Governor's Office of the Capital City

INTEGRATED PROJECT MANAGEMENT OFFICE

CSCEC AECOM Consultants Co., Ltd

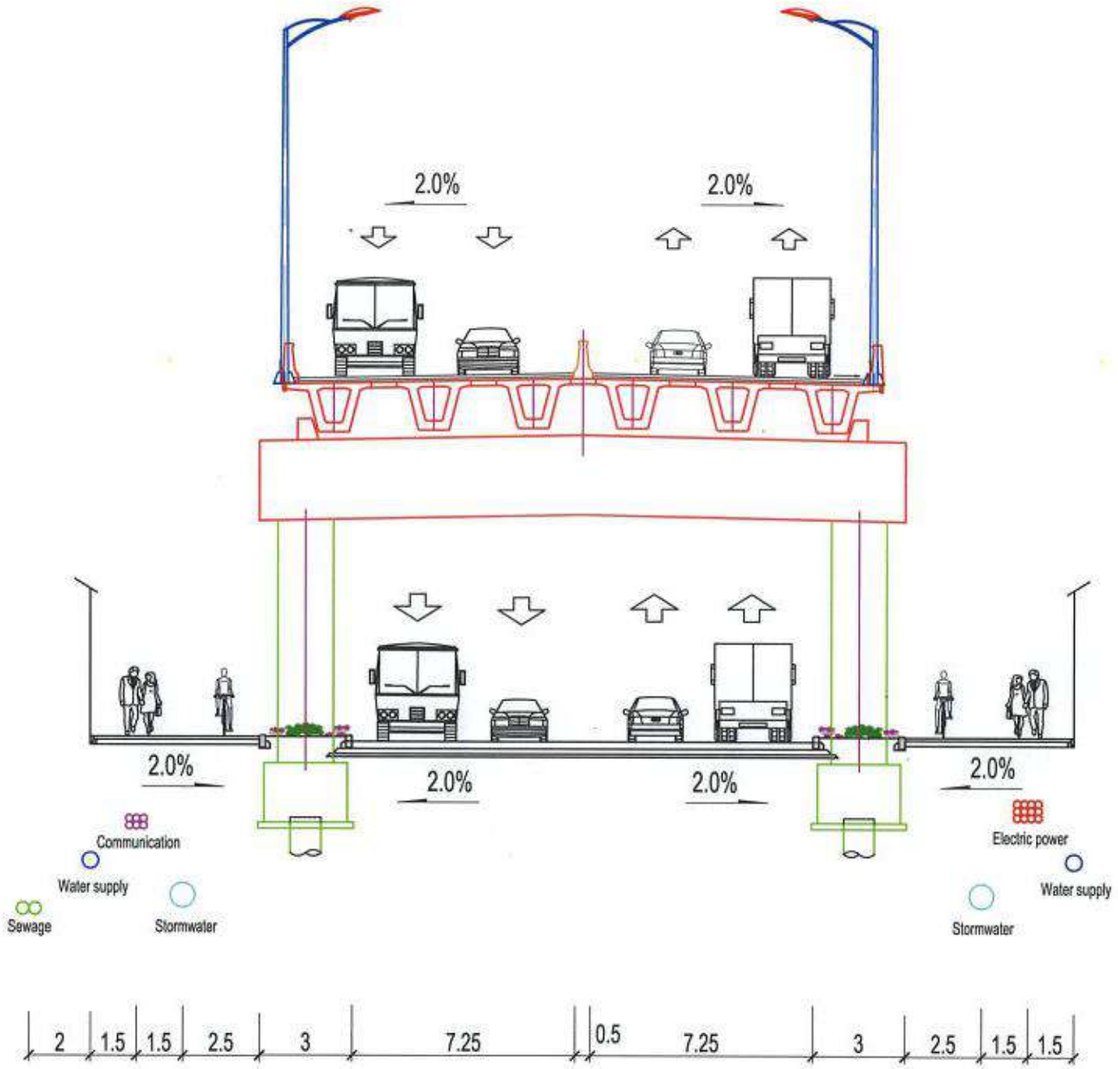
FEASIBILITY STUDY & CONCEPT DESIGN

"FIRST RING ROAD" project

"Engineering infrastructure & landschaft" Concept design Volume IV-IV

Ulaanbaatar

2025



Standard Cross-section Layout of the Utility Tunnel for a 32 m-wide Road

1:200

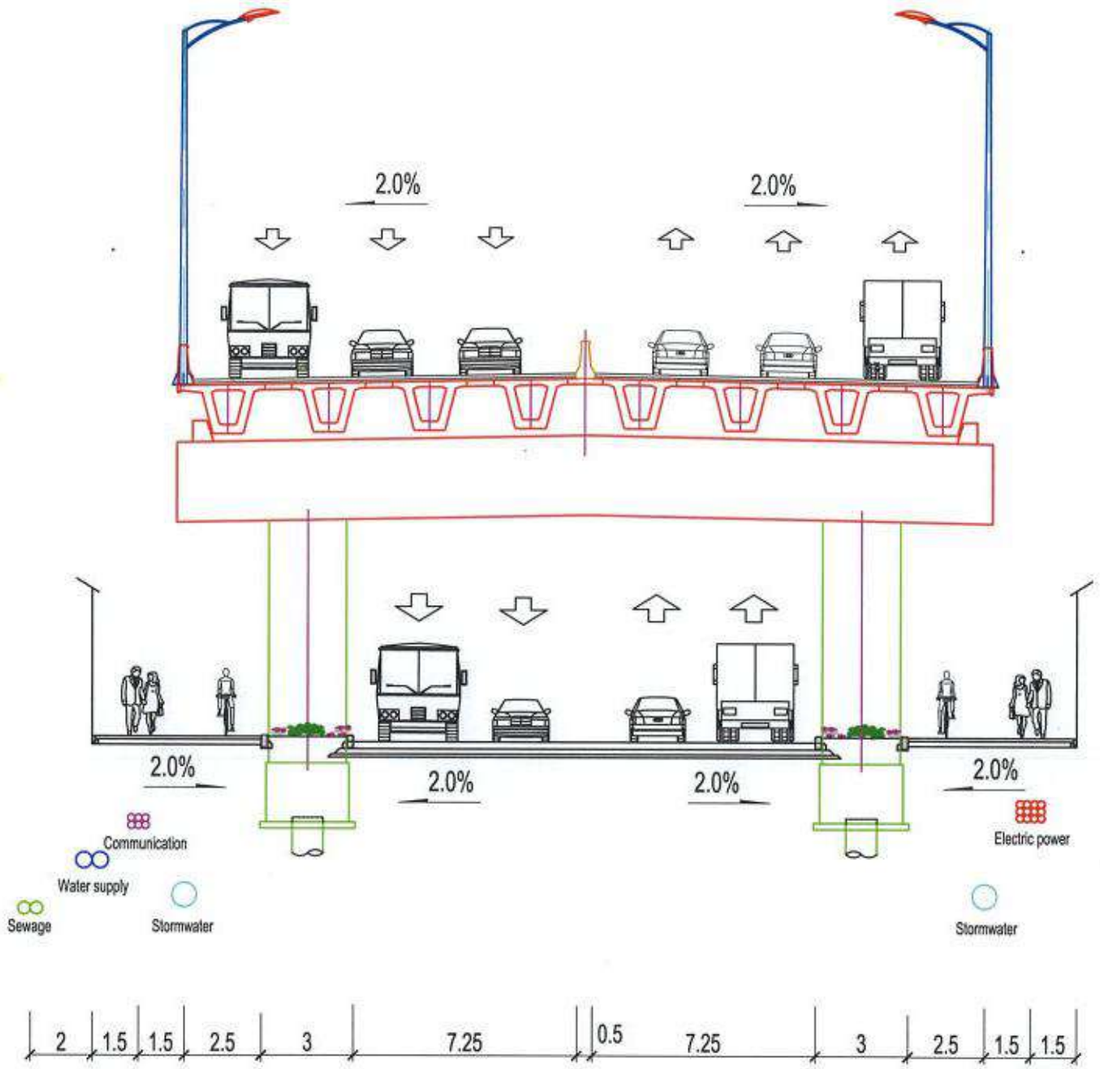
K0+380~K1+080

Description:

1、The drawing is designed for feasibility research.

2、A detailed design is to be carried out in the construction drawing stage.

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	–
		Standard Cross-section Layout of the Utility Tunnel				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-01
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Standard Cross-section Layout of the Utility Tunnel for a 32 m-wide Road

1:200

K1+080~K1+850

Description:

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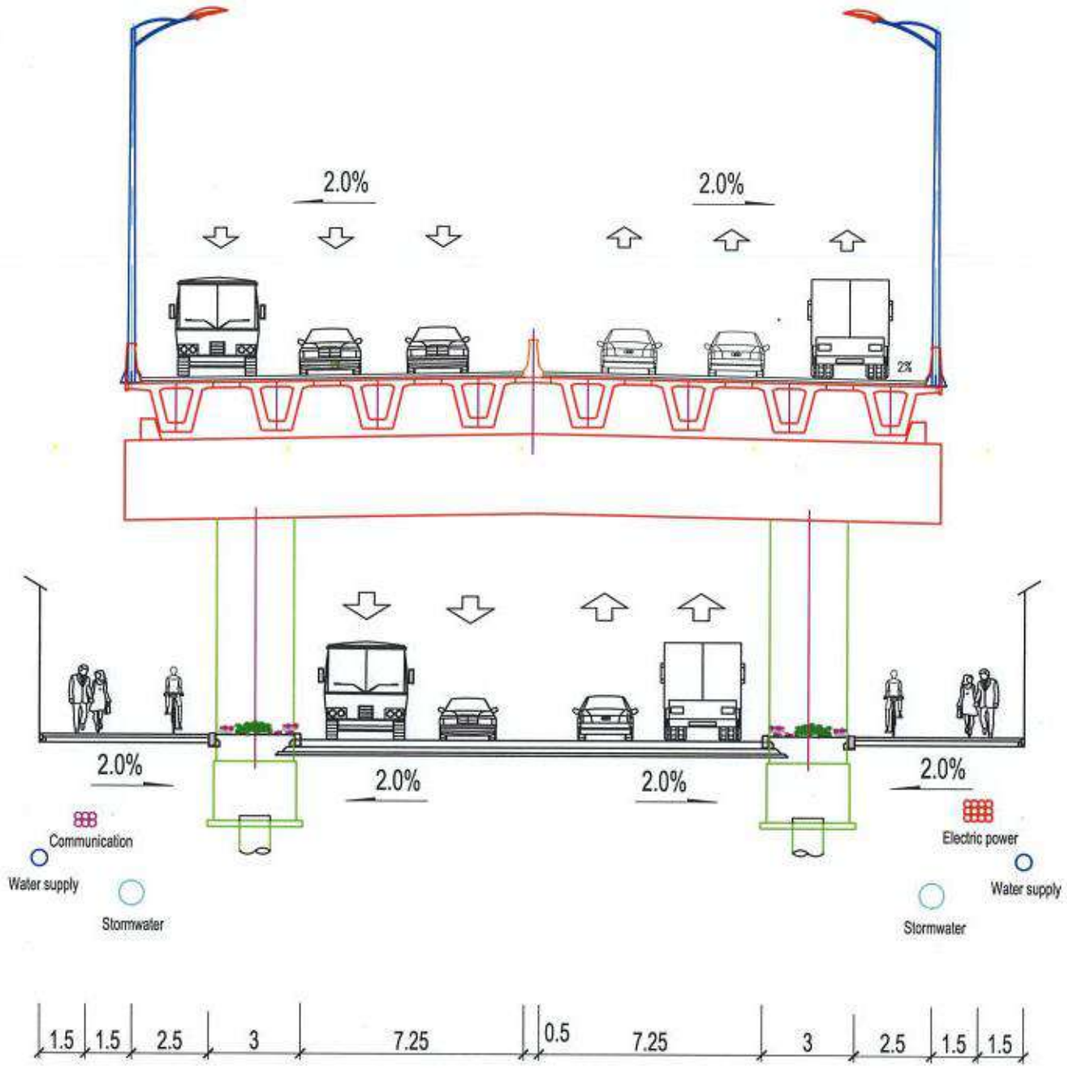
		Standard Cross-section Layout of the Utility Tunnel				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-01
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Standard Cross-section Layout of the Utility Tunnel for a 32 m-wide Road

1:200

K1+850~K3+240

Description:

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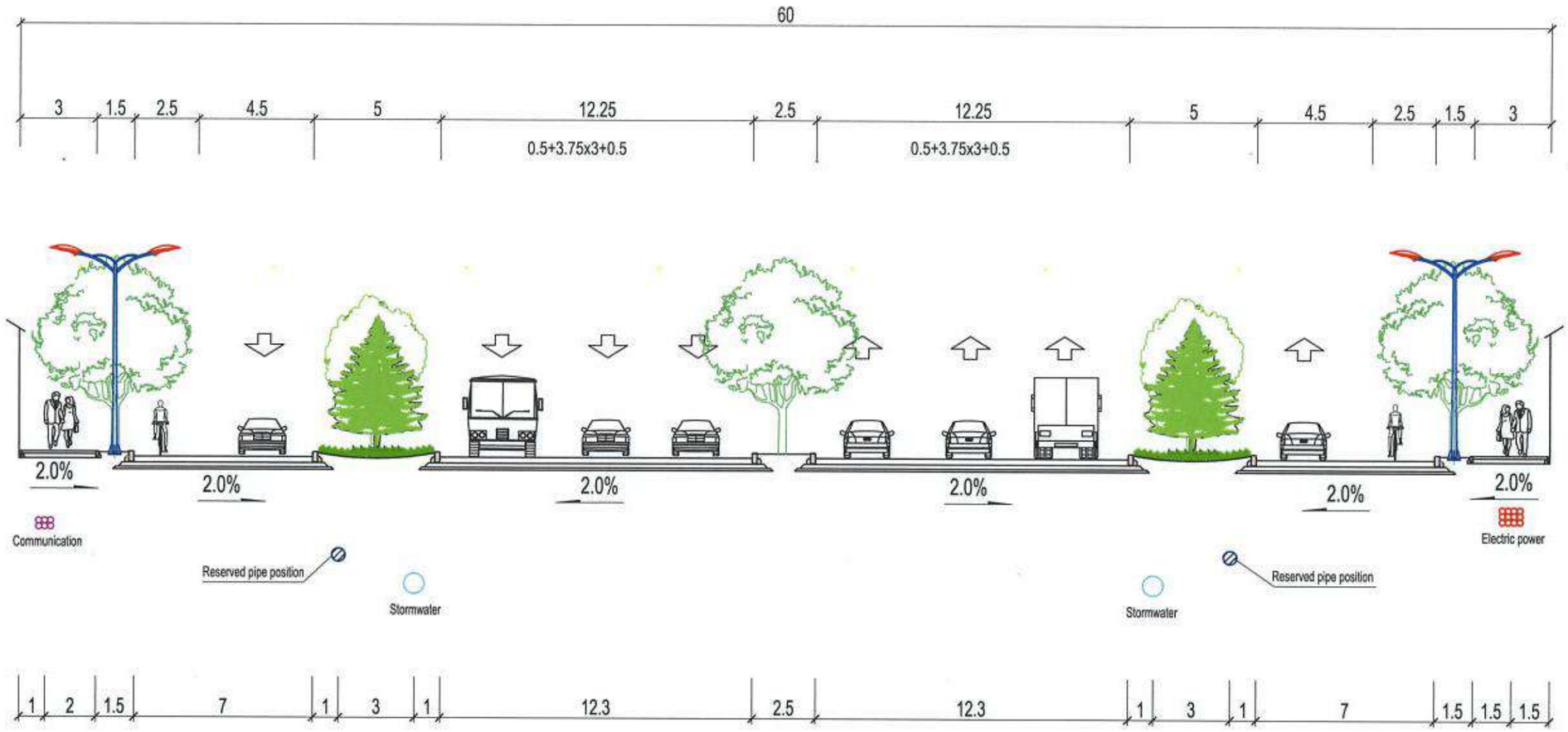
		Standard Cross-section Layout of the Utility Tunnel				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-01
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Standard Cross-section Layout of the Utility Tunnel for a 60 m-wide Road

1:200

Suitable for 60 m standard section
（Recommended scheme）

Description:

1、The drawing is designed for feasibility research.
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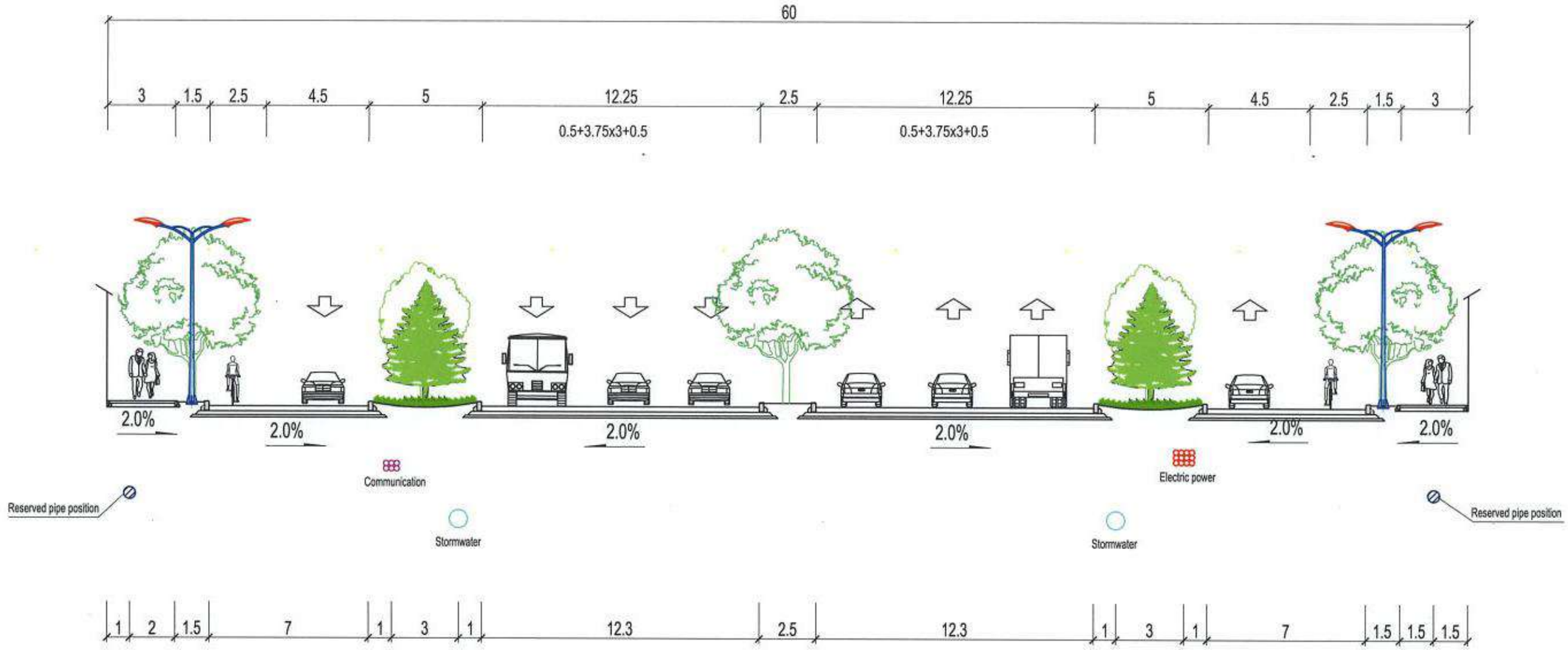
		Standard Cross-section Layout of the Utility Tunnel				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-01
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Standard Cross-section Layout of the Utility Tunnel for a 60 m-wide Road

1:200

Suitable for 60 m standard section
（Alternative scheme）

Description:

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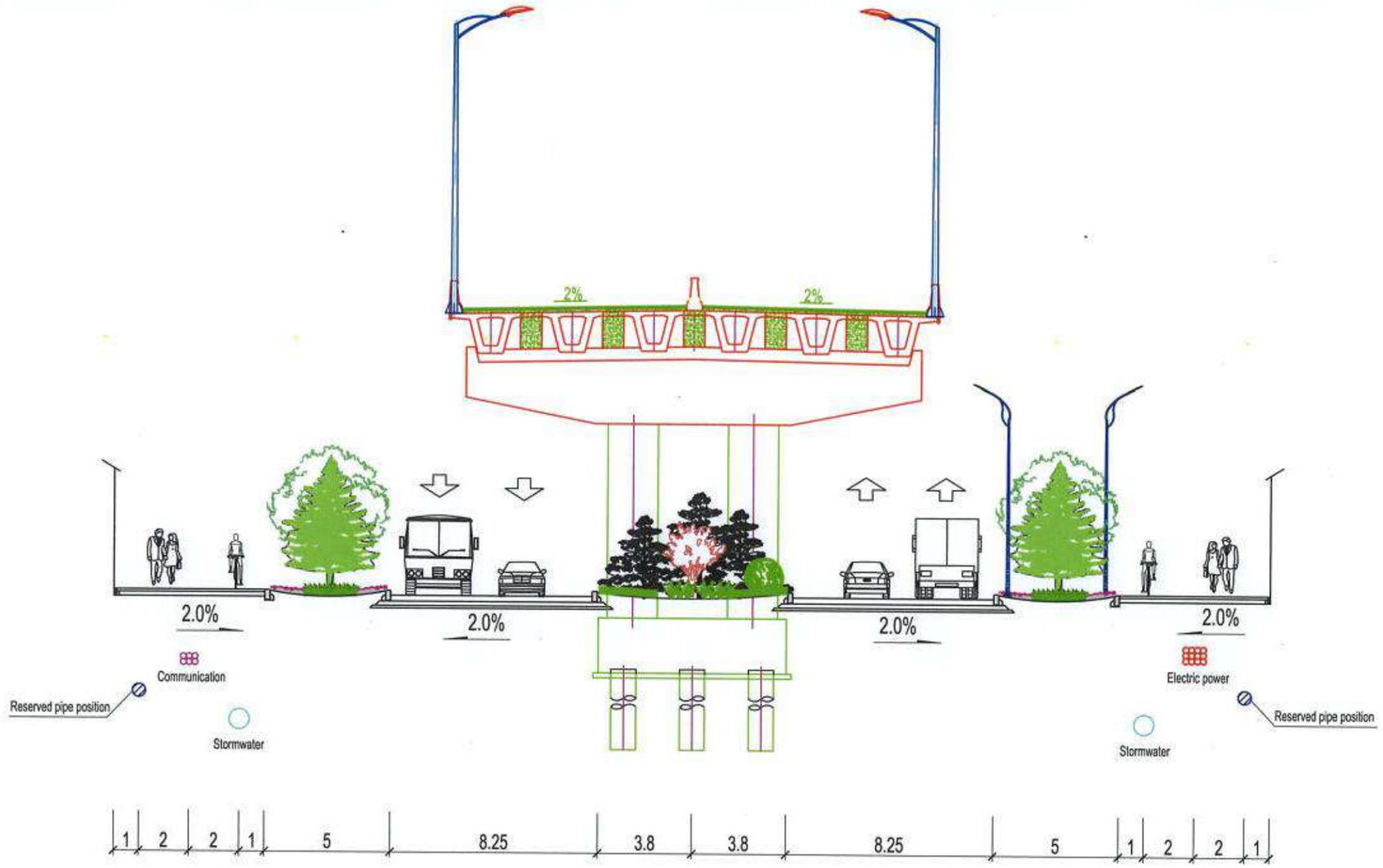
		Standard Cross-section Layout of the Utility Tunnel				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-01
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Standard Cross-section Layout of the Utility Tunnel for a 45 m-wide Road

1:200

Suitable for 45 m standard section

Description:

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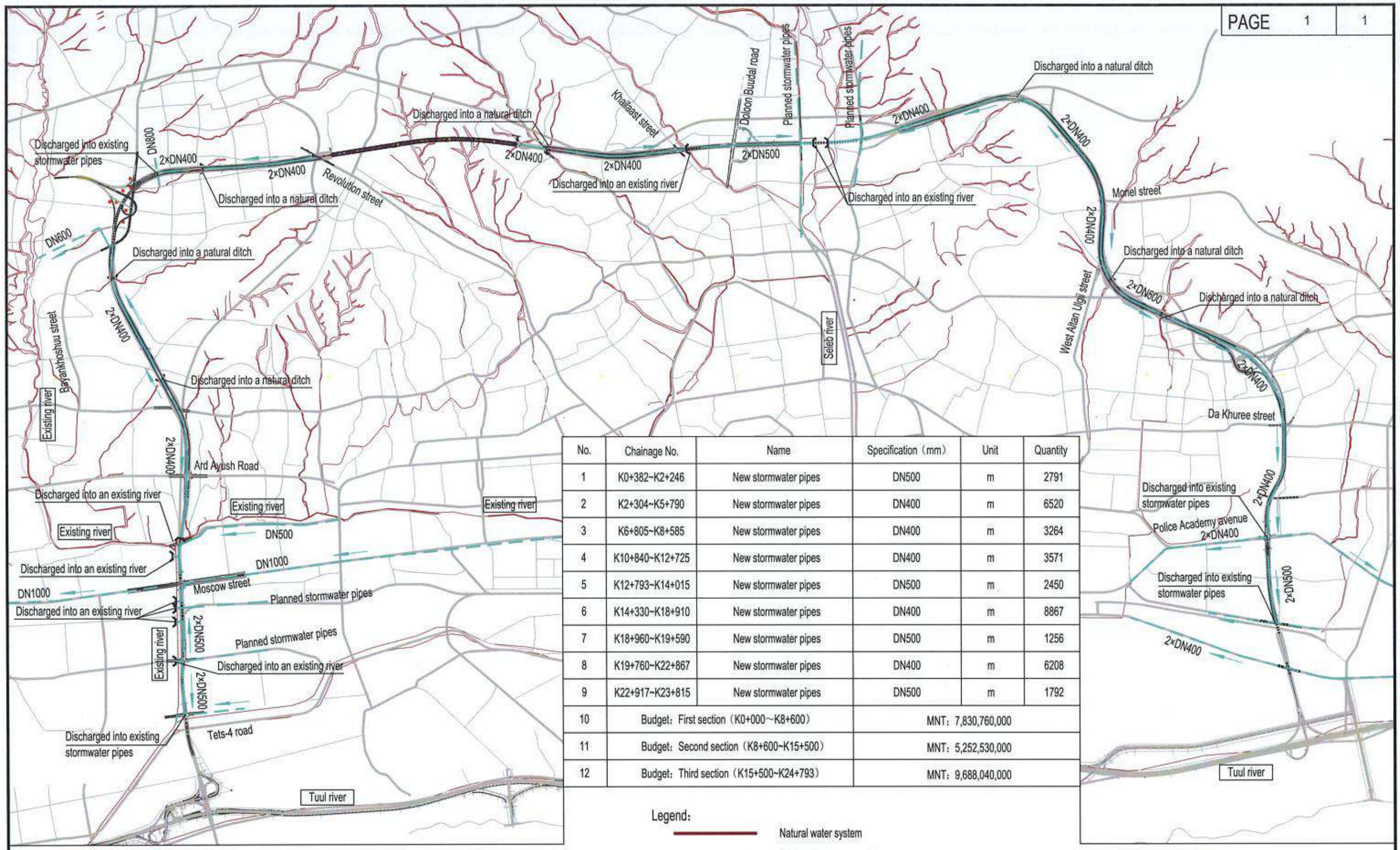
		Standard Cross-section Layout of the Utility Tunnel				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-01
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



