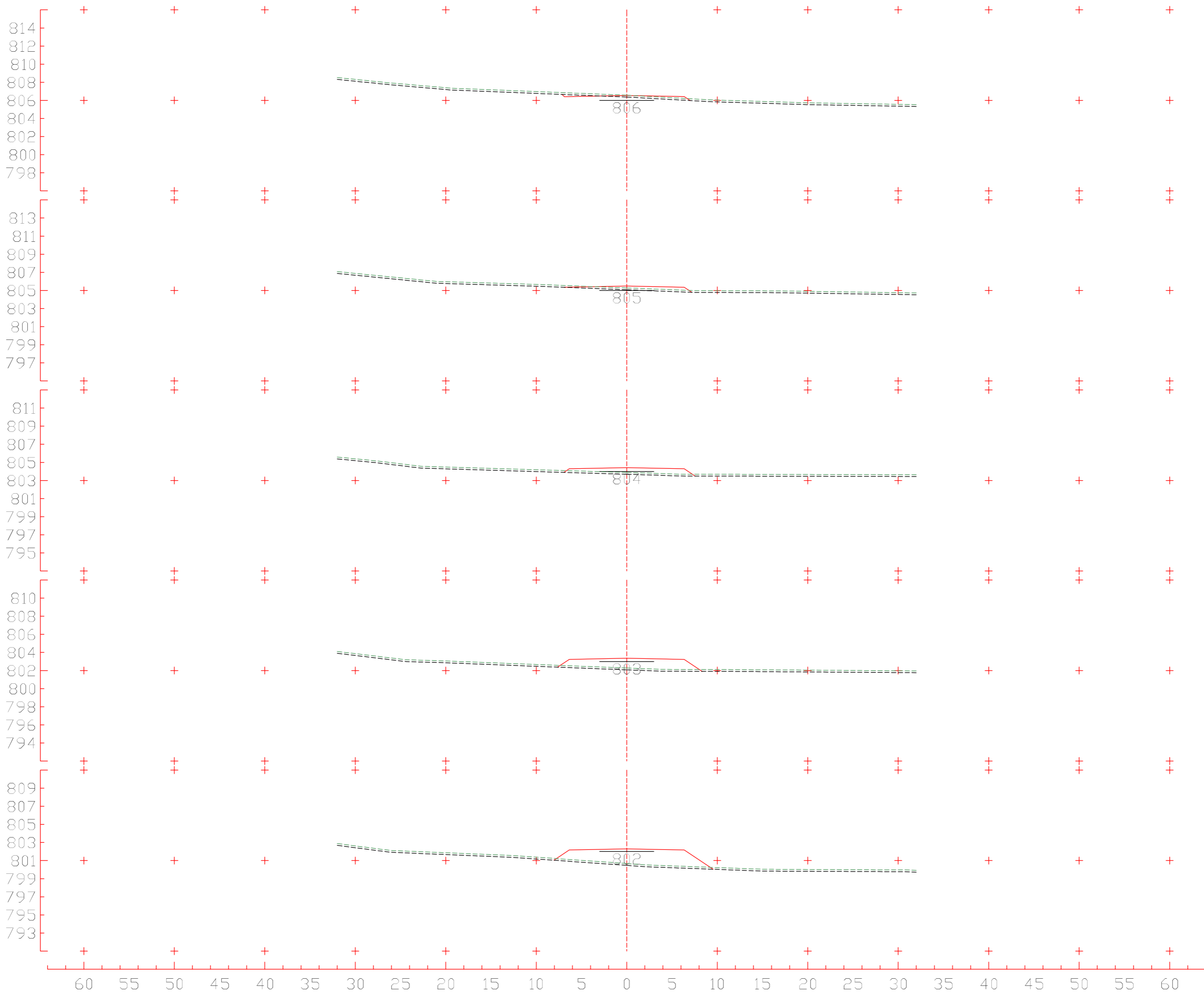
5+860
 CT 797,365 m
 CP 800,180 m

5+840
 CT 796,099 m
 CP 799,119 m

5+820
 CT 794,903 m
 CP 798,058 m

5+800
 CT 794,078 m
 CP 796,997 m

Eixo 01
 Escala 1:400



5+980
 CT 806,571 m
 CP 806,546 m

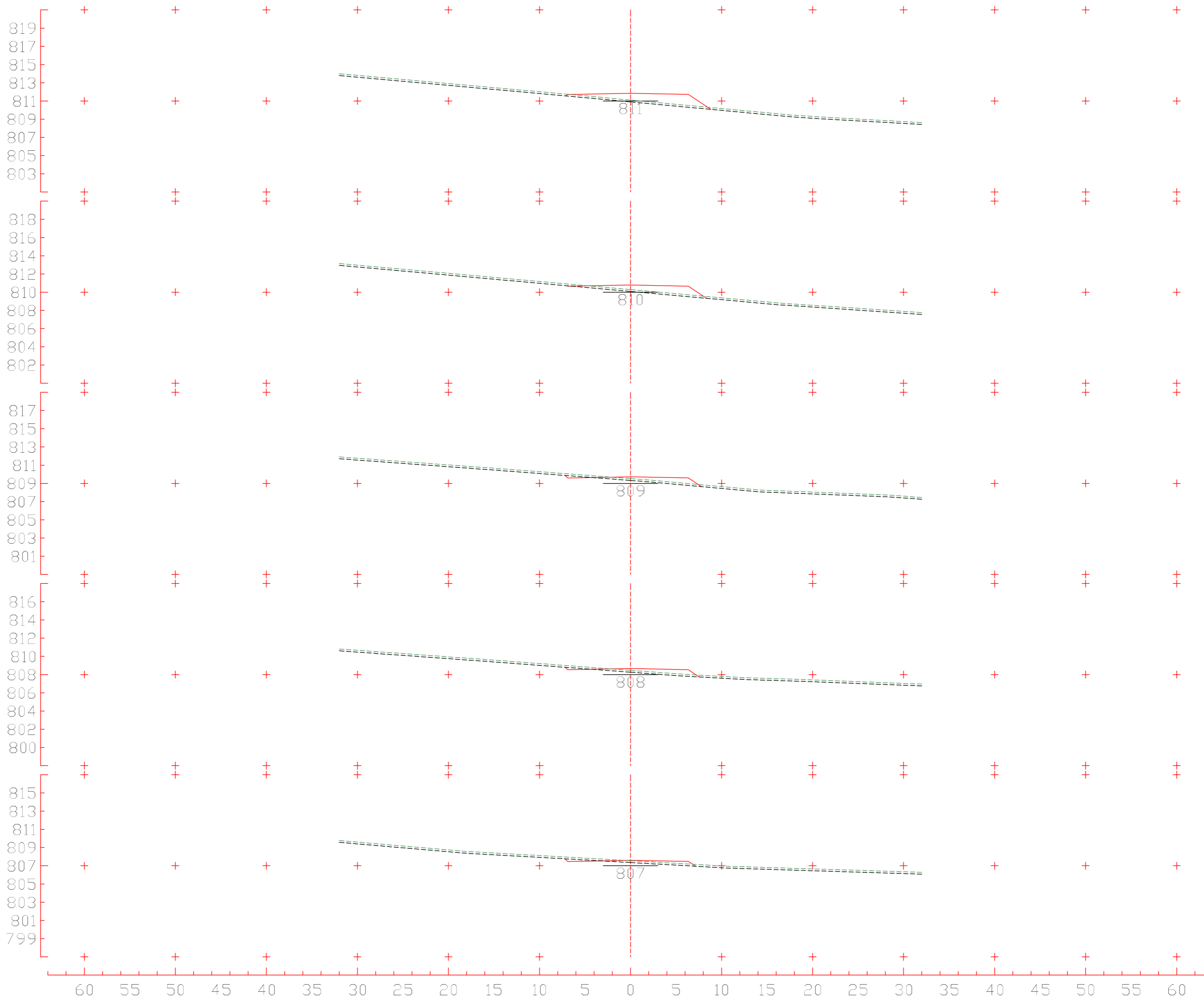
5+960
 CT 805,275 m
 CP 805,485 m

5+940
 CT 803,886 m
 CP 804,424 m

5+920
 CT 802,278 m
 CP 803,363 m

5+900
 CT 800,675 m
 CP 802,302 m

Eixo 01
 Escala 1:400



6+080
 CT 811,099 m
 CP 811,851 m

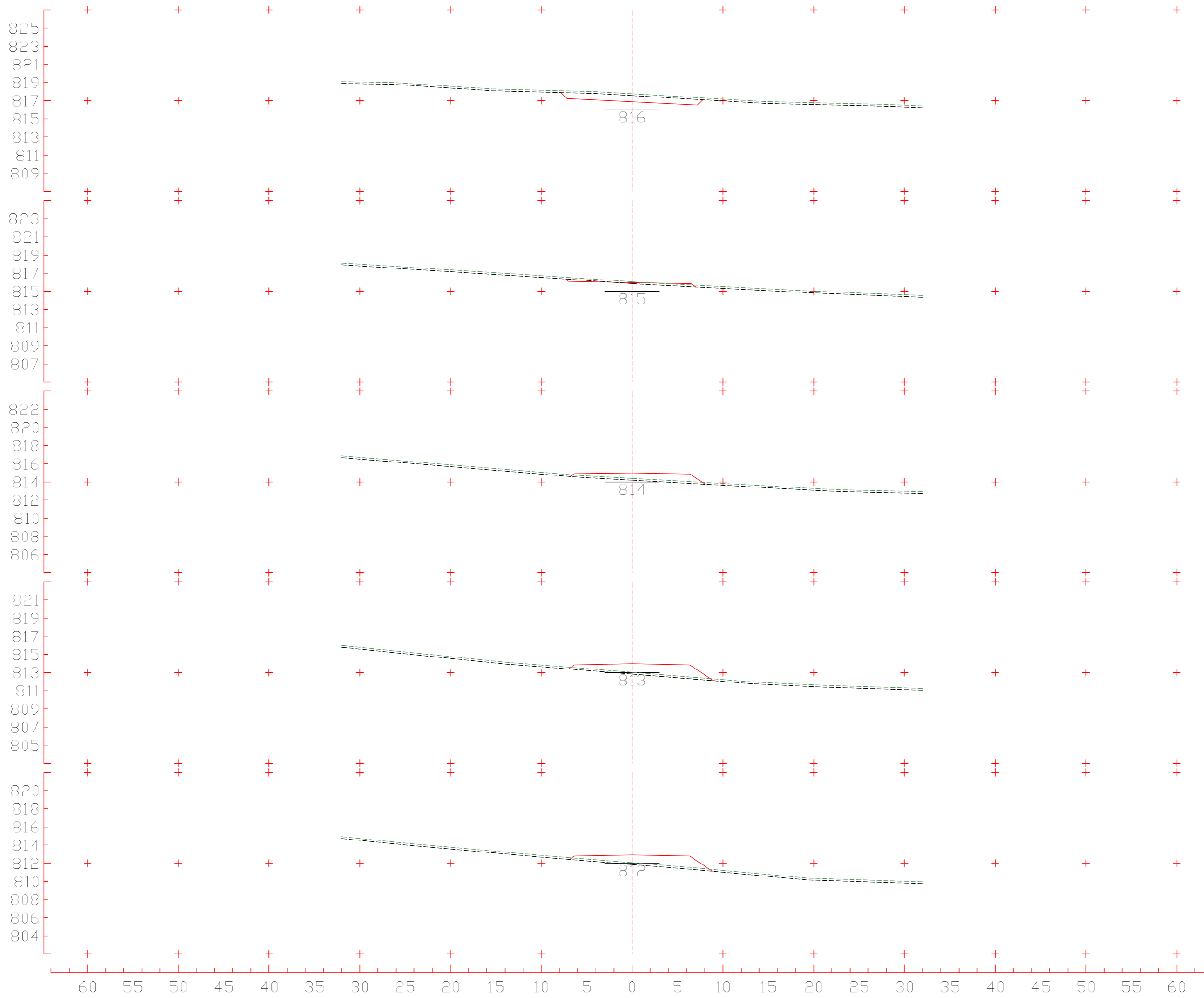
6+060
 CT 810,279 m
 CP 810,790 m

6+040
 CT 809,522 m
 CP 809,729 m

6+020
 CT 808,462 m
 CP 808,668 m

6+000
 CT 807,558 m
 CP 807,607 m

Eixo 1
 Escala 1:400



6+180
 CT 817,756 m
 CP 816,879 m

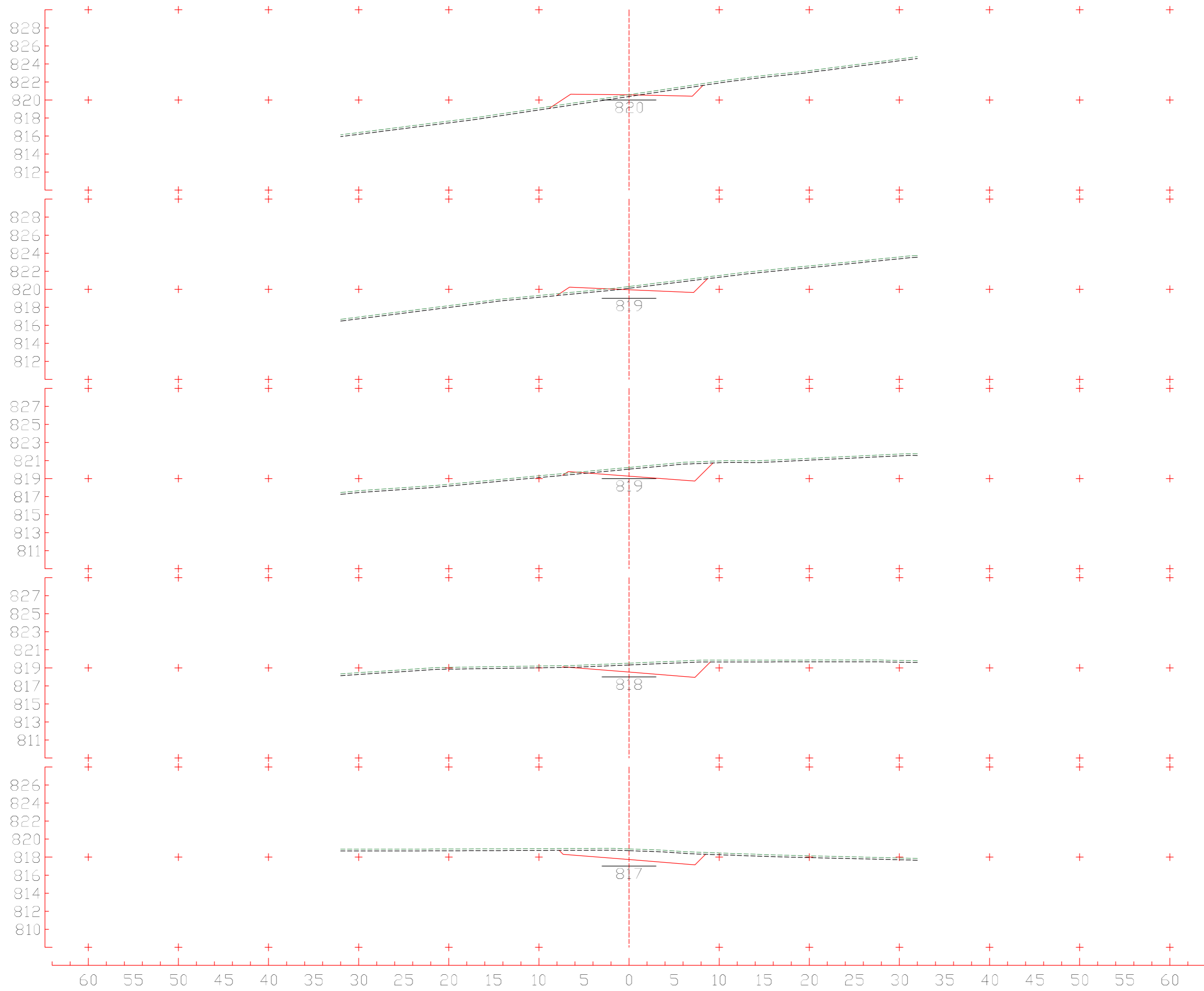
6+160
 CT 816,053 m
 CP 815,967 m

6+140
 CT 814,391 m
 CP 814,999 m

6+120
 CT 813,032 m
 CP 813,972 m

6+100
 CT 812,052 m
 CP 812,912 m

Eixo 01
 Escala 1:400



6+280
 CT 820,586 m
 CP 820,569 m

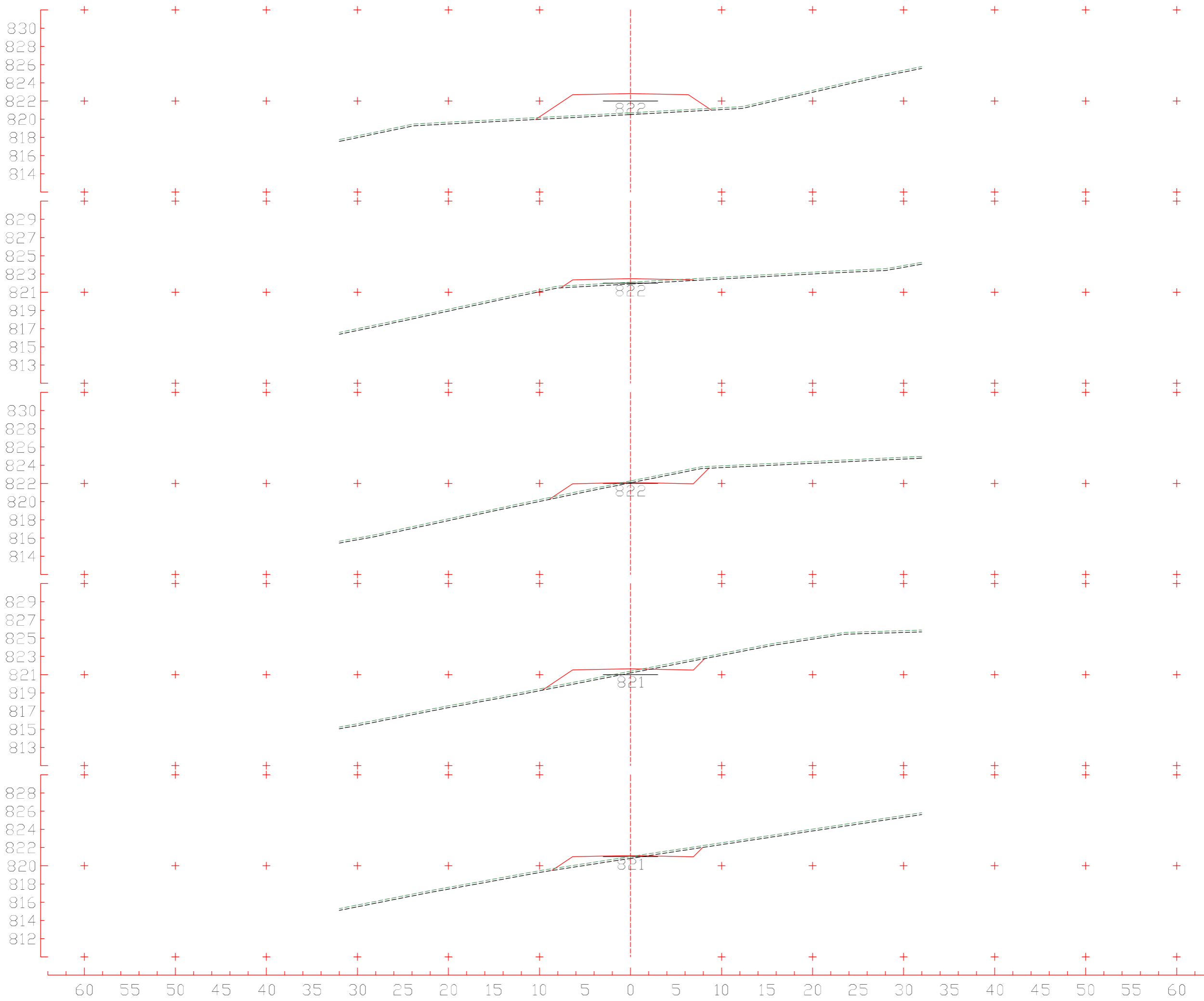
6+260
 CT 820,306 m
 CP 819,946 m

6+240
 CT 820,239 m
 CP 819,266 m

6+220
 CT 819,519 m
 CP 818,528 m

6+200
 CT 818,912 m
 CP 817,732 m

Eixo 01
 Escala 1:400



6+380
 CT 820,707 m
 CP 822,816 m

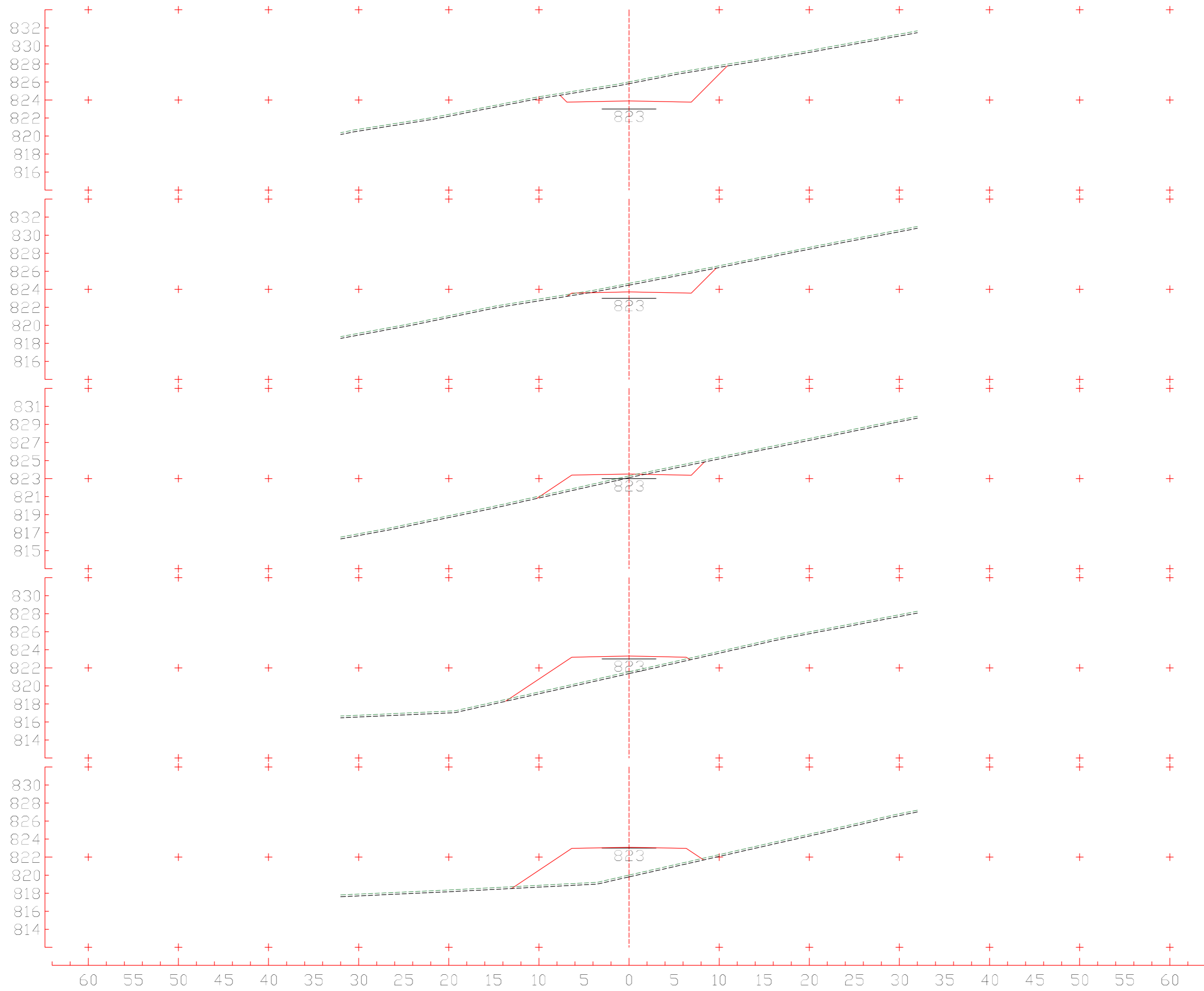
6+360
 CT 822,100 m
 CP 822,482 m

6+340