No.	Chainage No.	Name	Specification (mm)	Unit	Quantity
1	K0+382~K2+246	New stormwater pipes	DN500	m	2791
2	K2+304~K5+790	New stormwater pipes	DN400	m	6520
3	K6+805~K8+585	New stormwater pipes	DN400	m	3264
4	K10+840~K12+725	New stormwater pipes	DN400	m	3571
5	K12+793~K14+015	New stormwater pipes	DN500	m	2450
6	K14+330~K18+910	New stormwater pipes	DN400	m	8867
7	K18+960~K19+590	New stormwater pipes	DN500	m	1256
8	K19+760~K22+867	New stormwater pipes	DN400	m	6208
9	K22+917~K23+815	New stormwater pipes	DN500	m	1792
10	Budget: First section (K0+000~K8+600)		MNT: 7,830,760,000		
11	Budget: Second section (K8+600~K15+500)		MNT: 5,252,530,000		
12	Budget: Third section (K15+500~K24+793)		MNT: 9,688,040,000		

Legend:

- Natural water system
- Designed stormwater pipes
- Planned stormwater pipes
- Existing stormwater pipes
- DN300 — Pipe diameter
- Flow direction
- Discharge outlet
- Tuul river — Name of the river

Description:

1、The drawing is designed for feasibility research
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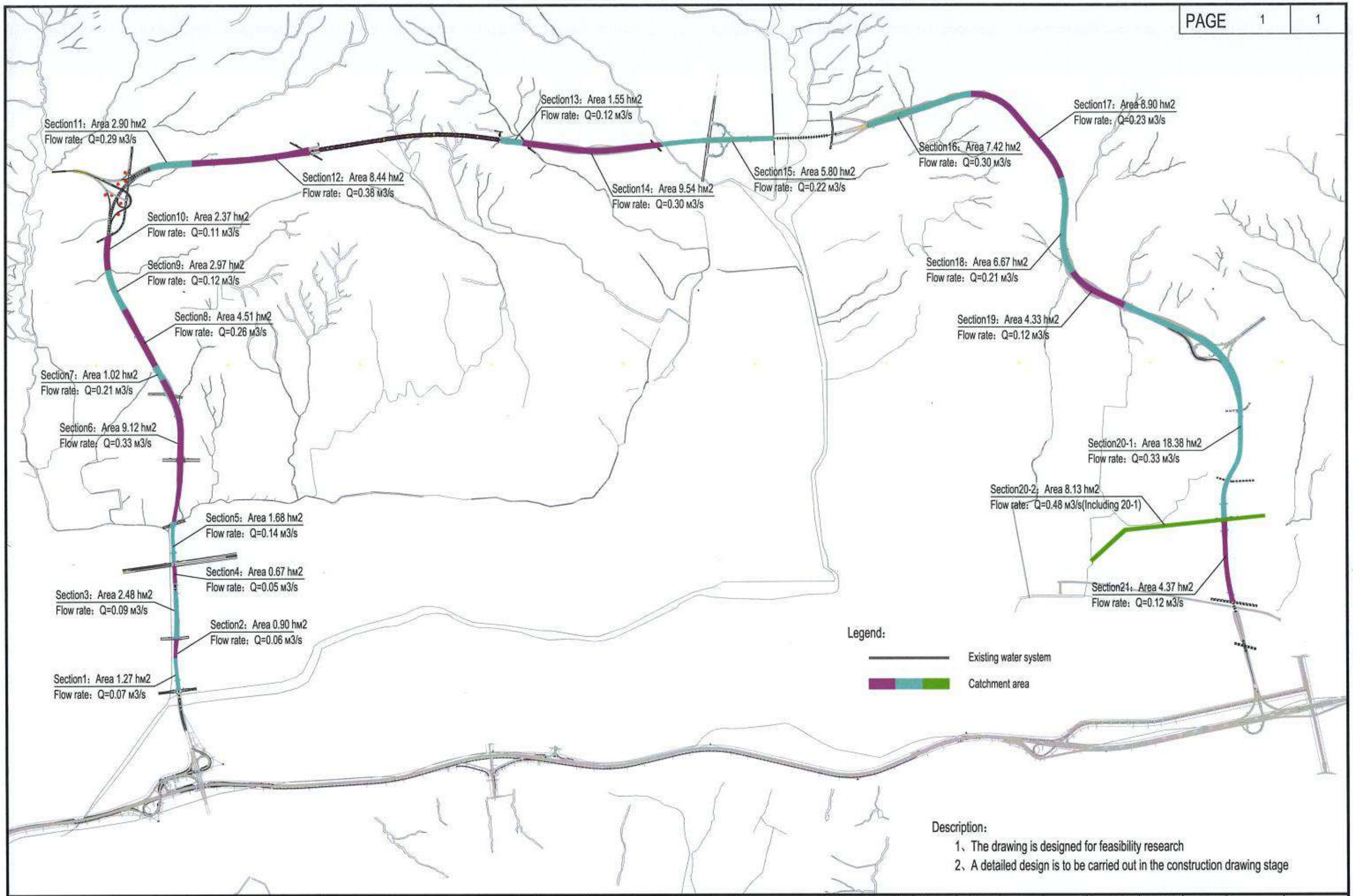
3、K0~K24 are road Chainage No.

中国市政工程西北设计研究院有限公司
CSCEC AECOM CONSULTANTS CO., LTD

The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City

Stormwater Drainage System Drawing

DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE –
				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO. IV-04
				MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG	
				SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE 2025.07



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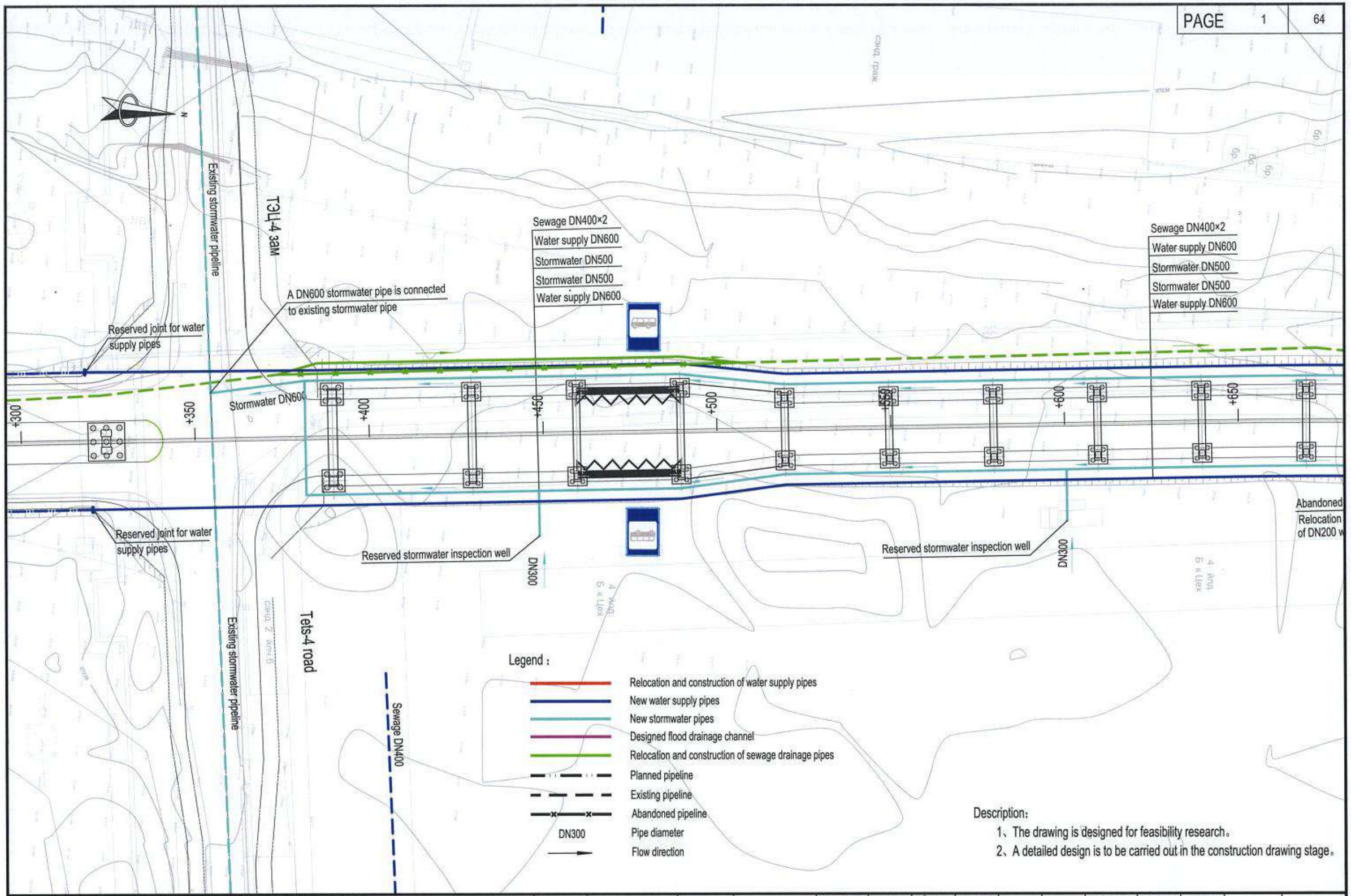
		Stormwater catchment area drawing				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-05
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Description:

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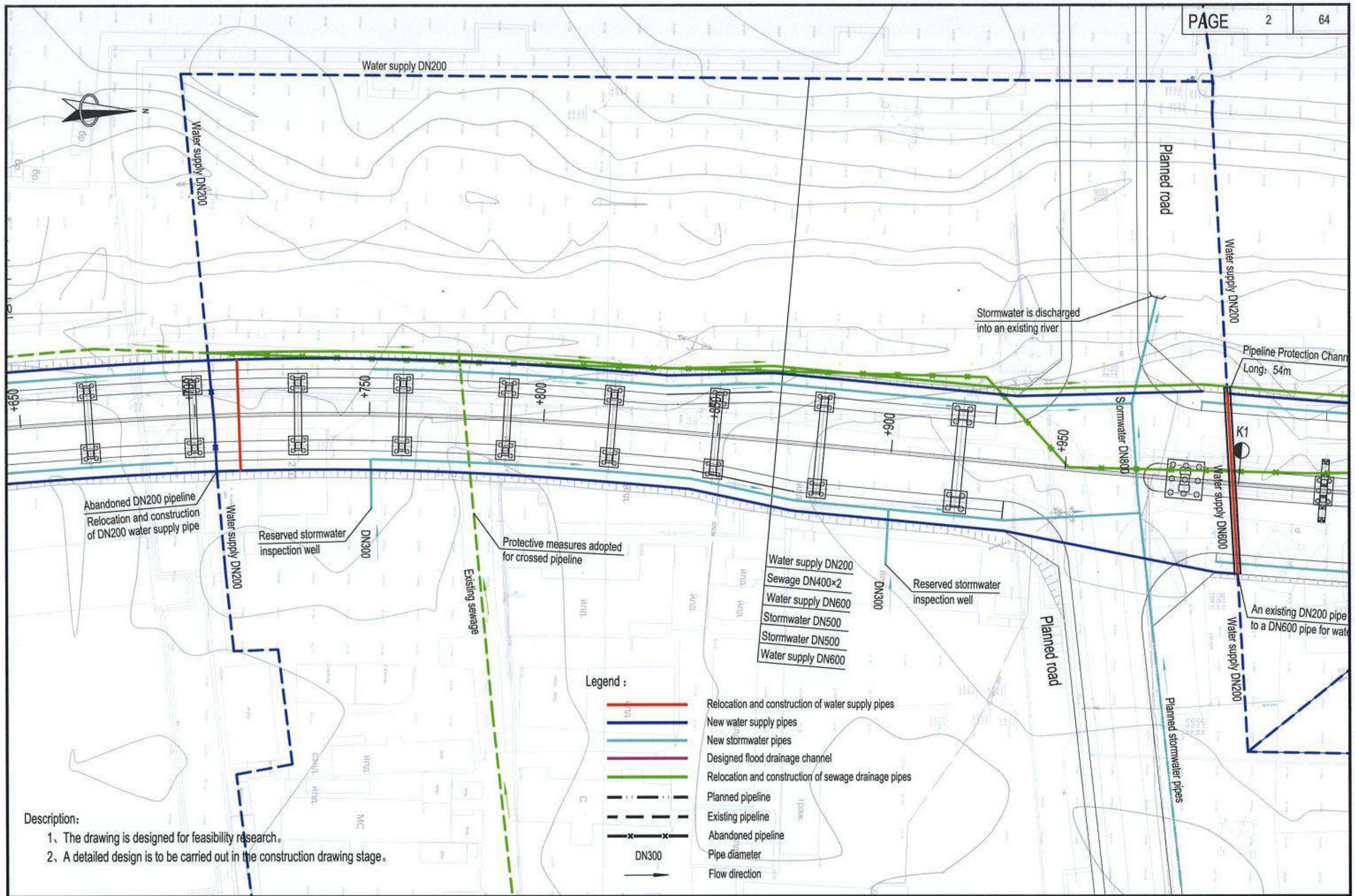
		Layout plan of water supply and drainage pipelines (K0+300~K0+650)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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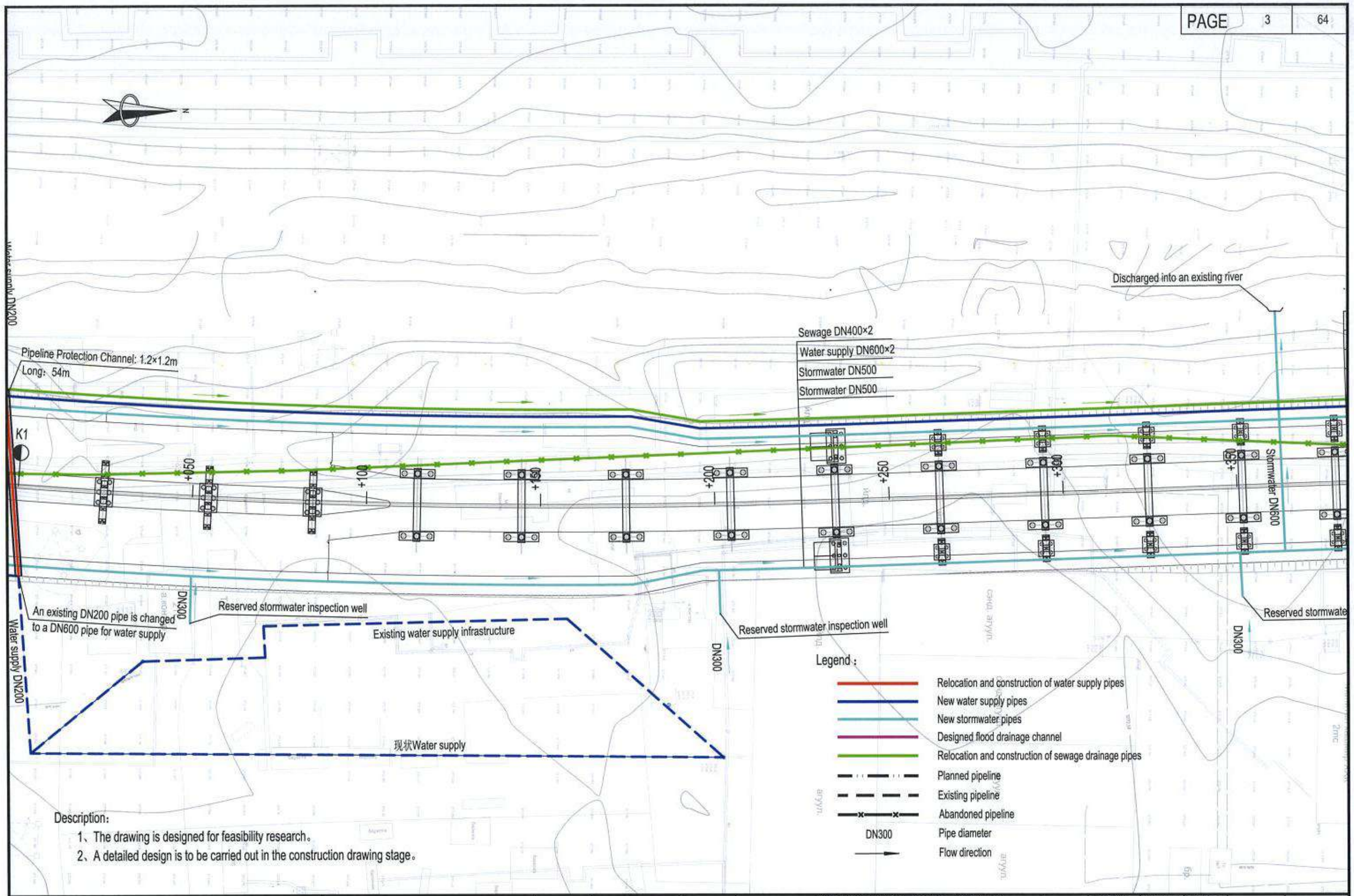
		Layout plan of water supply and drainage pipelines (K0+650~K1+000)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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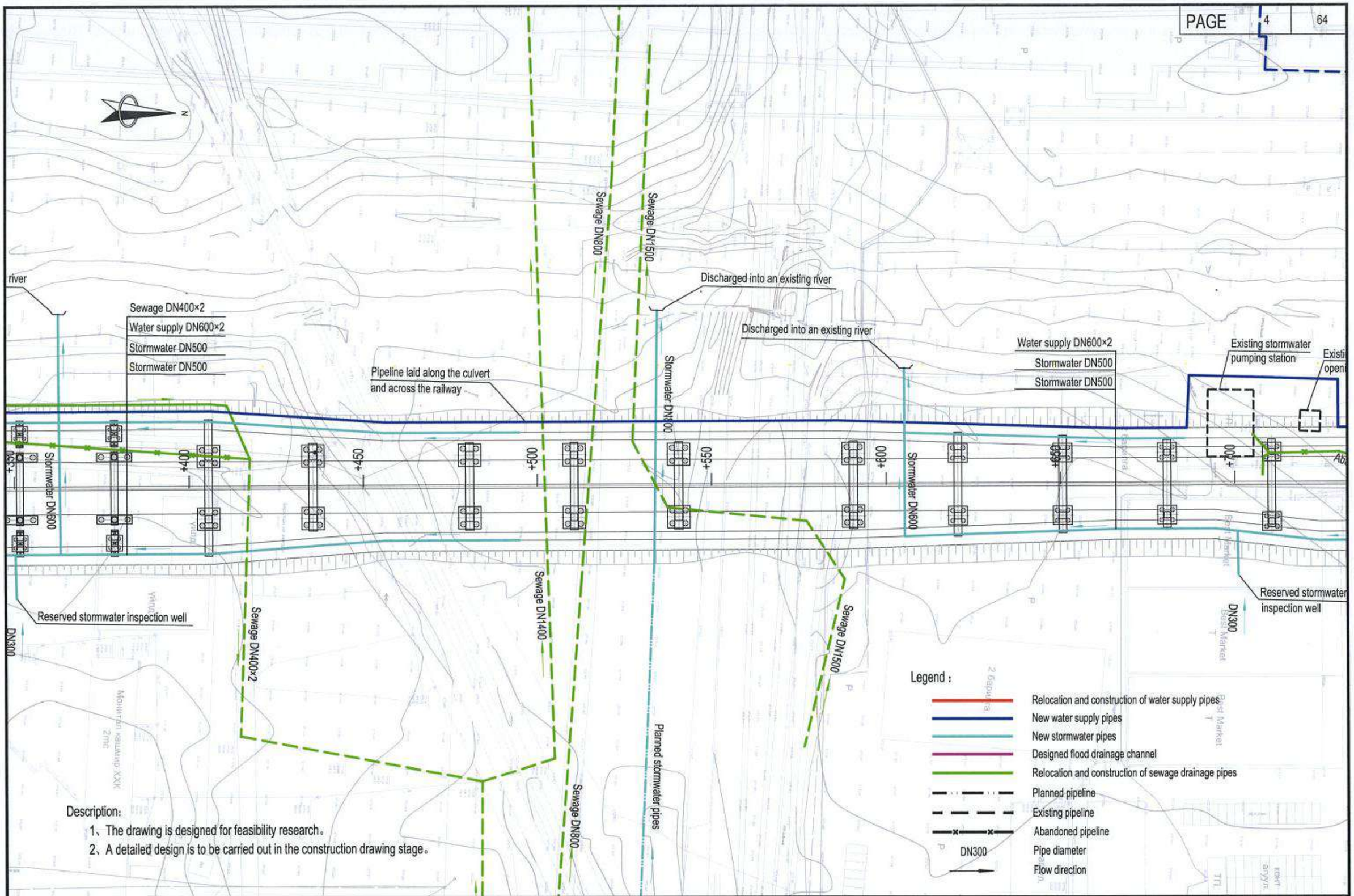
		Layout plan of water supply and drainage pipelines (K1+000~K1+350)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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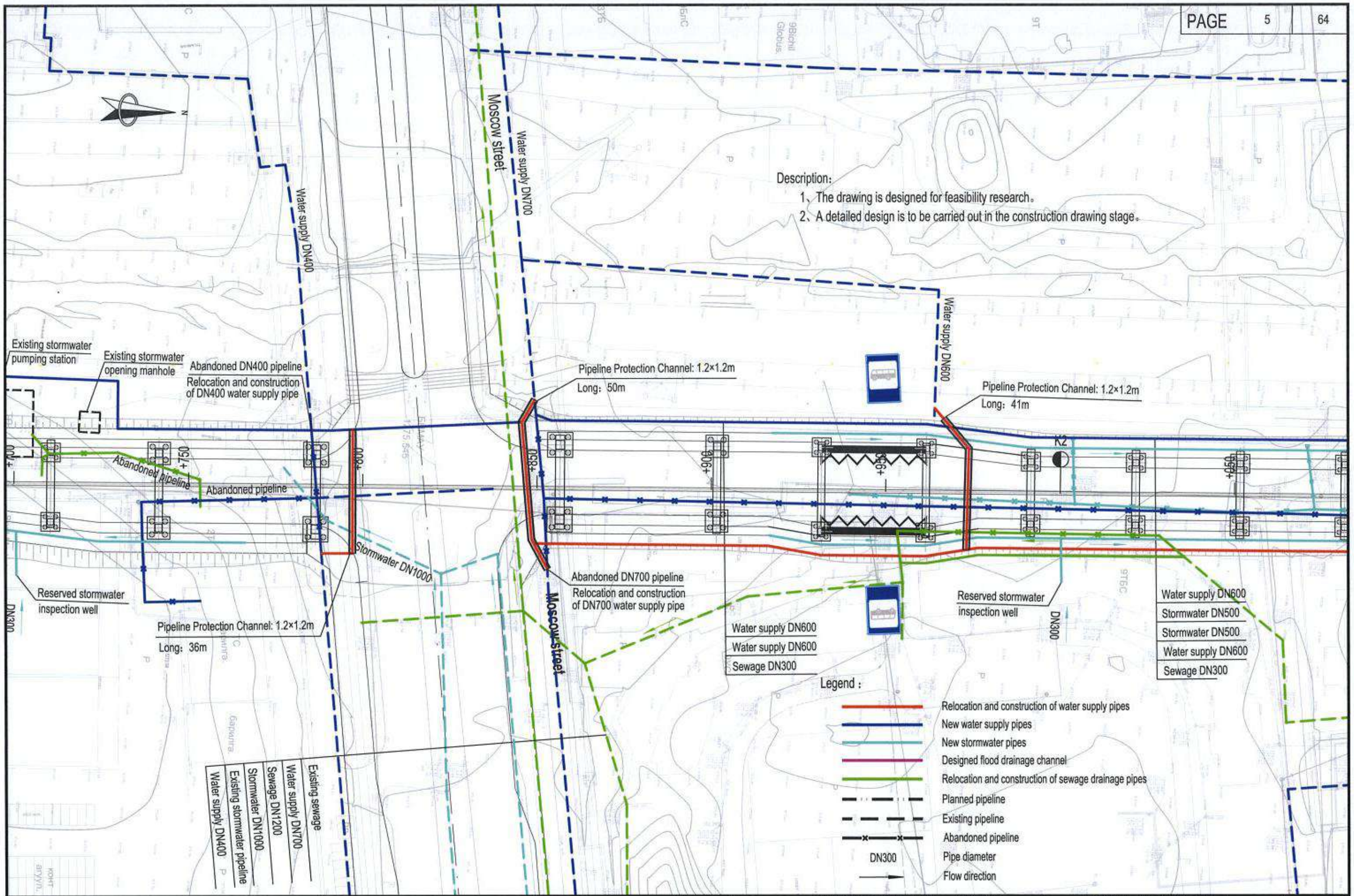
		Layout plan of water supply and drainage pipelines (K1+350~K1+700)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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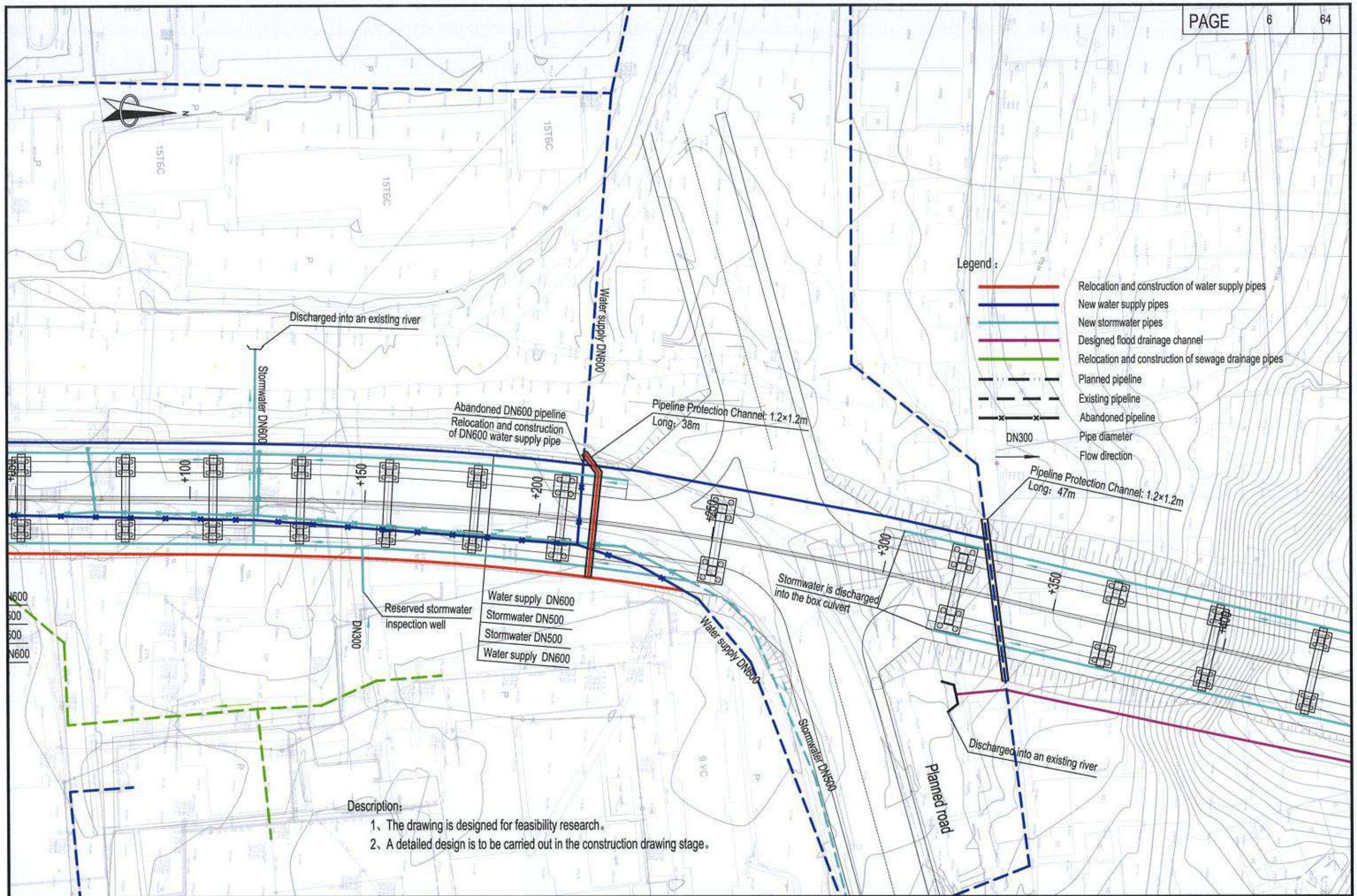
		Layout plan of water supply and drainage pipelines (K1+700~K2+050)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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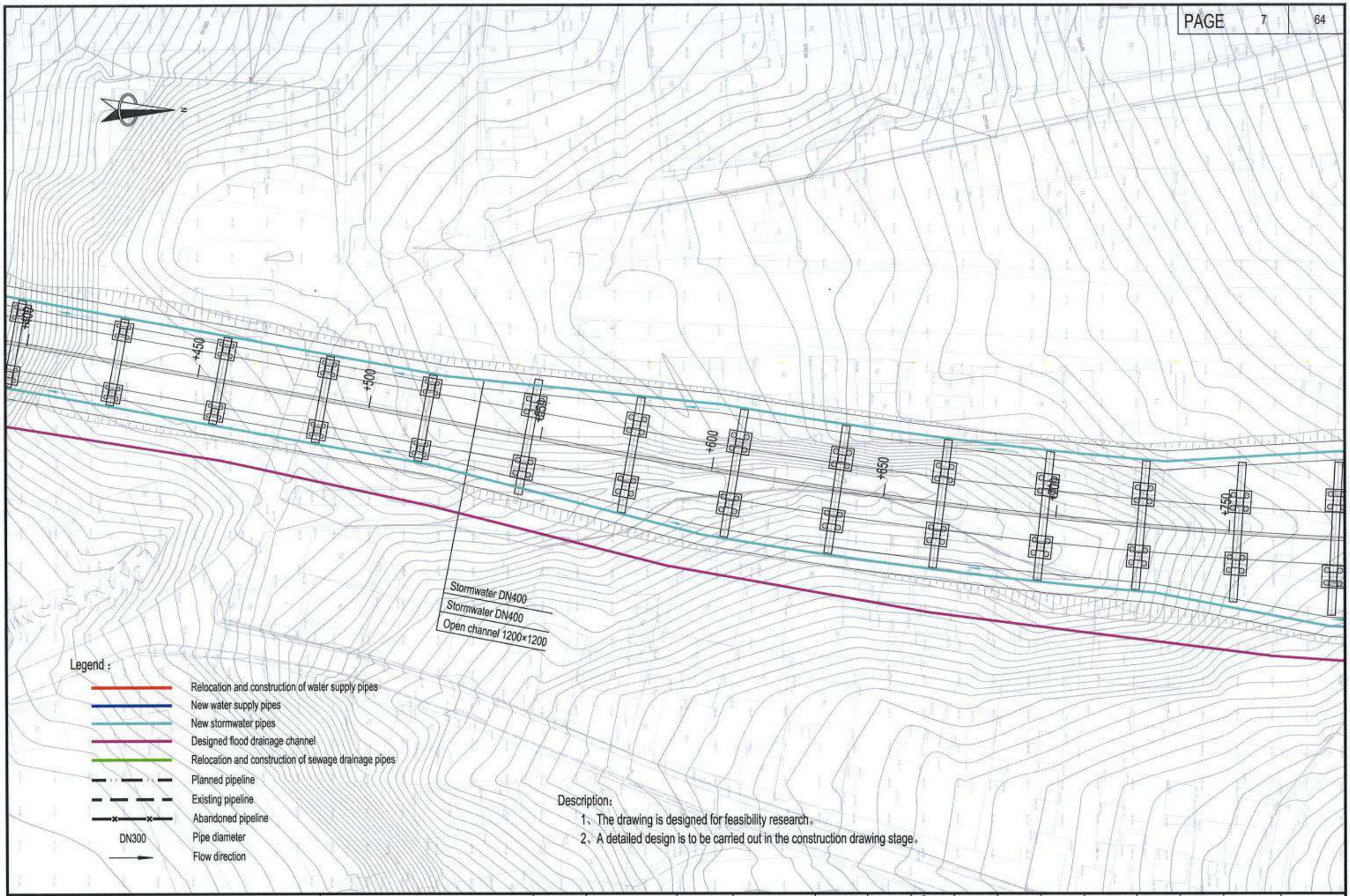
		Layout plan of water supply and drainage pipelines (K2+050~K2+400)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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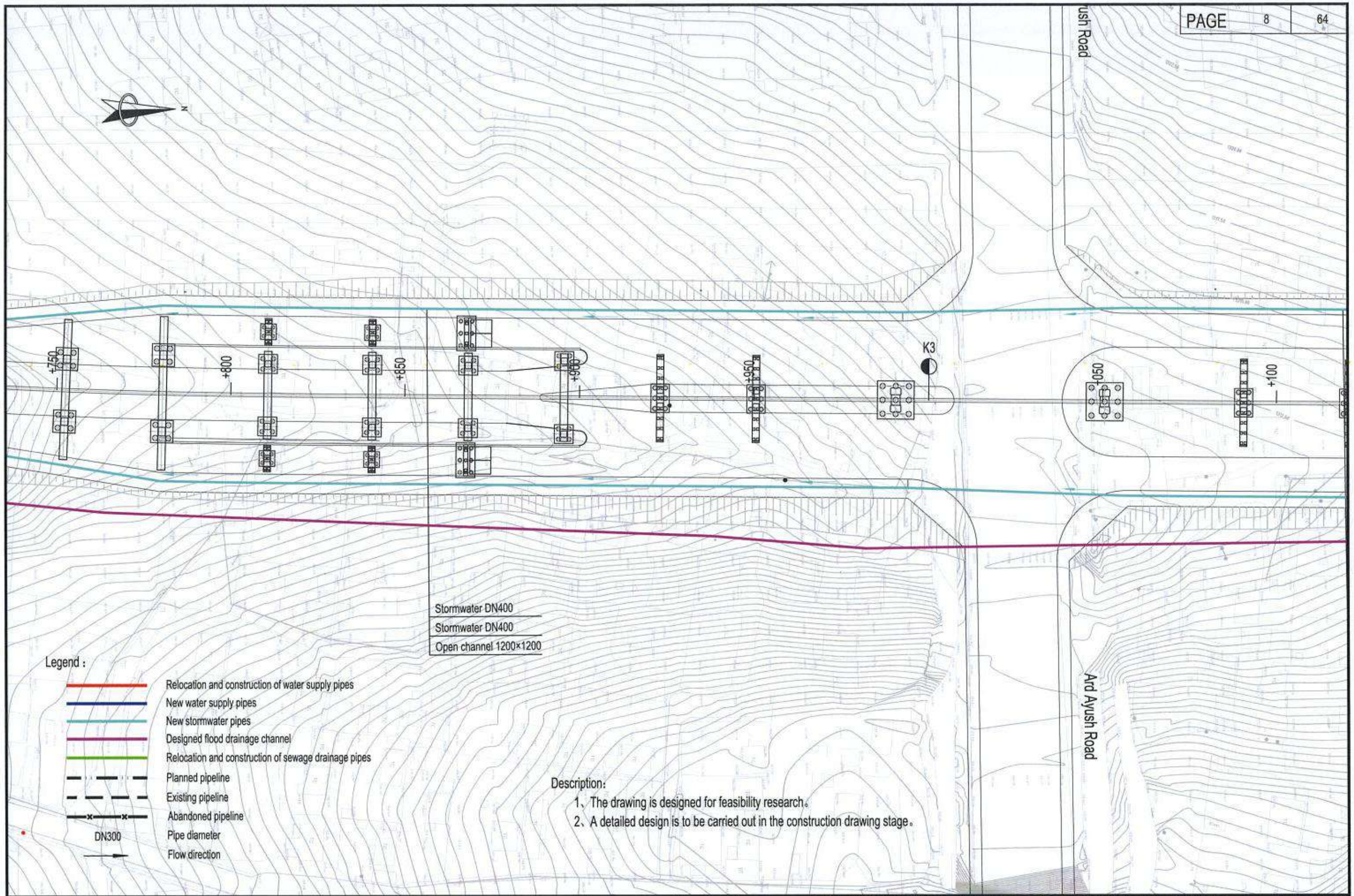
		Layout plan of water supply and drainage pipelines (K2+400~K2+750)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Description:

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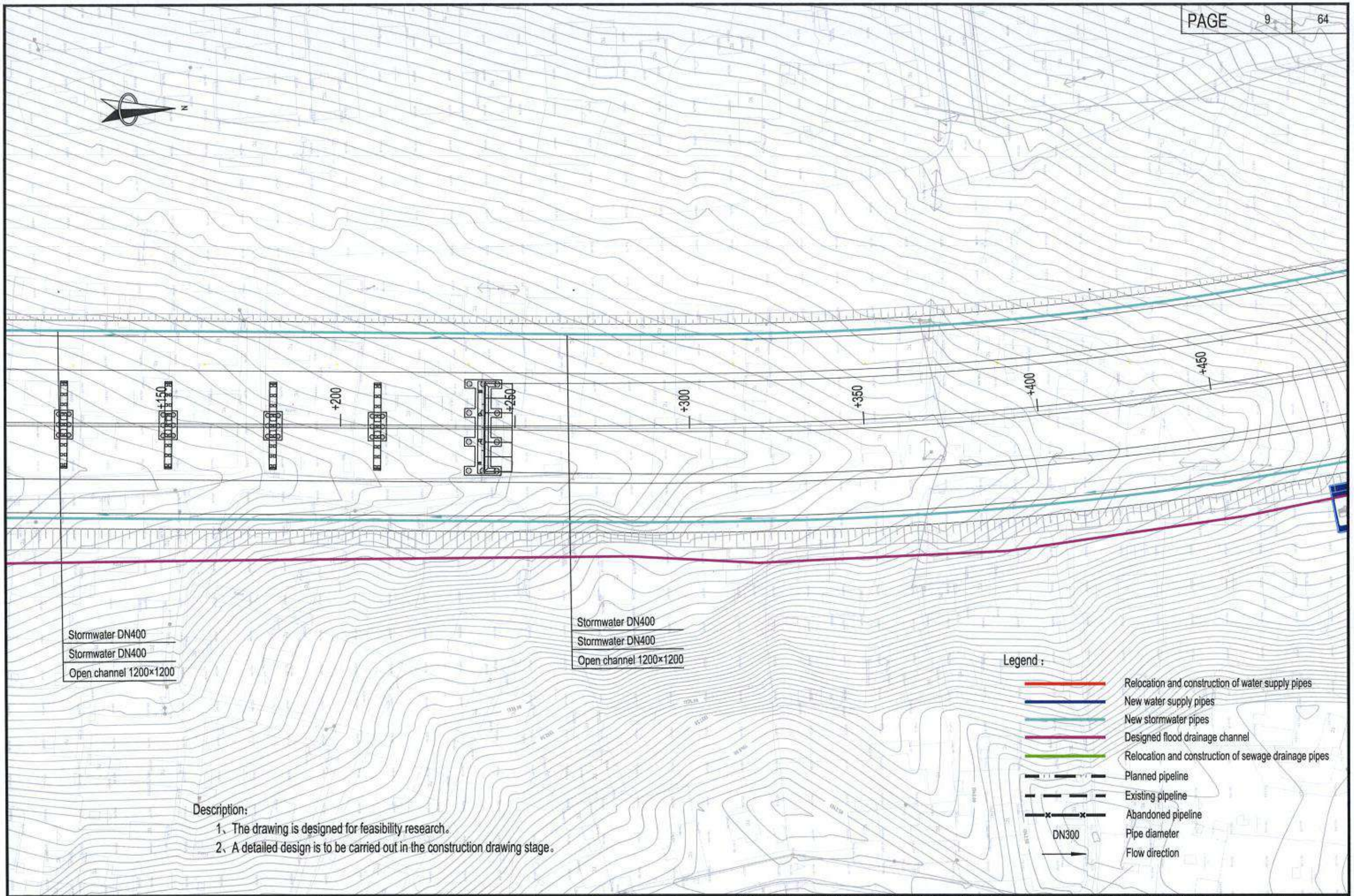
		Layout plan of water supply and drainage pipelines (K2+750~K3+100)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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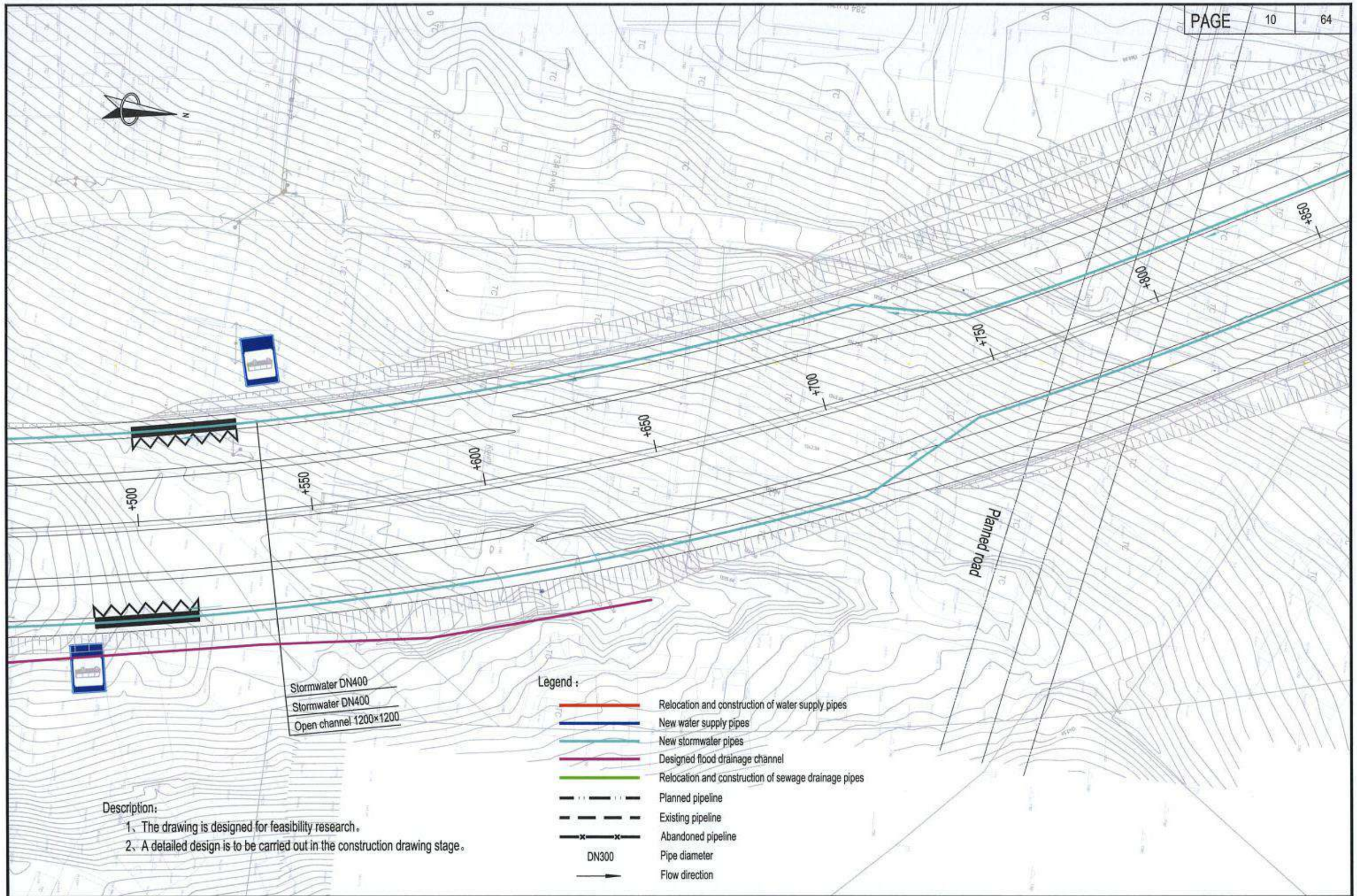
		Layout plan of water supply and drainage pipelines (K3+100~K3+450)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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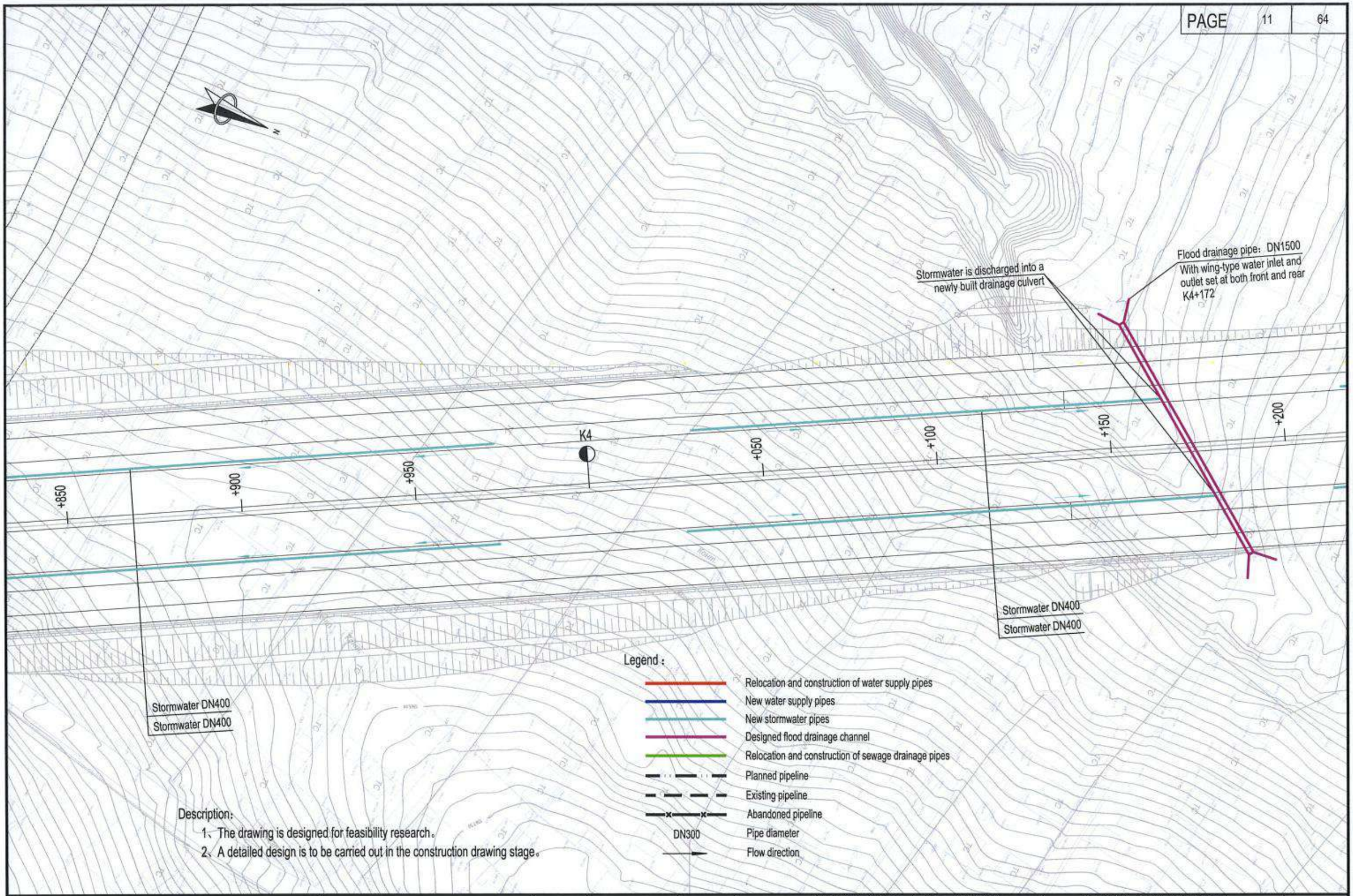
		Layout plan of water supply and drainage pipelines (K3+100~K3+850)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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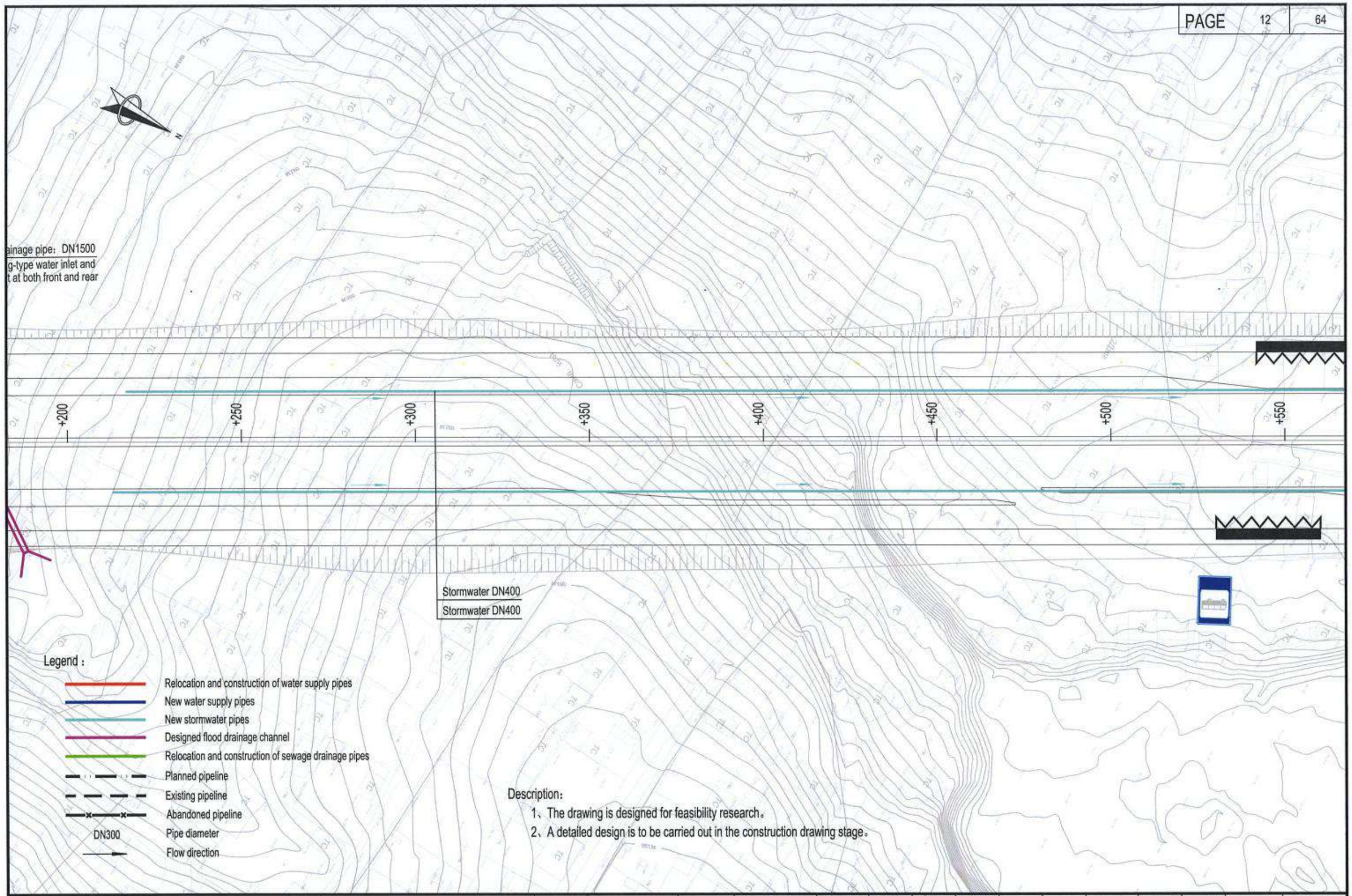