 CT 822,265 m
 CP 822,090 m

6+320
 CT 821,370 m
 CP 821,641 m

6+300
 CT 821,012 m
 CP 821,134 m

Eixo 01
 Escala 1:400



6+480
 CT 826,009 m
 CP 823,899 m

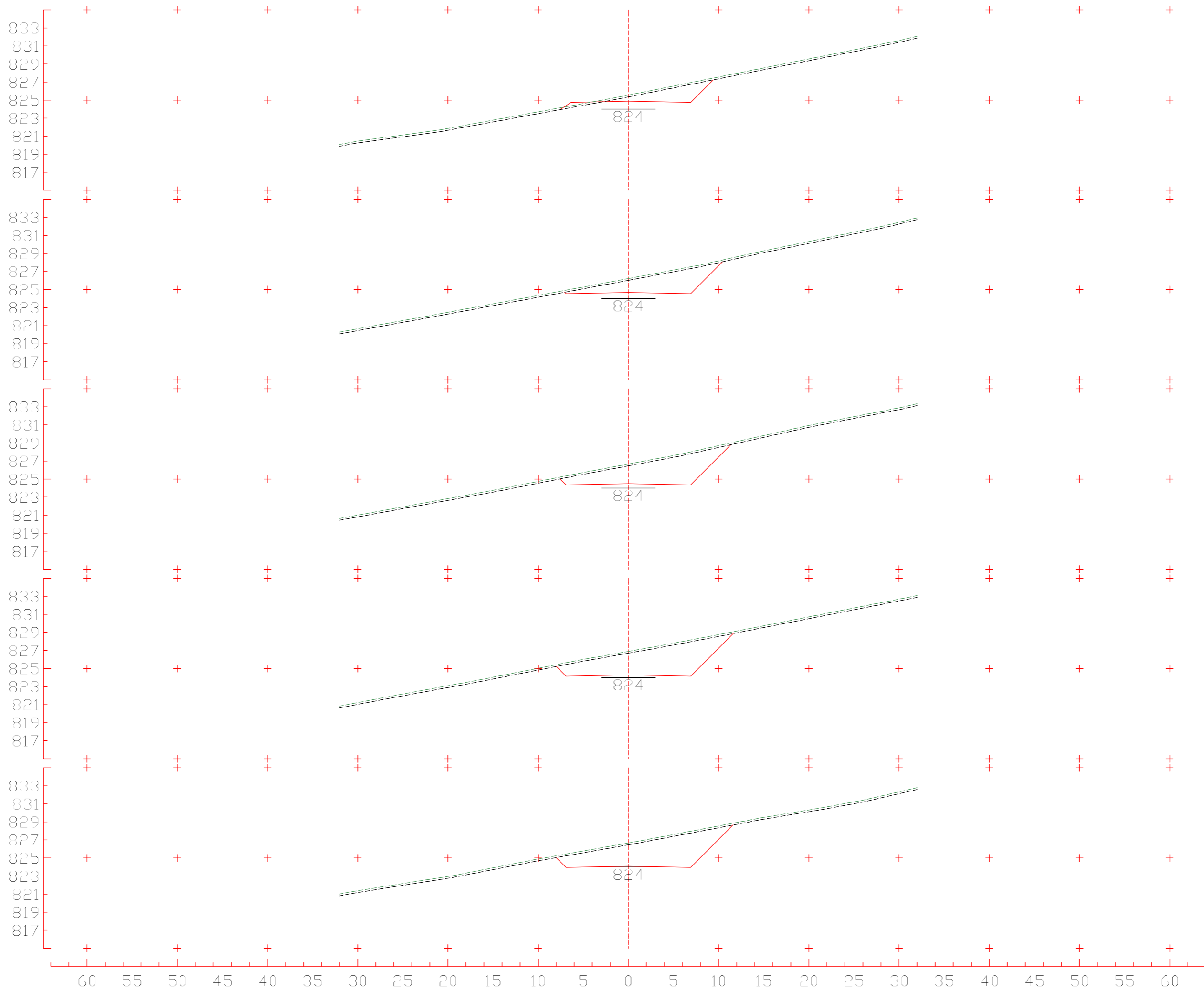
6+460
 CT 824,654 m
 CP 823,703 m

6+440
 CT 823,293 m
 CP 823,507 m

6+420
 CT 821,564 m
 CP 823,312 m

6+400
 CT 820,008 m
 CP 823,093 m

Eixo 1
 Escala 1:400



6+580
 CT 825,553 m
 CP 824,876 m

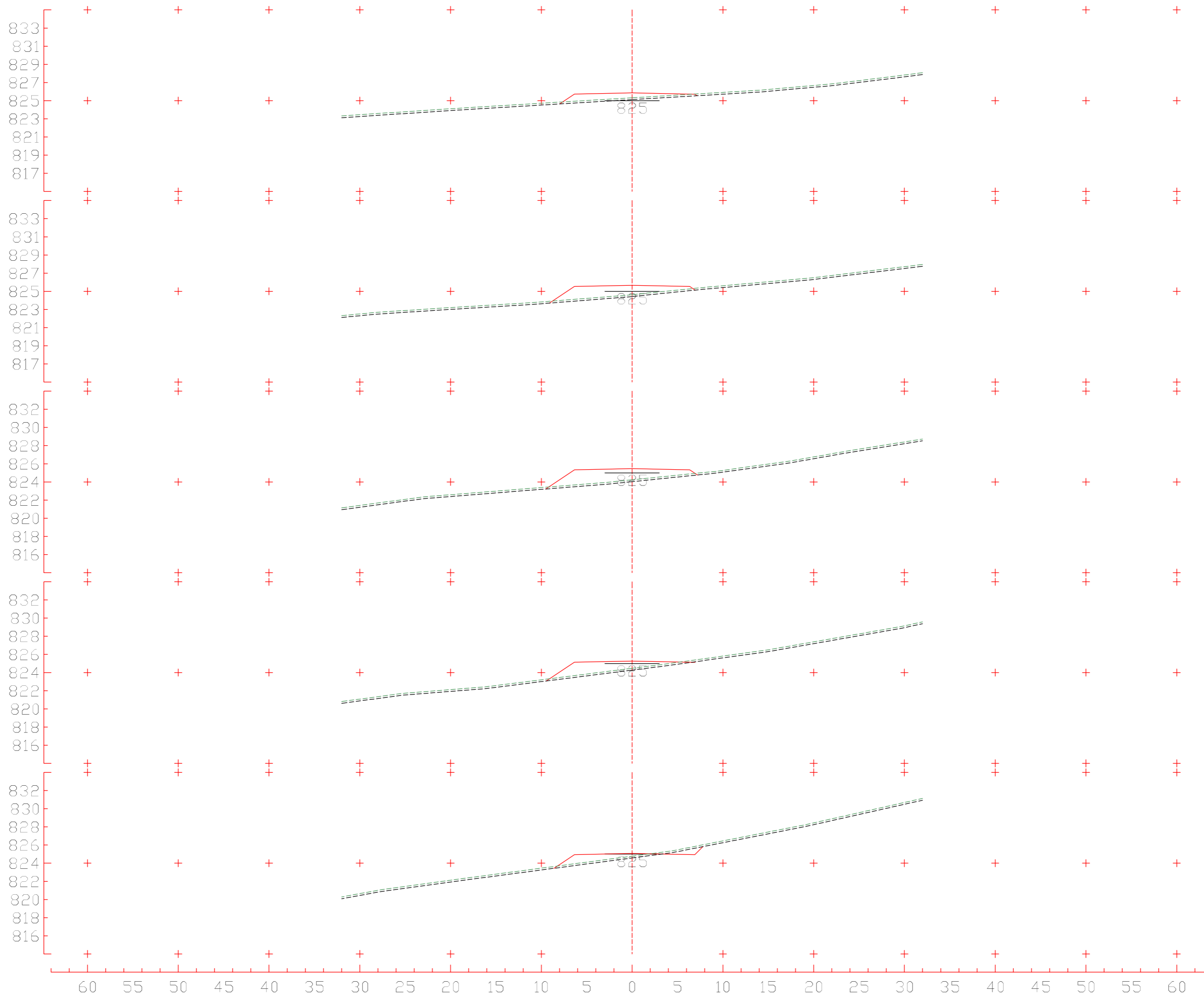
6+560
 CT 826,219 m
 CP 824,681 m

6+540
 CT 826,662 m
 CP 824,485 m

6+520
 CT 826,897 m
 CP 824,290 m

6+500
 CT 826,664 m
 CP 824,094 m

Eixo 01
 Escala 1:400



6+680
 CT 825,317 m
 CP 825,854 m

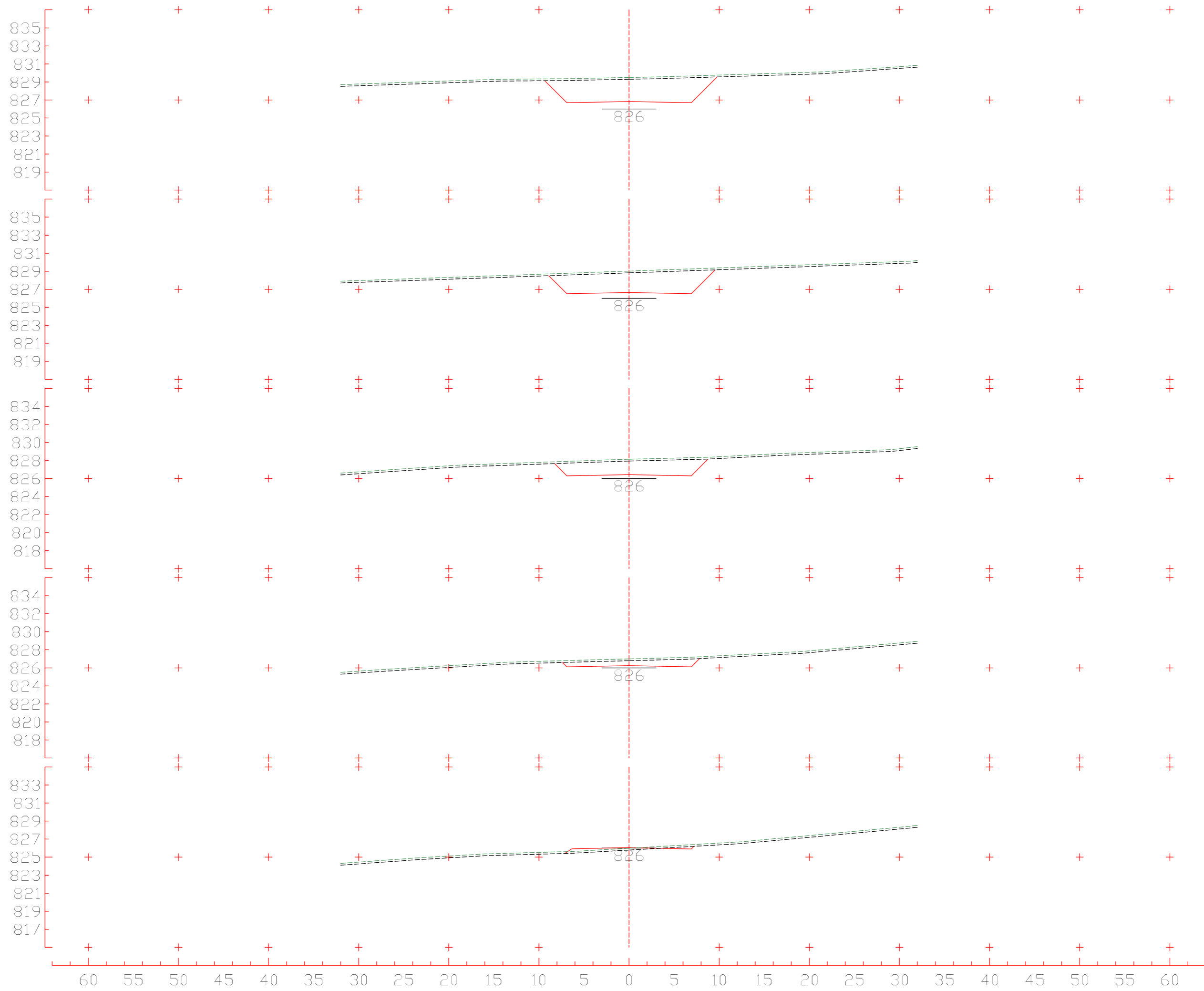
6+660
 CT 824,625 m
 CP 825,658 m

6+640
 CT 824,232 m
 CP 825,463 m

6+620
 CT 824,469 m
 CP 825,267 m

6+600
 CT 824,776 m
 CP 825,072 m

Eixo 01
 Escala 1:400



6+780
 CT 829,497 m
 CP 826,831 m

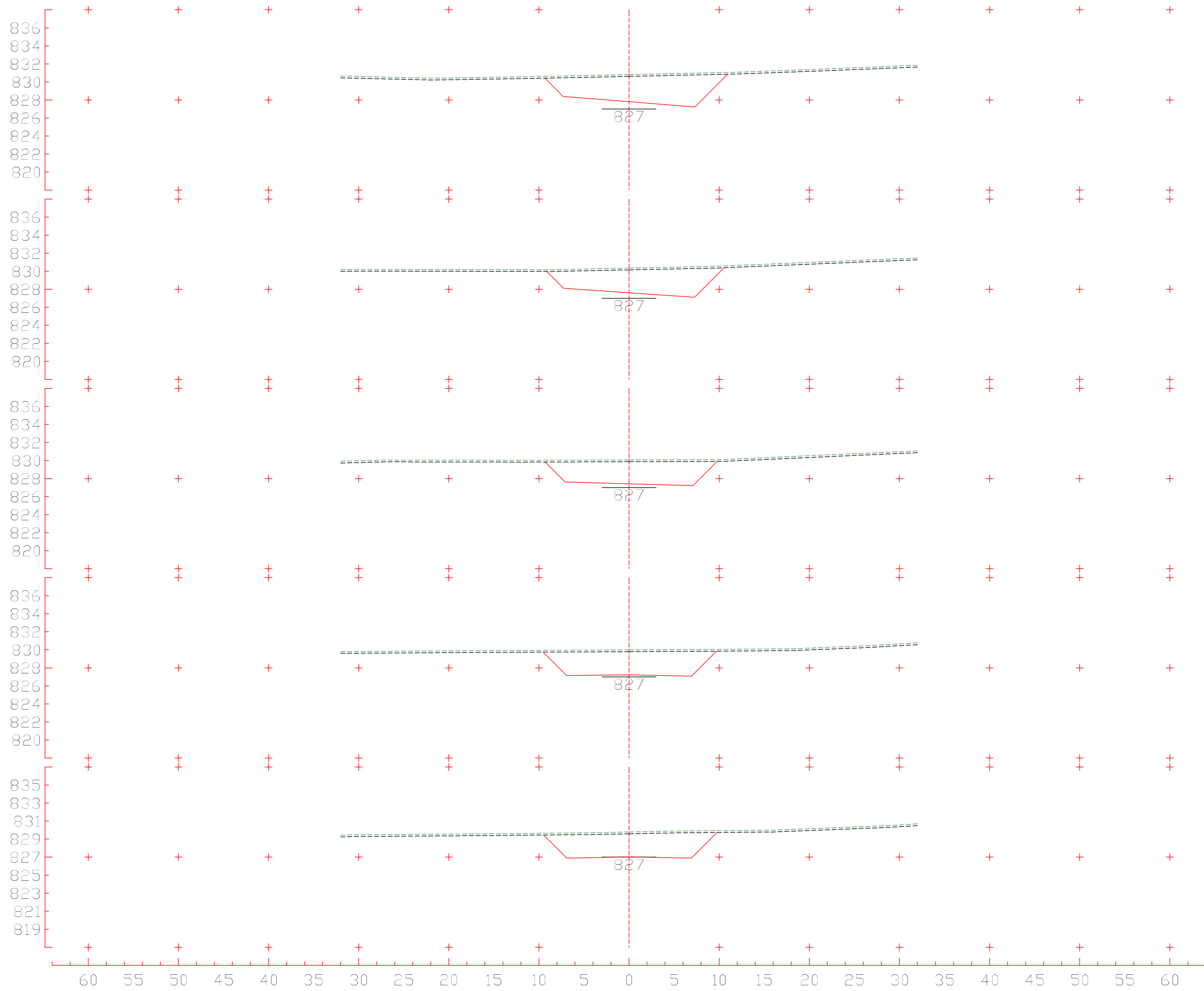
6+760
 CT 829,018 m
 CP 826,636 m

6+740
 CT 828,141 m
 CP 826,440 m

6+720
 CT 826,994 m
 CP 826,245 m

6+700
 CT 825,988 m
 CP 826,049 m

Eixo 01
 Escala 1:400



6+880
 CT 830,821 m
 CP 827,809 m

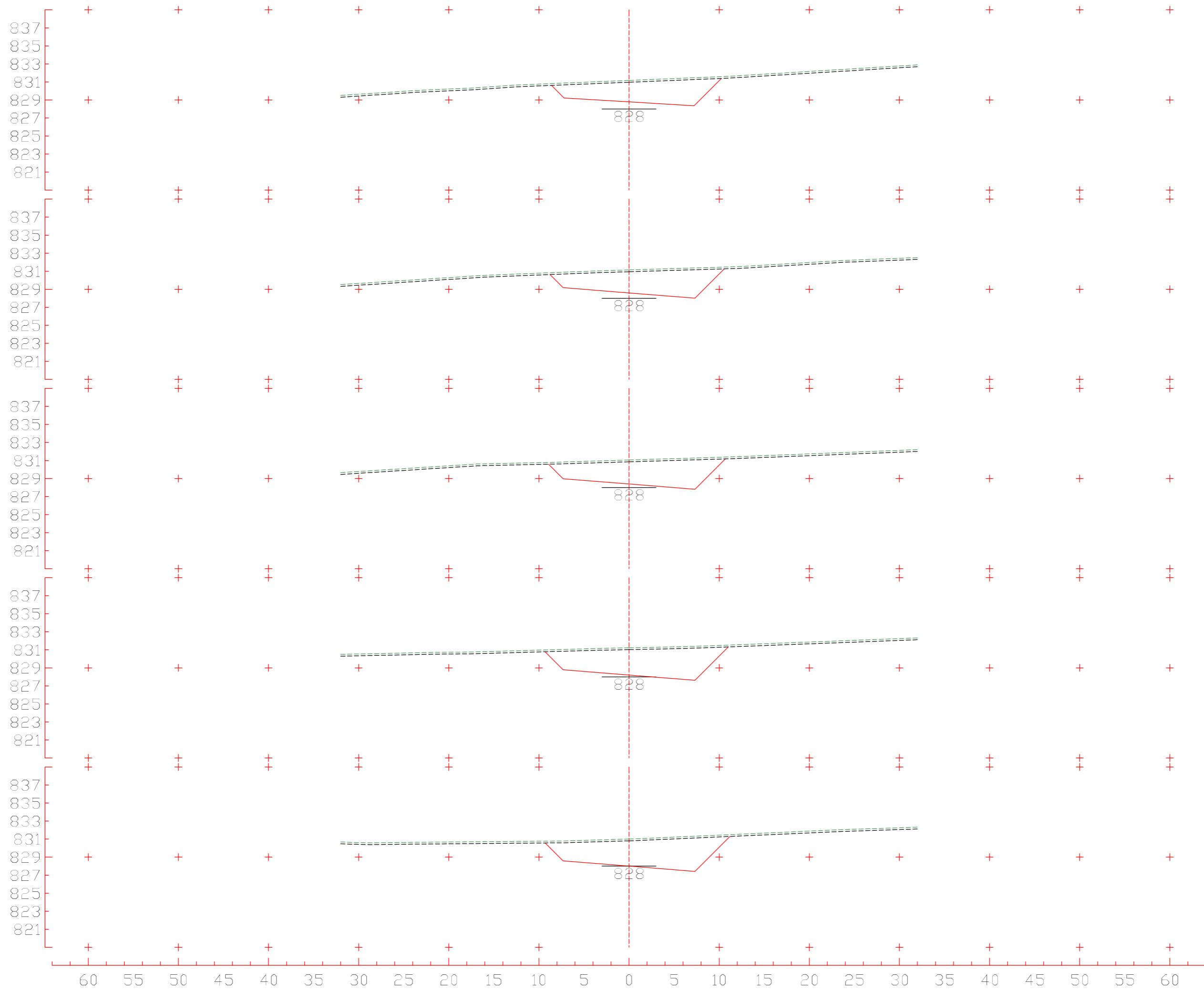
6+860
 CT 830,349 m
 CP 827,613 m

6+840
 CT 830,068 m
 CP 827,418 m

6+820
 CT 829,996 m
 CP 827,222 m

6+800
 CT 829,788 m
 CP 827,027 m