		Layout plan of water supply and drainage pipelines (K3+850~K4+200)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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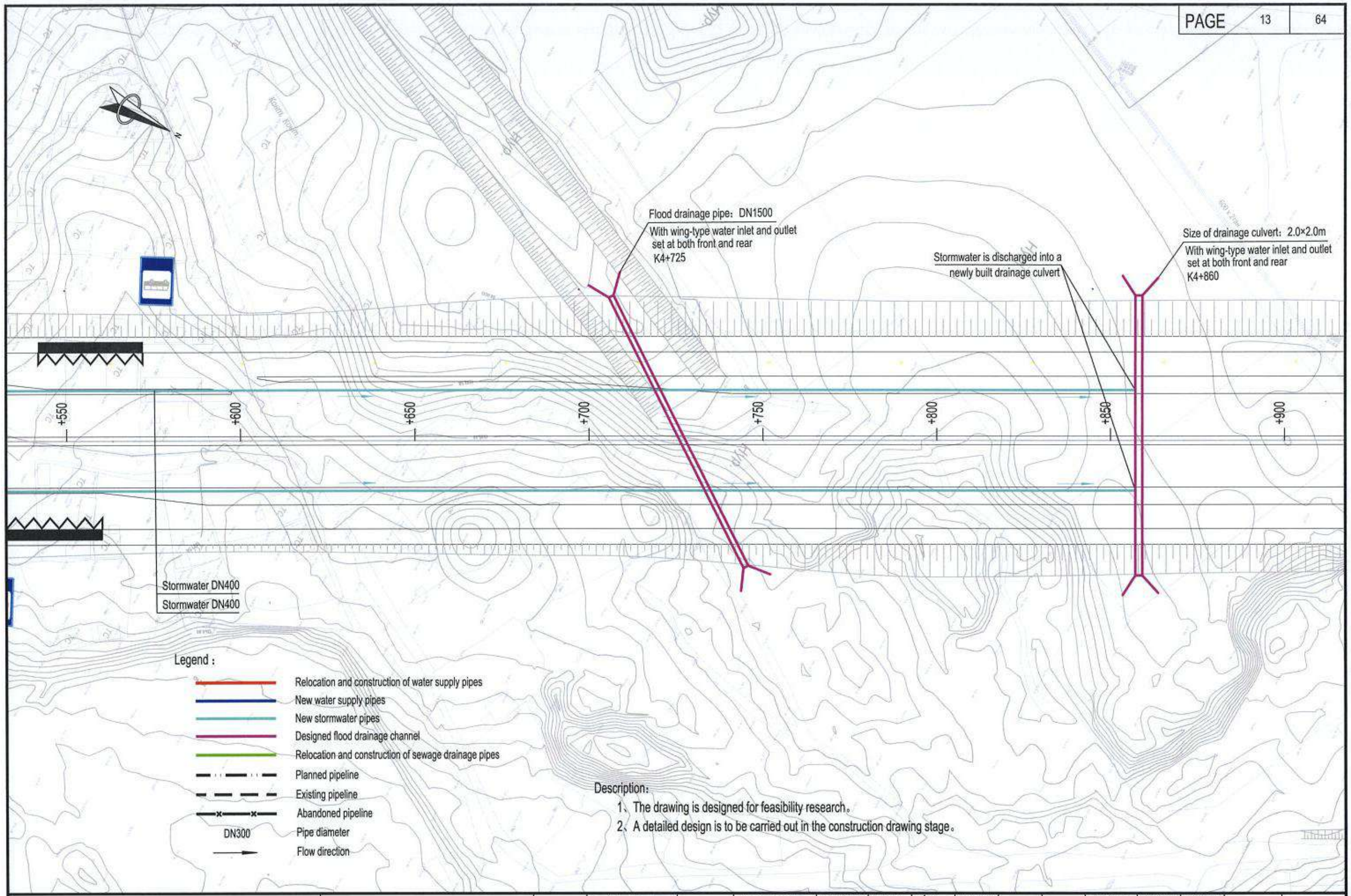
		Layout plan of water supply and drainage pipelines (K4+200~K4+550)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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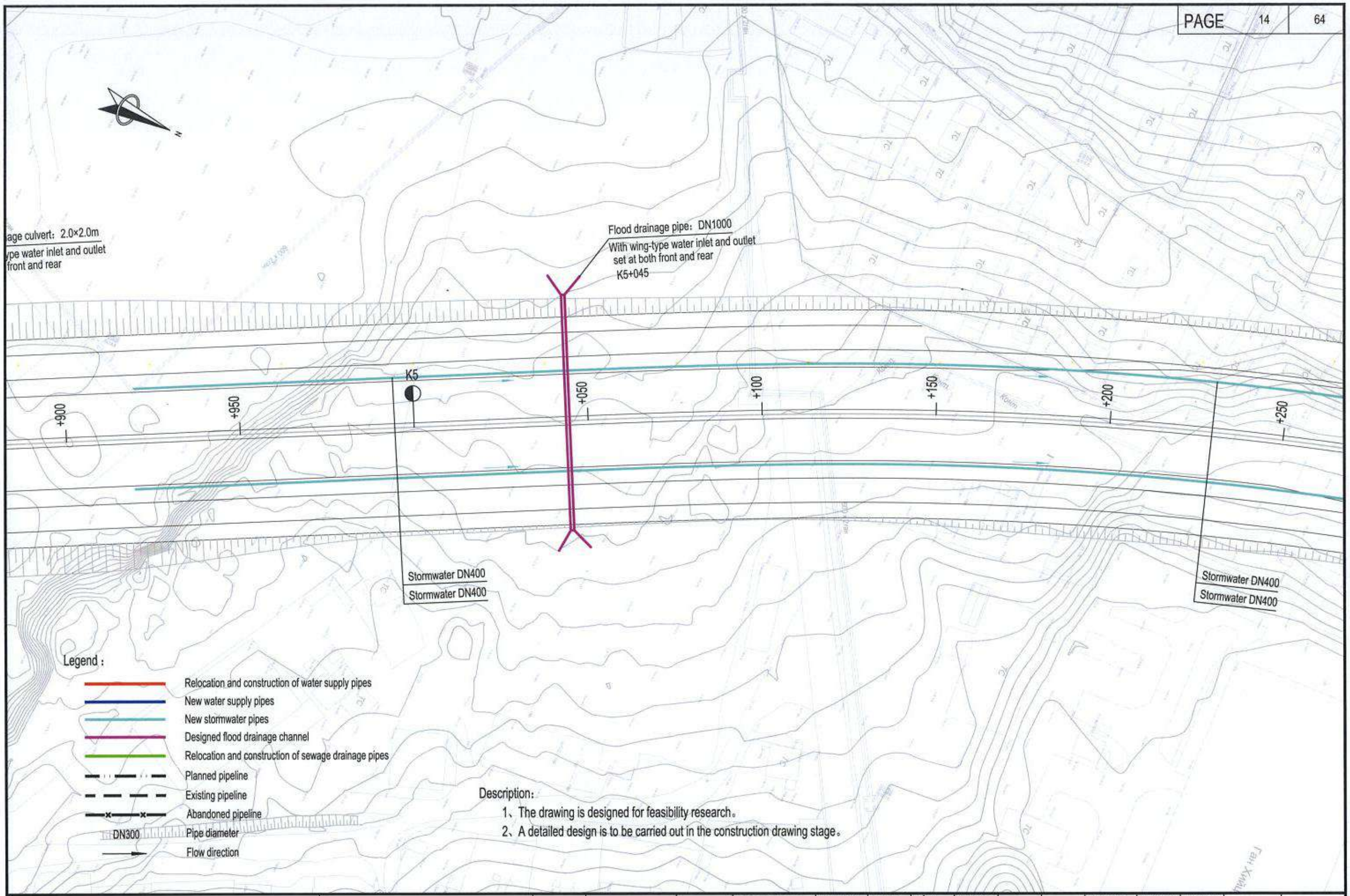
		Layout plan of water supply and drainage pipelines (K4+550~K4+900)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA	CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE	EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO	APPROVED	WANG HAI MEI	DATE	2025.07