Eixo 1
 Escala 1:400



6+980
 CT 831,169 m
 CP 828,787 m

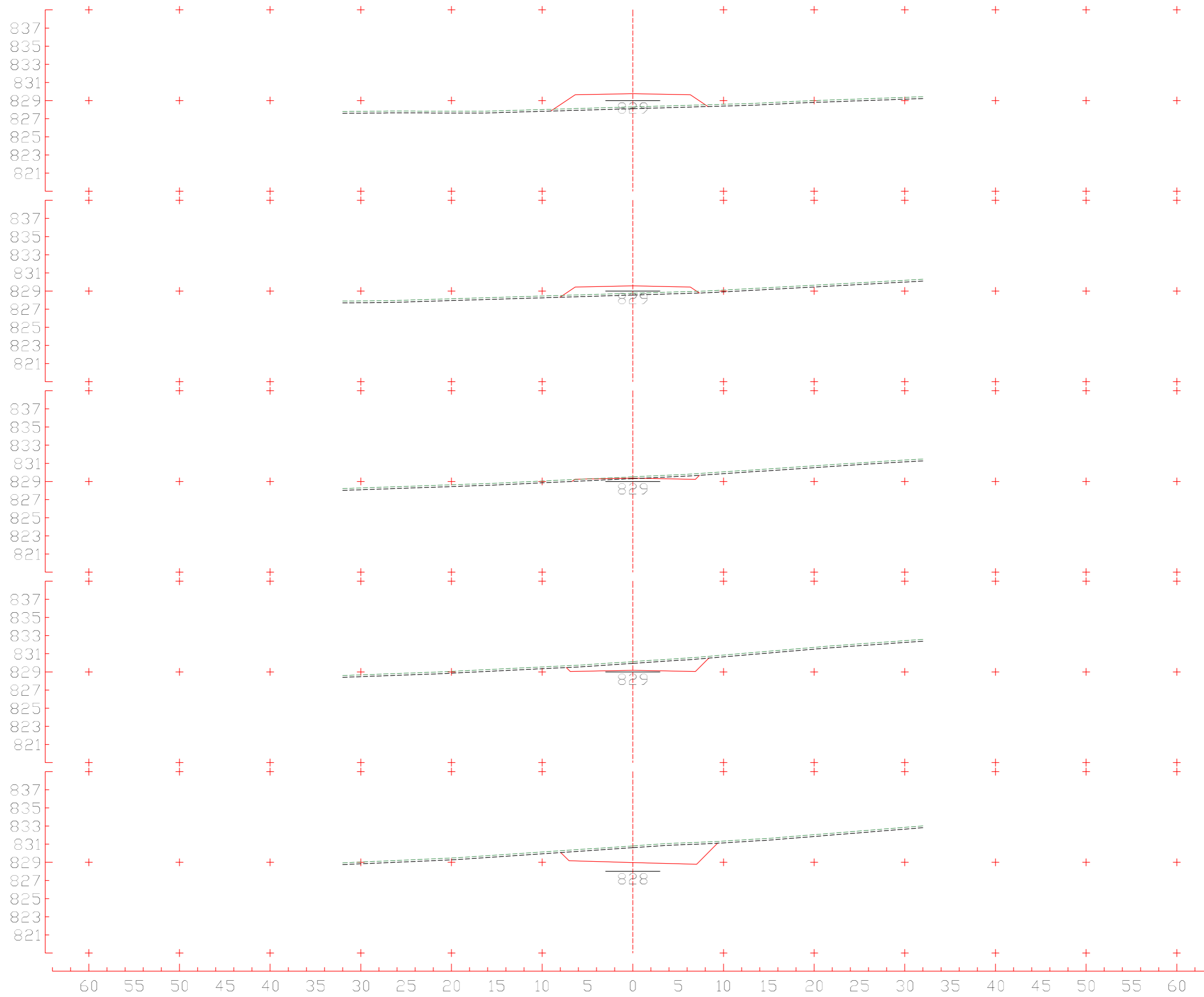
6+960
 CT 831,144 m
 CP 828,591 m

6+940
 CT 831,057 m
 CP 828,395 m

6+920
 CT 831,221 m
 CP 828,200 m

6+900
 CT 831,010 m
 CP 828,004 m

Eixo 1
 Escala 1:400



7+080
 CT 828,303 m
 CP 829,764 m

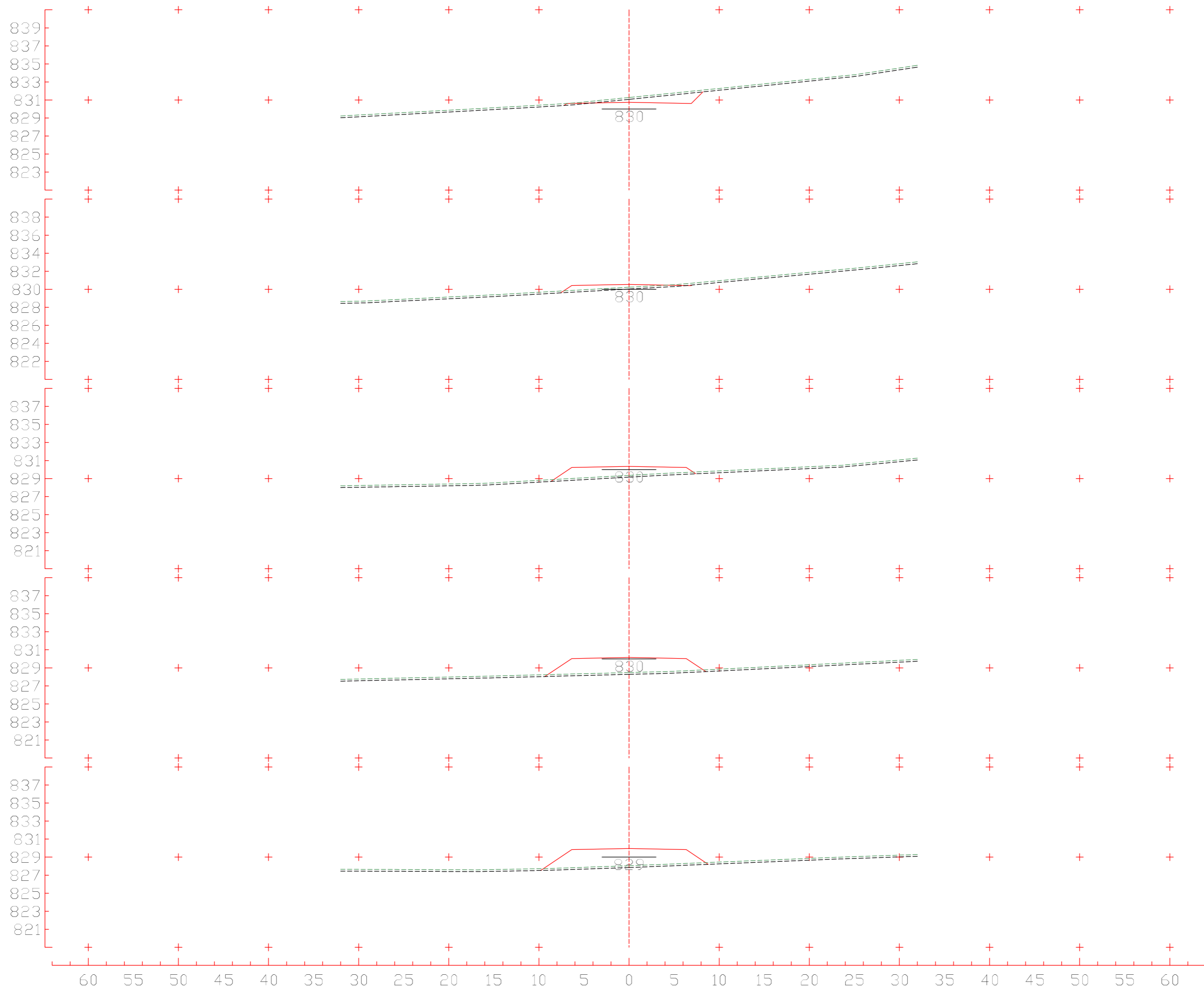
7+060
 CT 828,755 m
 CP 829,569 m

7+040
 CT 829,512 m
 CP 829,373 m

7+020
 CT 830,135 m
 CP 829,178 m

7+000
 CT 830,811 m
 CP 828,982 m

Eixo 01
 Escala 1:400



7+180
 CT 831,274 m
 CP 830,742 m

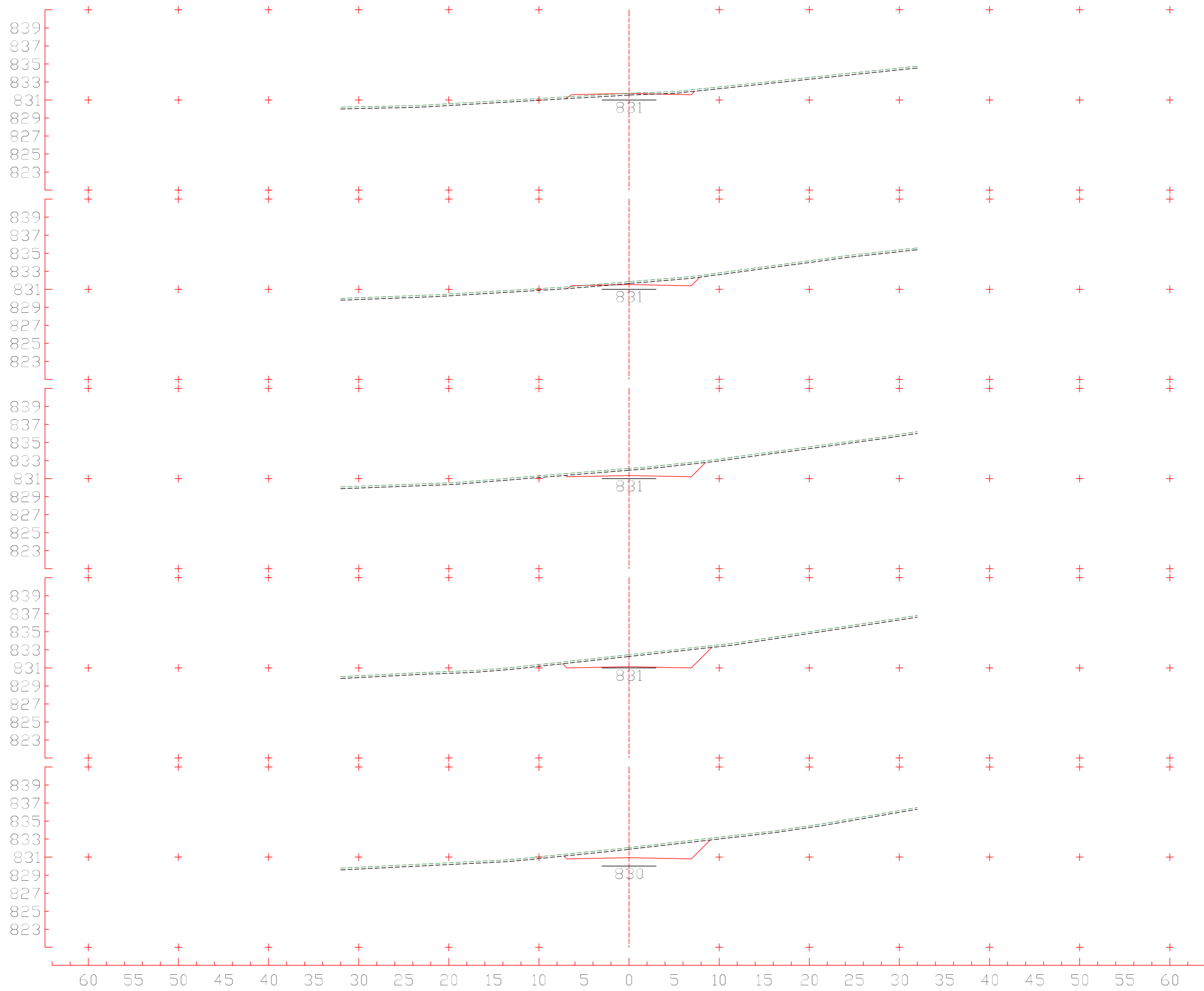
7+160
 CT 830,226 m
 CP 830,546 m

7+140
 CT 829,356 m
 CP 830,351 m

7+120
 CT 828,477 m
 CP 830,155 m

7+100
 CT 828,045 m
 CP 829,960 m

Eixo 01
 Escala 1:400



7+280
 CT 831,745 m
 CP 831,719 m

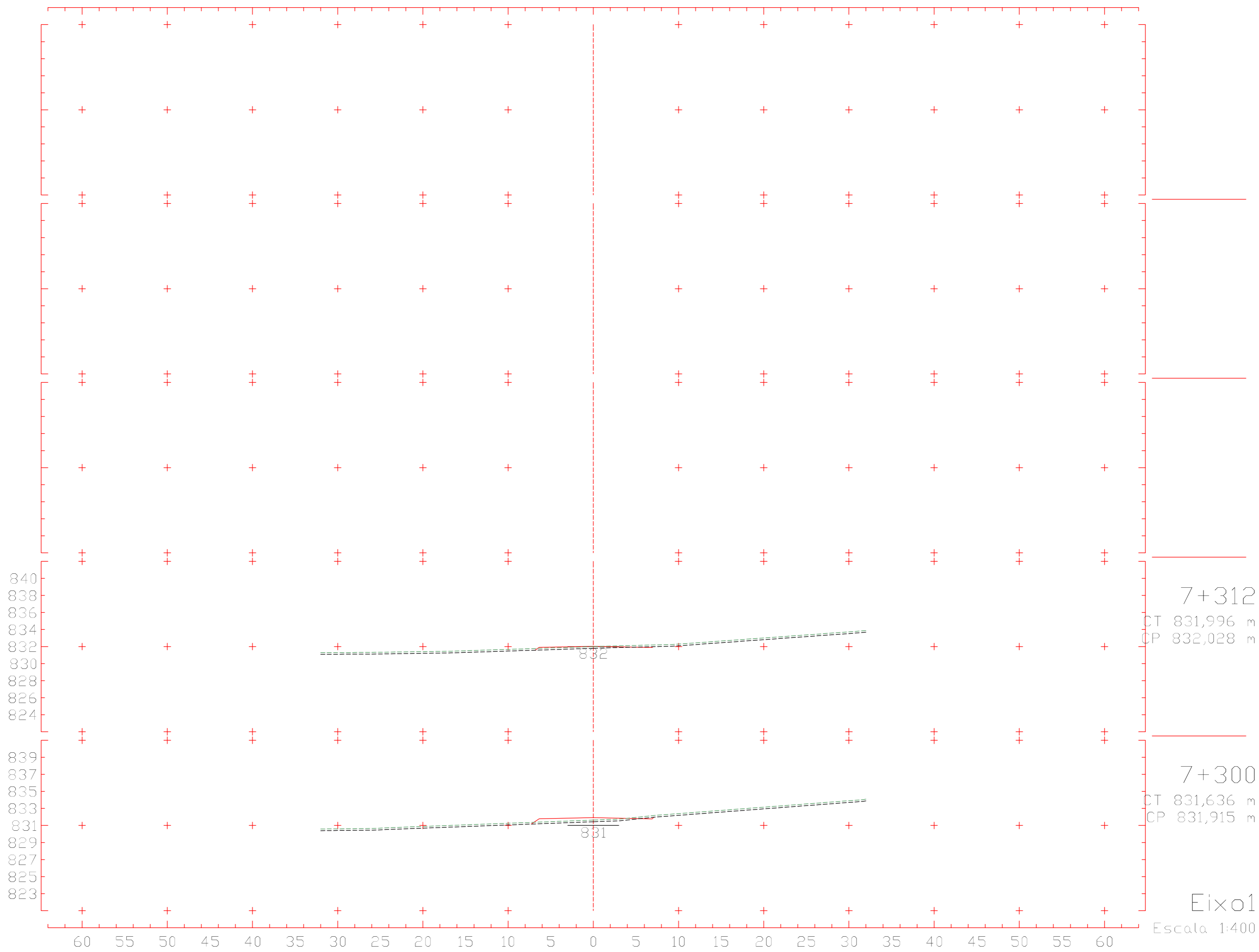
7+260
 CT 831,838 m
 CP 831,524 m

7+240
 CT 832,123 m
 CP 831,328 m

7+220
 CT 832,462 m
 CP 831,133 m

7+200
 CT 832,071 m
 CP 830,937 m

Eixo 01
 Escala 1:400



PROJETO DE TERRAPLENAGEM

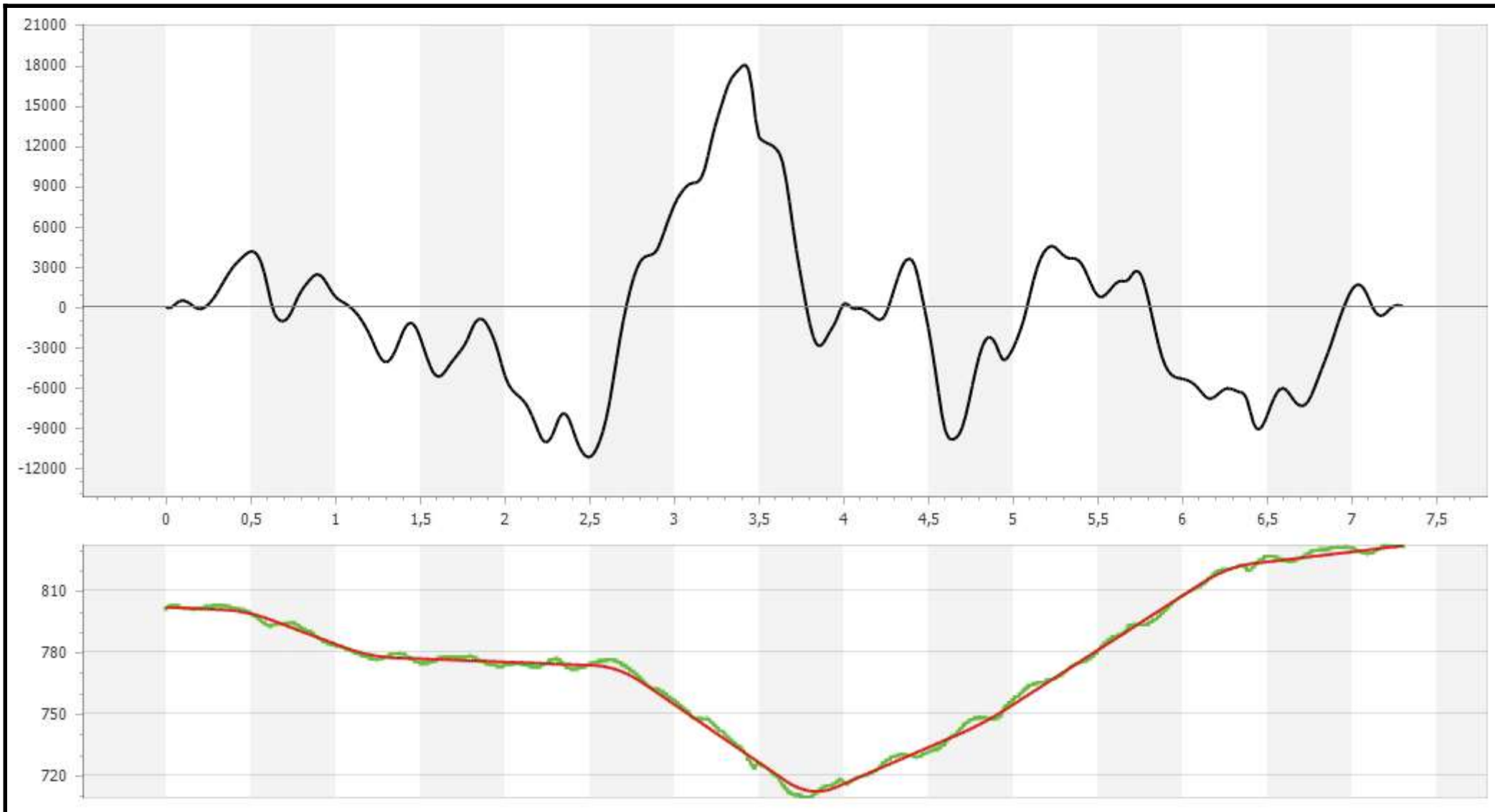
3 PROJETO DE TERRAPLENAGEM

■ Diagrama de Massa

DIAGRAMA DE MASSAS (BRÜCKNER)

Rodovia: Grupo de Eixos 1
Trecho: Eixo1
Segmento: km: 0+000,00 ao km: 7+311,57

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



■ Quadro de Origem e Destino

QUADRO DE ORIENTAÇÃO DA TERRAPLENAGEM

Rodovia: Grupo de Eixos 1 Trecho: Eixo1 Segmento: km: 0+000,00 ao km: 7+311,57	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. : 111361,00m³ Momento tot.: 60363,57m³.m DMT : 0,542km
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ORIGEM						DESTINO						TRANSPORTE			OBSERVAÇÕES				
IDENTIFICAÇÃO			LOCALIZAÇÃO			VOLUMES (m3)			IDENTIFICAÇÃO			LOCALIZAÇÃO				VOLUME	DIST. TRANSP.	VOL. COMP.	MOM. DE TRANSP.
ESPECIFICAÇÃO		FATOR	POSICIONAMENTO			DM (km)	GEO. TOTAL	HOMOGENEIZADO		ESPECIFICAÇÃO		POSICIONAMENTO							
ID	TIPO	HOMO.	INÍCIO	CM	FIM			TOTAL	TOTAL	PARC.	ID	TIPO	INÍCIO	CM		FIM	DM (km)		
C-001	C1ª	1,30	0+000	0+290	0+550	7206,00	5543,08												
								85,00	A-001	AI	0+000	0+010	0+030		85,00	0,280	110,50	30,940	
								384,00	A-001	AI	0+090	0+140	0+190			0,150	499,20	74,880	
								804,00	A-001	AS	0+000	0+110	0+210		804,00	0,180	1045,20	188,136	
								3646,00	A-002	AI	0+490	0+590	0+690		3646,00	0,300	4739,80	1421,940	
								624,08	A-002	AS	0+430	0+590	0+710		1765,00	0,300	811,30	243,390	
C-002	C1ª	1,30	0+650	0+780	0+970	4825,00	3711,54												
								1140,92	A-002	AS	0+430	0+590	0+710			0,190	1483,20	281,808	
								2570,62	A-003	AI	0+890	1+120	1+290		3209,00	0,340	3341,80	1136,212	
C-003	C1ª	1,30	1+290	1+370	1+470	686,00	527,69												
								527,69	A-003	AS	0+830	1+100	1+310		3529,00	0,270	686,00	185,220	
C-003	C2ª	1,00	1+290	1+370	1+450	2229,00	2229,00												
								375,88	A-003	AI	0+890	1+120	1+290			0,250	375,88	93,971	
								1853,12	A-003	AS	0+830	1+100	1+310			0,270	1853,12	500,341	
C-003	C3ª	0,80	1+330	1+370	1+430	210,00	262,50												
								262,50	A-003	AI	0+890	1+120	1+290			0,250	210,00	52,500	
C-004	C1ª	1,30	1+590	1+730	1+890	1216,00	935,38												
								935,38	A-003	AS	0+830	1+100	1+310			0,630	1216,00	766,080	
C-004	C2ª	1,00	1+590	1+730	1+870	3405,00	3405,00												
								212,81	A-003	AS	0+830	1+100	1+310			0,630	212,81	134,069	
								2612,00	A-004	AI	1+450	1+520	1+610		2612,00	0,210	2612,00	548,520	
								580,19	A-004	AS	1+430	1+520	1+630		1558,00	0,210	580,19	121,840	
C-004	C3ª	0,80	1+630	1+660	1+670	12,00	15,00												
								15,00	A-005	AI	1+850	2+030	2+250		5642,00	0,370	12,00	4,440	
C-004	C3ª	0,80	1+770	1+790	1+810	109,00	136,25												
								136,25	A-005	AI	1+850	2+030	2+250			0,240	109,00	26,160	
C-005	C1ª	1,30	2+050	2+070	2+110	16,00	12,31												
								12,31	A-004	AS	1+430	1+520	1+630			0,550	16,00	8,800	
C-006	C1ª	1,30	2+230	2+290	2+350	524,00	403,08												
								403,08	A-004	AS	1+430	1+520	1+630			0,770	524,00	403,480	
C-006	C2ª	1,00	2+250	2+290	2+350	1674,00	1674,00												
								562,42	A-004	AS	1+430	1+520	1+630			0,770	562,42	433,066	
								1111,58	A-005	AI	1+850	2+030	2+250			0,260	1111,58	289,010	
C-006	C3ª	0,80	2+270	2+300	2+330	164,00	205,00												
								205,00	A-005	AI	1+850	2+030	2+250			0,270	164,00	44,280	
C-007	C1ª	1,30	2+490	3+150	3+450	16958,00	13044,62												
								4174,17	A-005	AI	1+850	2+030	2+250			1,120	5426,43	6077,596	
								3717,00	A-005	AS	1+850	2+040	2+250		3717,00	1,110	4832,10	5363,631	
								2026,00	A-006	AI	2+350	2+410	2+490		2026,00	0,740	2633,80	1949,012	
								1370,00	A-006	AS	2+350	2+410	2+510		1370,00	0,740	1781,00	1317,940	
								22,00	A-007	AS	3+090	3+100	3+130		22,00	0,050	28,60	1,430	
								1735,44	A-008	AI	3+330	3+640	3+850		16820,00	0,490	2256,08	1105,477	
C-007	C2ª	1,00	2+490	2+740	3+010	10596,00	10596,00												

QUADRO DE ORIENTAÇÃO DA TERRAPLENAGEM

Rodovia: Grupo de Eixos 1	Homogeneização:	- Corte 1ª Categoria: 1,300	Vol. transp. : 111361,00m³
Trecho: Eixo1	- Aterro Camada Superior: 1,000	- Corte 2ª Categoria: 1,000	Momento tot.: 60363,57m³.m
Segmento: km: 0+000,00 ao km: 7+311,57	- Aterro Camada Inferior : 1,000	- Corte 3ª Categoria: 0,800	DMT : 0,542km

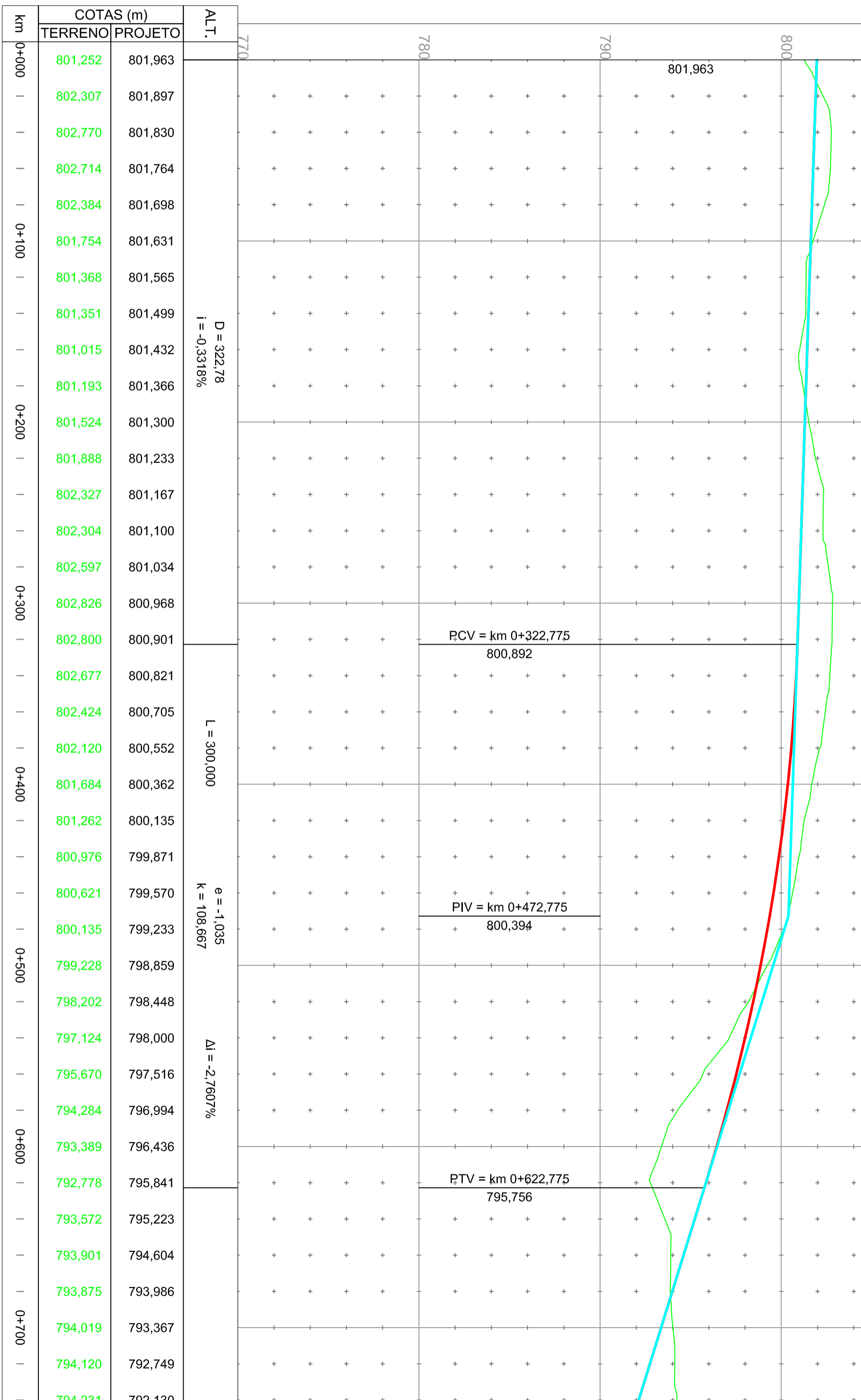
ORIGEM							DESTINO							TRANSPORTE			OBSERVAÇÕES			
IDENTIFICAÇÃO			LOCALIZAÇÃO				VOLUMES (m3)			IDENTIFICAÇÃO			LOCALIZAÇÃO			VOLUME		DIST. TRANSP.	VOL. COMP.	MOM. DE TRANSP.
ESPECIFICAÇÃO		FATOR	POSICIONAMENTO			DM (km)	GEO. TOTAL	HOMOGENEIZADO		ESPECIFICAÇÃO		POSICIONAMENTO			DM (km)					
ID	TIPO	HOMO.	INÍCIO	CM	FIM			TOTAL	TOTAL	PARC.	ID	TIPO	INÍCIO	CM		FIM		TOTAL		
C-007	C3ª	0,80	2+530	2+660	2+790	4682,00	5852,50	10596,00	A-008	AI	3+330	3+640	3+850		0,900	10596,00	9536,400			
								4488,56	A-008	AI	3+330	3+640	3+850		0,980	3590,85	3519,029			
								236,00	A-009	AI	4+010	4+030	4+070	236,00	1,370	188,80	258,656			
								397,00	A-009	AI	4+090	4+160	4+230		1,500	317,60	476,400			
								730,94	A-010	AI	4+370	4+510	4+650	10418,00	1,850	584,75	1081,795			
C-007	C3ª	0,80	2+890	2+950	3+010	483,00	603,75		A-010	AI	4+370	4+510	4+650		1,560	483,00	753,480			
								603,75												
C-008	C1ª	1,30	3+490	3+540	3+610	829,00	637,69		A-008	AS	3+310	3+620	3+850	5591,00	0,080	829,00	66,320			
								637,69												
C-009	C1ª	1,30	3+850	4+150	4+410	11225,00	8634,62		A-008	AS	3+310	3+620	3+850		0,530	6439,30	3412,829			
								4953,31	A-009	AS	4+010	4+110	4+270	1203,00	0,050	1563,90	78,195			
								1203,00	A-010	AI	4+370	4+510	4+650		0,360	3221,80	1159,848			
								2478,31												
C-010	C1ª	1,30	4+570	4+750	4+890	10472,00	8055,38		A-010	AI	4+370	4+510	4+650		0,240	8586,50	2060,760			
								6605,00	A-010	AS	4+350	4+510	4+670	3612,00	0,240	1885,50	452,520			
								1450,38												
C-011	C1ª	1,30	4+930	5+090	5+390	11799,00	9076,15		A-010	AS	4+350	4+510	4+670		0,580	2810,10	1629,858			
								2161,62	A-011	AI	4+850	4+900	4+950	1108,00	0,190	1440,40	273,676			
								1108,00	A-011	AS	4+850	4+900	4+950	810,00	0,190	1053,00	200,070			
								810,00	A-012	AI	5+210	5+400	5+510	2161,00	0,310	2809,30	870,883			
								2161,00	A-012	AS	5+170	5+380	5+530	2167,00	0,290	2817,10	816,959			
								2167,00	A-013	AI	5+650	5+660	5+670	46,00	0,570	59,80	34,086			
								46,00	A-013	AI	5+710	5+820	5+950		0,730	809,30	590,789			
								622,54												
C-012	C1ª	1,30	5+490	5+630	5+750	3212,00	2470,77		A-013	AI	5+710	5+820	5+950		0,190	3212,00	610,280			
								2470,77												
C-013	C1ª	1,30	5+970	6+000	6+070	36,00	27,69		A-013	AI	5+710	5+820	5+950		0,180	36,00	6,480			
								27,69												
C-014	C1ª	1,30	6+150	6+230	6+350	1478,00	1136,92		A-013	AI	5+710	5+820	5+950		0,410	1478,00	605,980			
								1136,92												
C-015	C1ª	1,30	6+430	6+510	6+630	4301,00	3308,46		A-013	AI	5+710	5+820	5+950		0,690	1861,70	1284,573			
								1432,08	A-013	AI	6+010	6+100	6+150		0,410	596,70	244,647			
								459,00	A-013	AS	5+610	5+900	6+170	3872,00	0,610	1842,60	1123,986			
								1417,38												
C-016	C1ª	1,30	6+690	6+870	7+050	11883,00	9140,77		A-013	AS	5+610	5+900	6+170		0,970	3191,00	3095,270			
								2454,62	A-014	AI	6+250	6+390	6+450	2118,00	0,480	2753,40	1321,632			
								2118,00	A-014	AS	6+210	6+360	6+470	1406,00	0,510	1827,80	932,178			
								1406,00	A-015	AI	6+590	6+640	6+690	580,00	0,230	754,00	173,420			
								580,00	A-015	AS	6+570	6+640	6+710	884,00	0,230	1149,20	264,316			
								884,00	A-016	AI	7+050	7+100	7+170	1299,00	0,230	1688,70	388,401			
								1299,00	A-016	AS	7+030	7+100	7+190	1114,00	0,230	518,90	119,347			
								399,15												

QUADRO DE ORIENTAÇÃO DA TERRAPLENAGEM

Rodovia: Grupo de Eixos 1	Homogeneização:	- Corte 1ª Categoria: 1,300	Vol. transp. : 111361,00m³
Trecho: Eixo1	- Aterro Camada Superior: 1,000	- Corte 2ª Categoria: 1,000	Momento tot.: 60363,57m³.m
Segmento: km: 0+000,00 ao km: 7+311,57	- Aterro Camada Inferior : 1,000	- Corte 3ª Categoria: 0,800	DMT : 0,542km

ORIGEM							DESTINO							TRANSPORTE			OBSERVAÇÕES				
IDENTIFICAÇÃO			LOCALIZAÇÃO				VOLUMES (m3)			IDENTIFICAÇÃO			LOCALIZAÇÃO					VOLUME	DIST.	VOL.	MOM. DE
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-017	C1ª	1,30	7+150	7+210	7+312		1131,00	870,00													
								714,85		A-016	AS	7+030	7+100	7+190			0,110	929,30	102,223		
								155,15		A-017	AS	7+250	7+280	7+312		156,00	0,070	201,70	14,119		

■ Esquema Linear de Distribuição dos Materiais



D = 322,78
i = -0,3318%

L = 300,000

e = -1,035
k = 108,667

Δi = -2,7607%

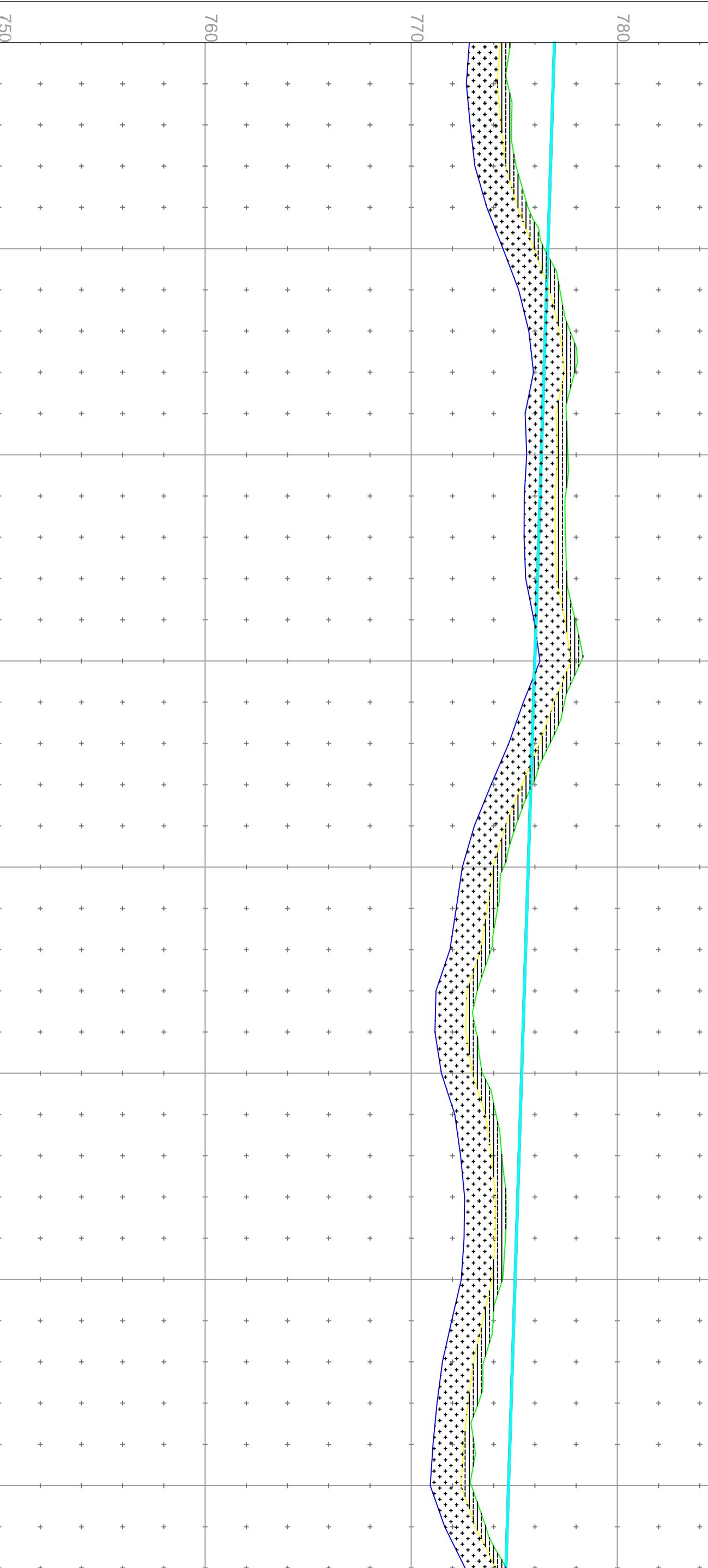
PCV = km 0+322,775
800,892

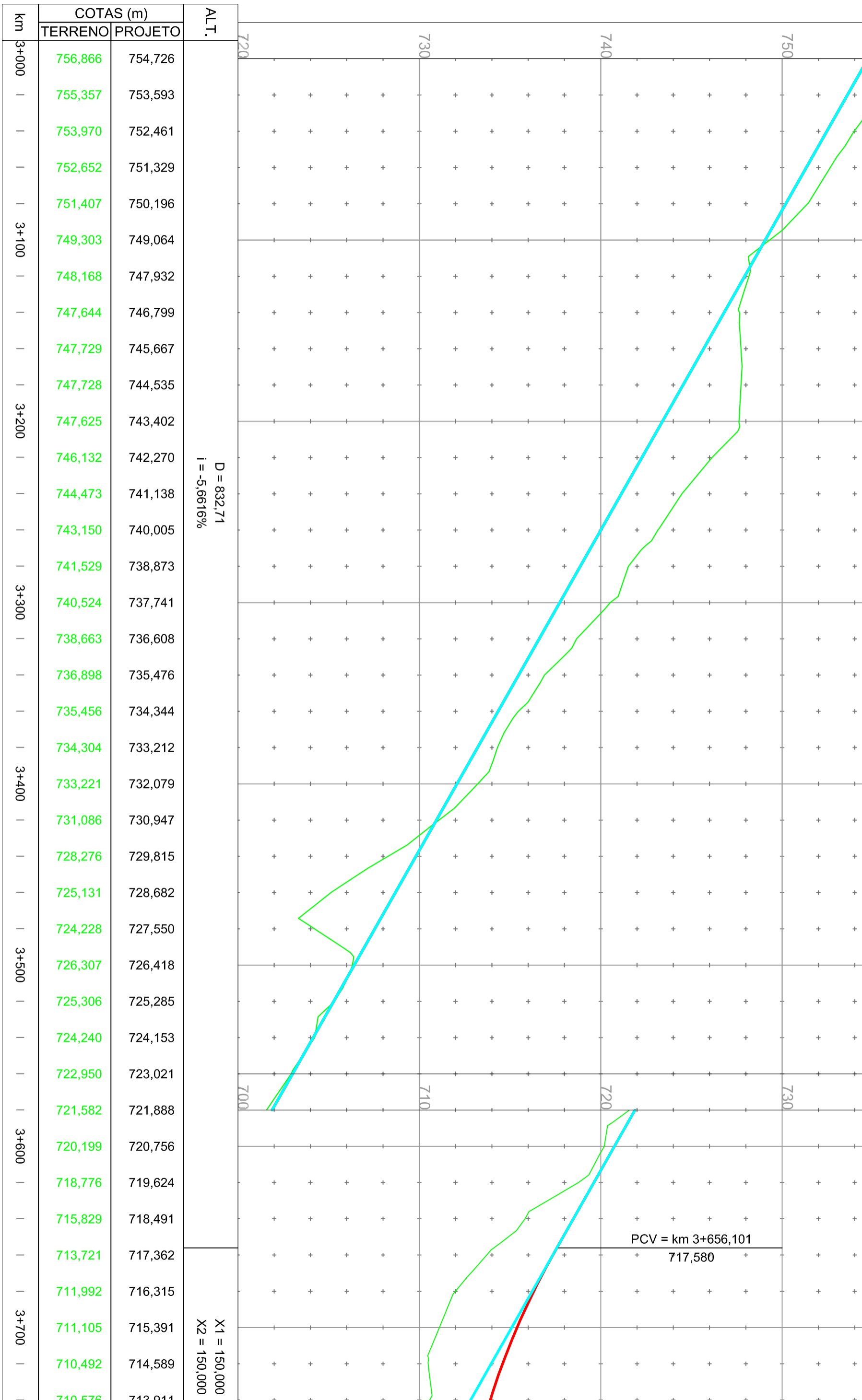
PIV = km 0+472,775
800,394

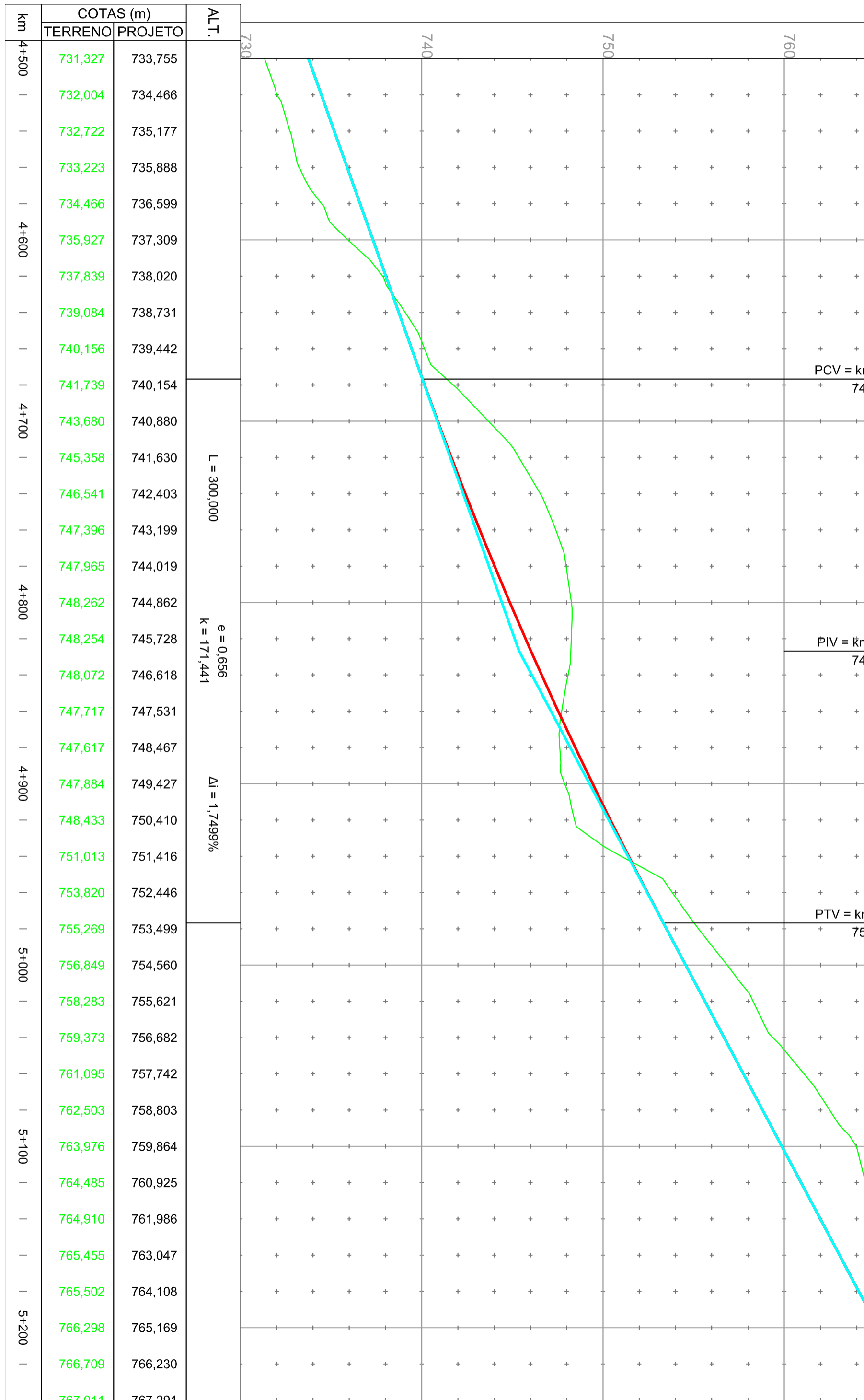
PTV = km 0+622,775
795,756

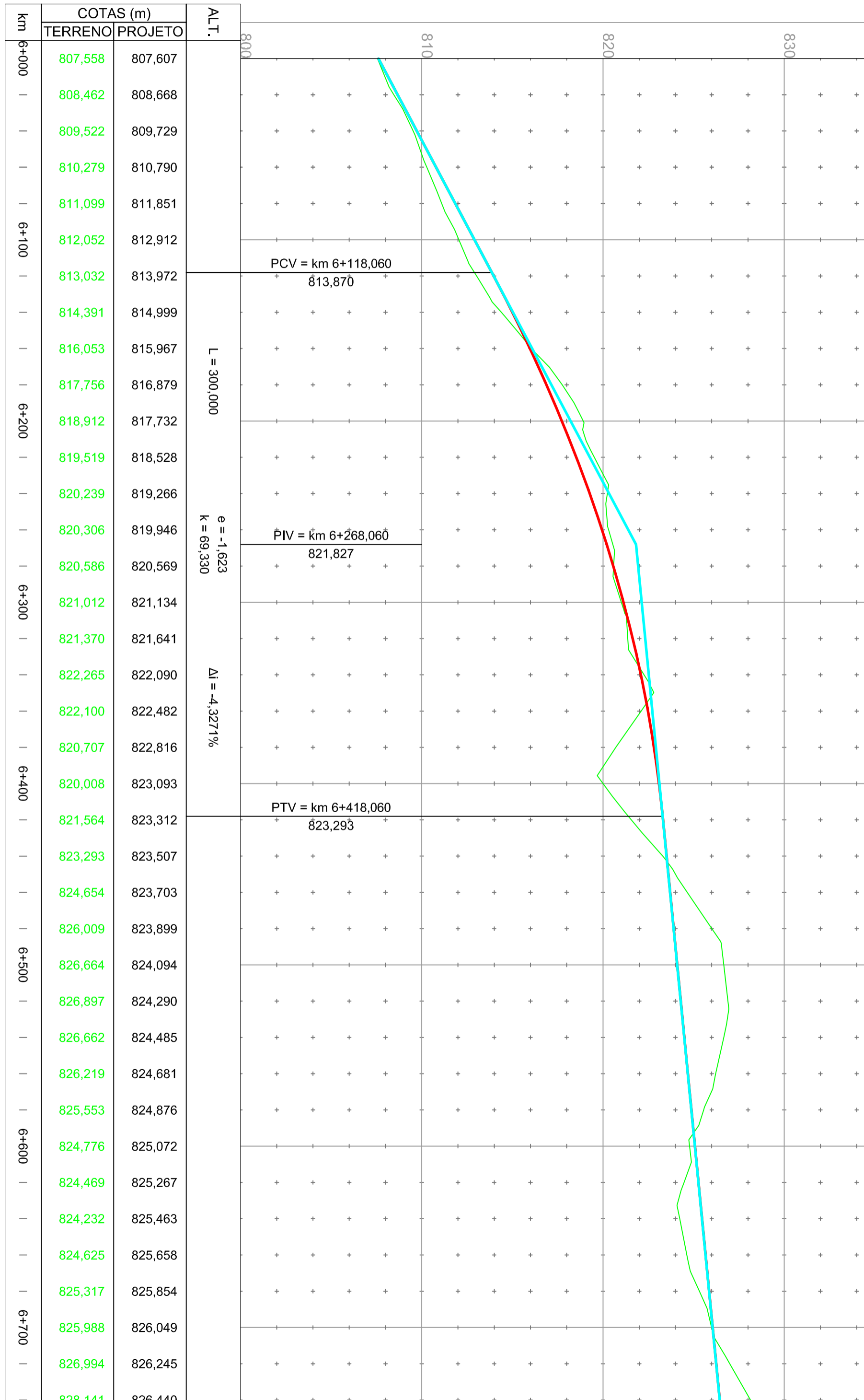
801,963

km	COTAS (m)		ALT.
	TERRENO	PROJETO	
1+500	774,824	776,949	D = 1173,36 i = -0,3181%
-	774,676	776,886	
-	774,863	776,822	
-	775,089	776,759	
-	775,665	776,695	
1+600	776,454	776,631	
-	777,217	776,568	
-	777,708	776,504	
-	777,936	776,440	
-	777,525	776,377	
1+700	777,602	776,313	
-	777,488	776,250	
-	777,480	776,186	
-	777,552	776,122	
-	777,954	776,059	
1+800	778,251	775,995	
-	777,441	775,931	
-	776,732	775,868	
-	775,879	775,804	
-	775,068	775,741	
1+900	774,481	775,677	
-	774,187	775,613	
-	773,877	775,550	
-	773,198	775,486	
-	773,150	775,422	
2+000	773,462	775,359	
-	774,112	775,295	
-	774,395	775,232	
-	774,594	775,168	
-	774,568	775,104	
2+100	774,430	775,041	
-	773,968	774,977	
-	773,516	774,914	
-	773,255	774,850	
-	773,056	774,786	
2+200	772,919	774,723	
-	773,626	774,659	
-	774,615	774,595	









PROJETOS COMPLEMENTARES

4 PROJETOS COMPLEMENTARES

No presente projeto, não houve necessidade de projetos complementares como obras de arte especiais ou muro de arrimo.