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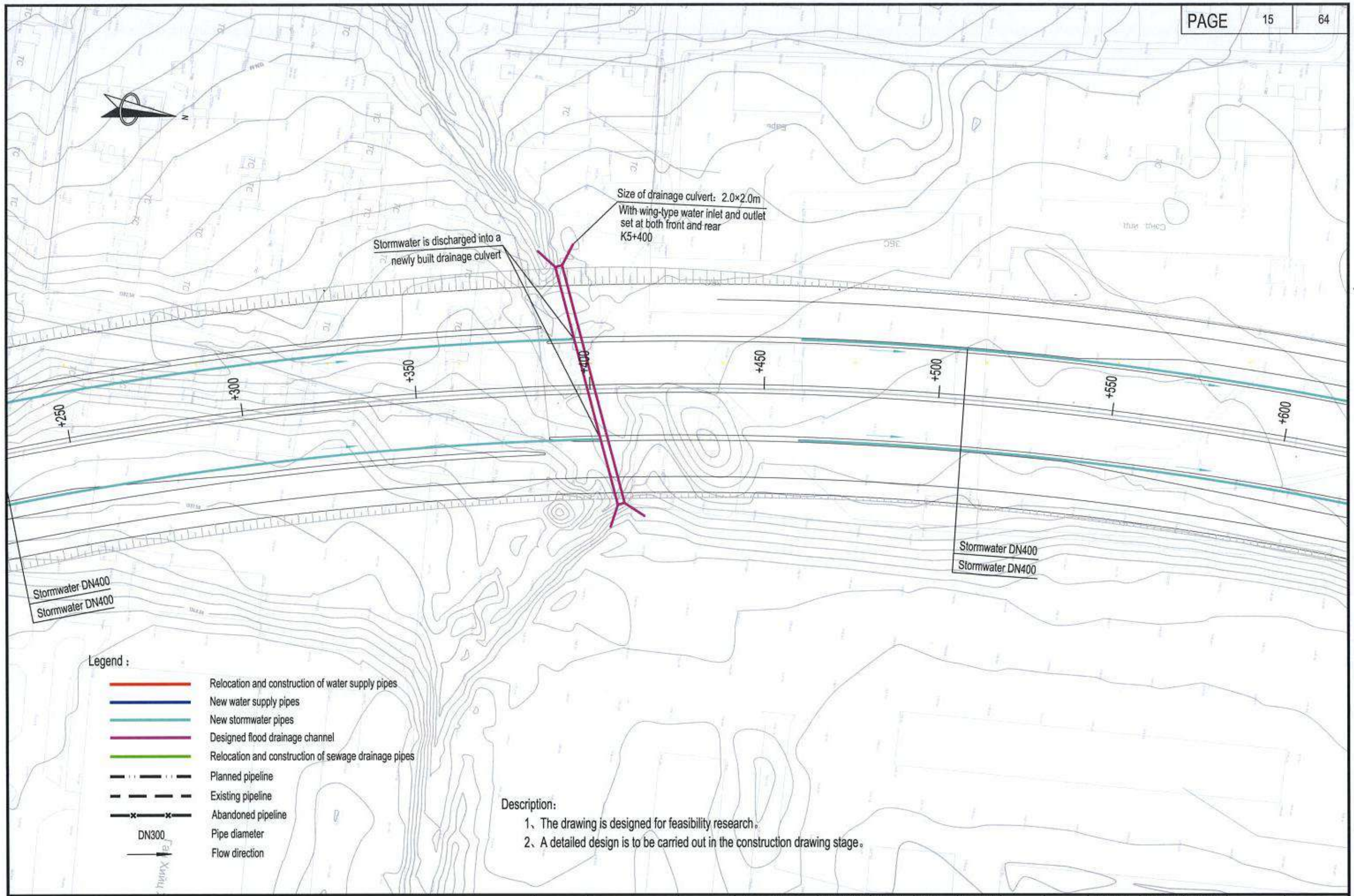
		Layout plan of water supply and drainage pipelines (K4+900~K5+250)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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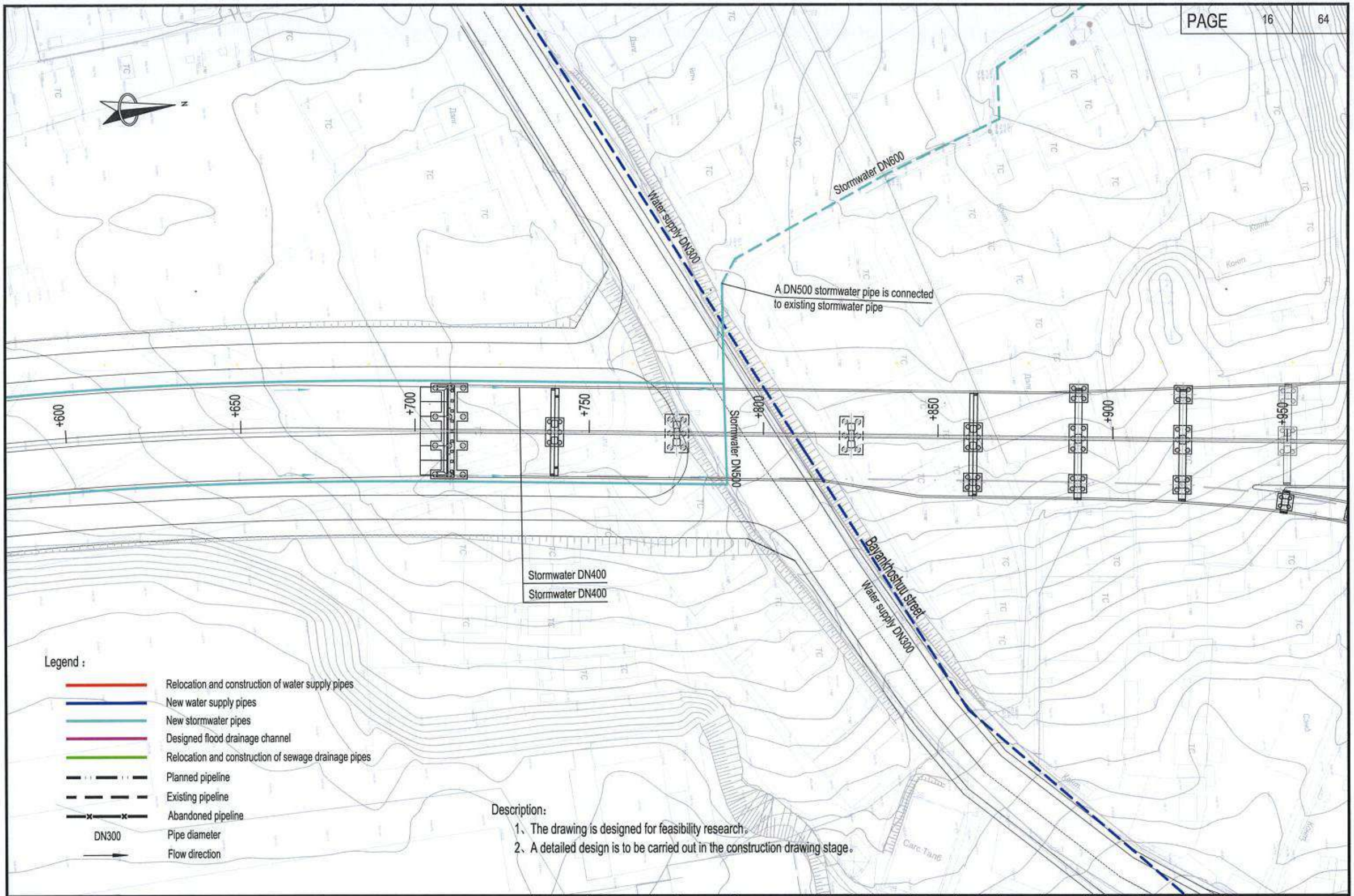
		Layout plan of water supply and drainage pipelines (K5+250~K5+600)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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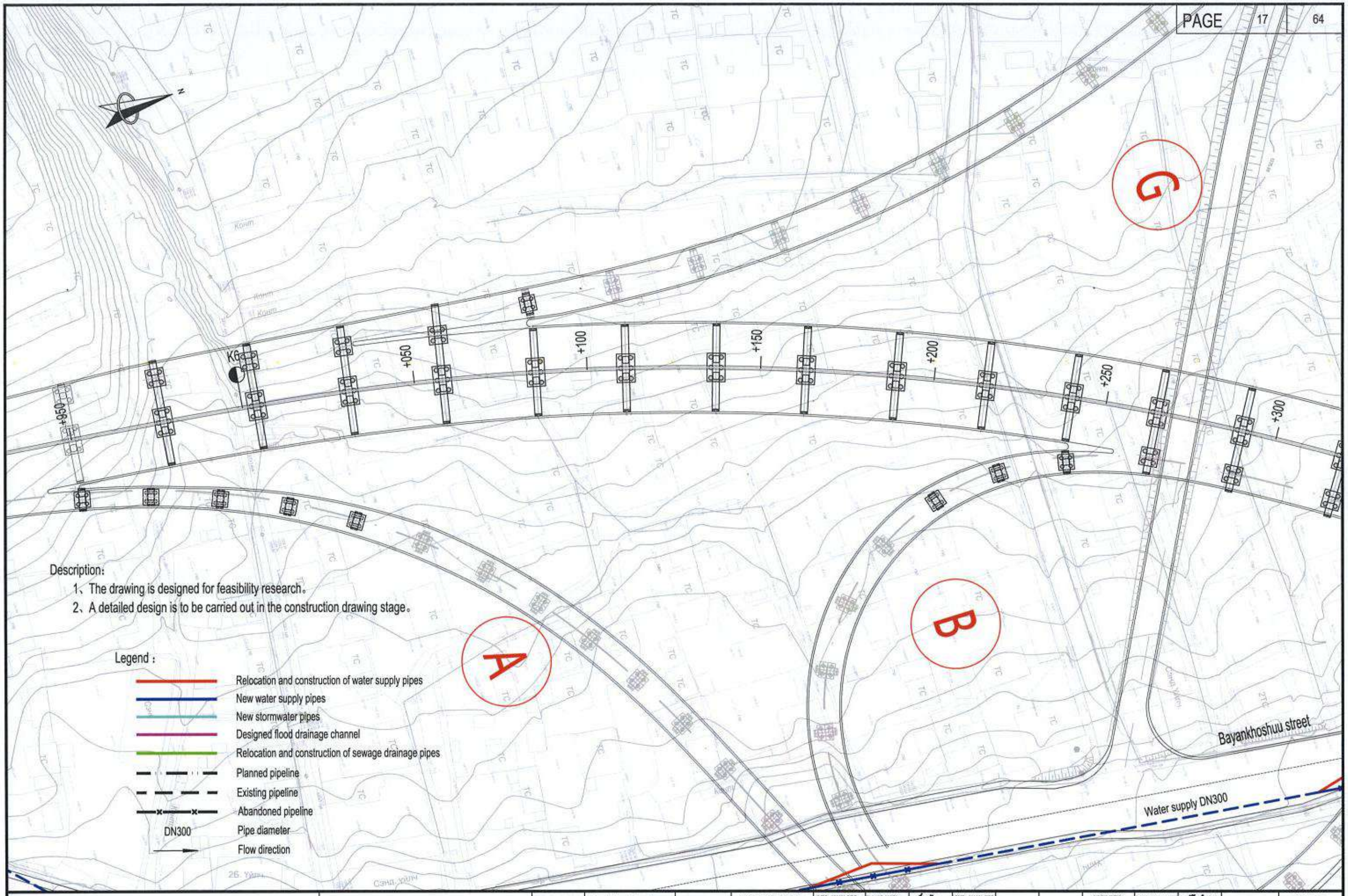
		Layout plan of water supply and drainage pipelines (K5+600~K5+950)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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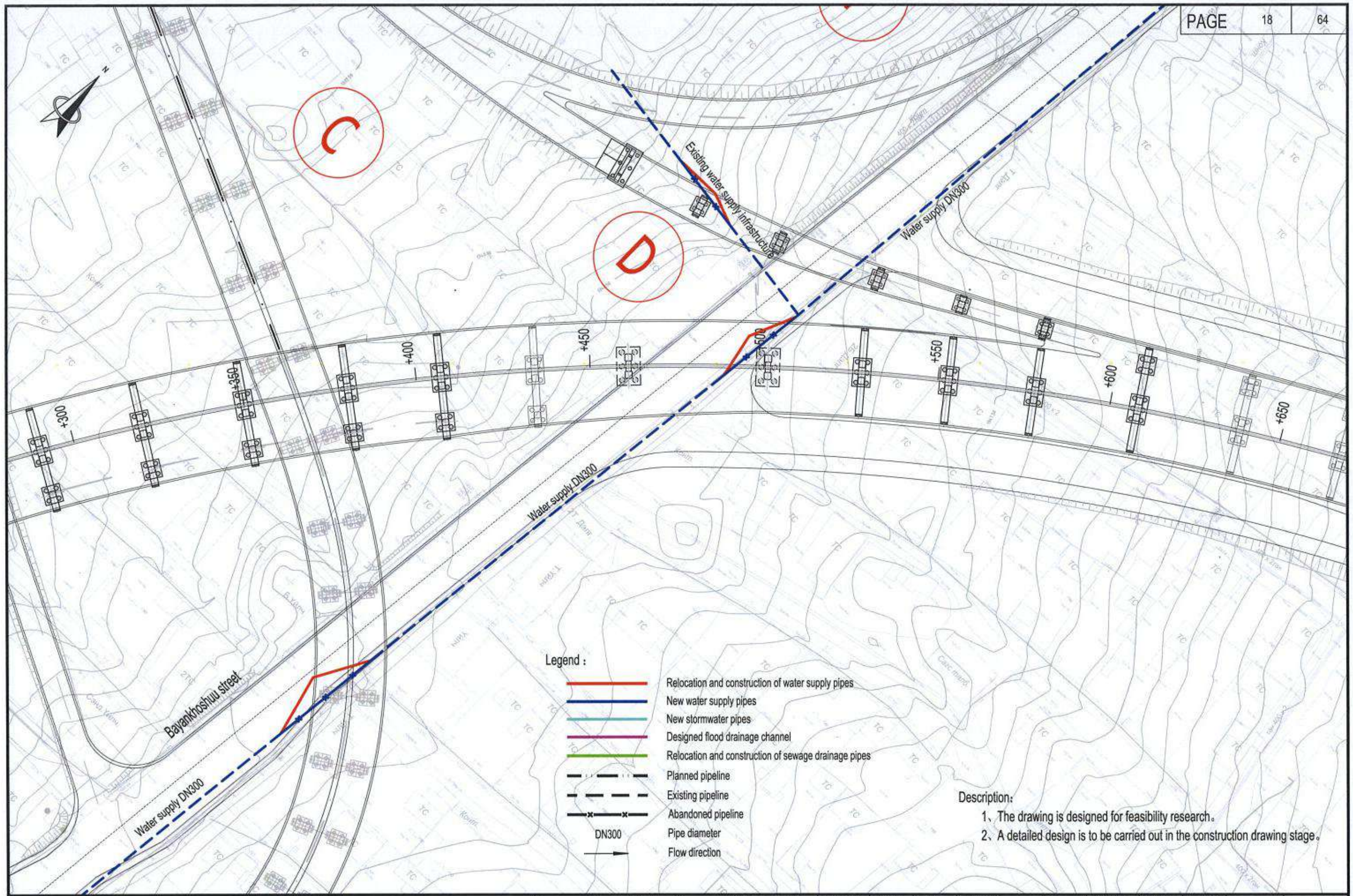
		Layout plan of water supply and drainage pipelines (K5+950~K6+300)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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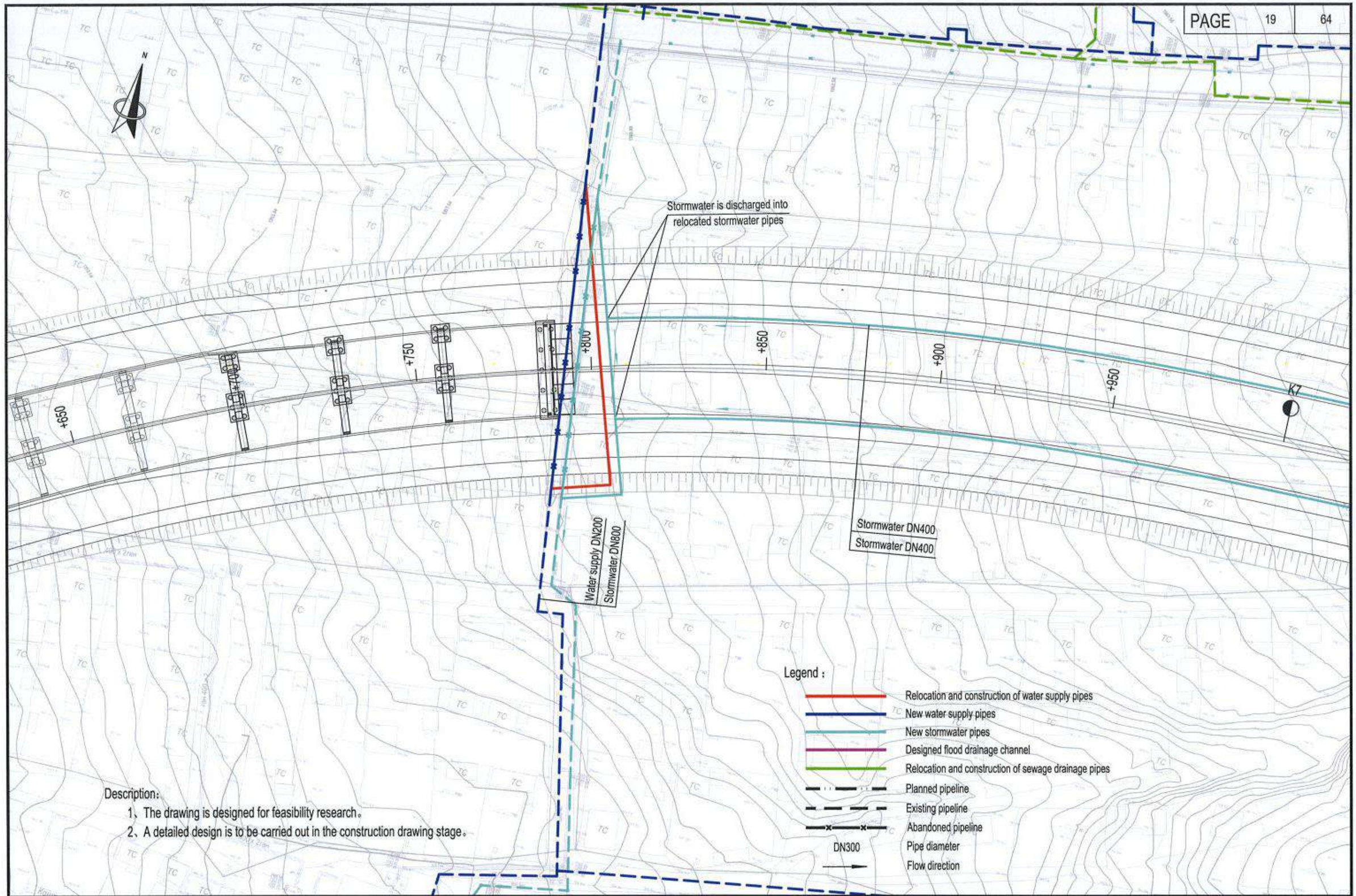
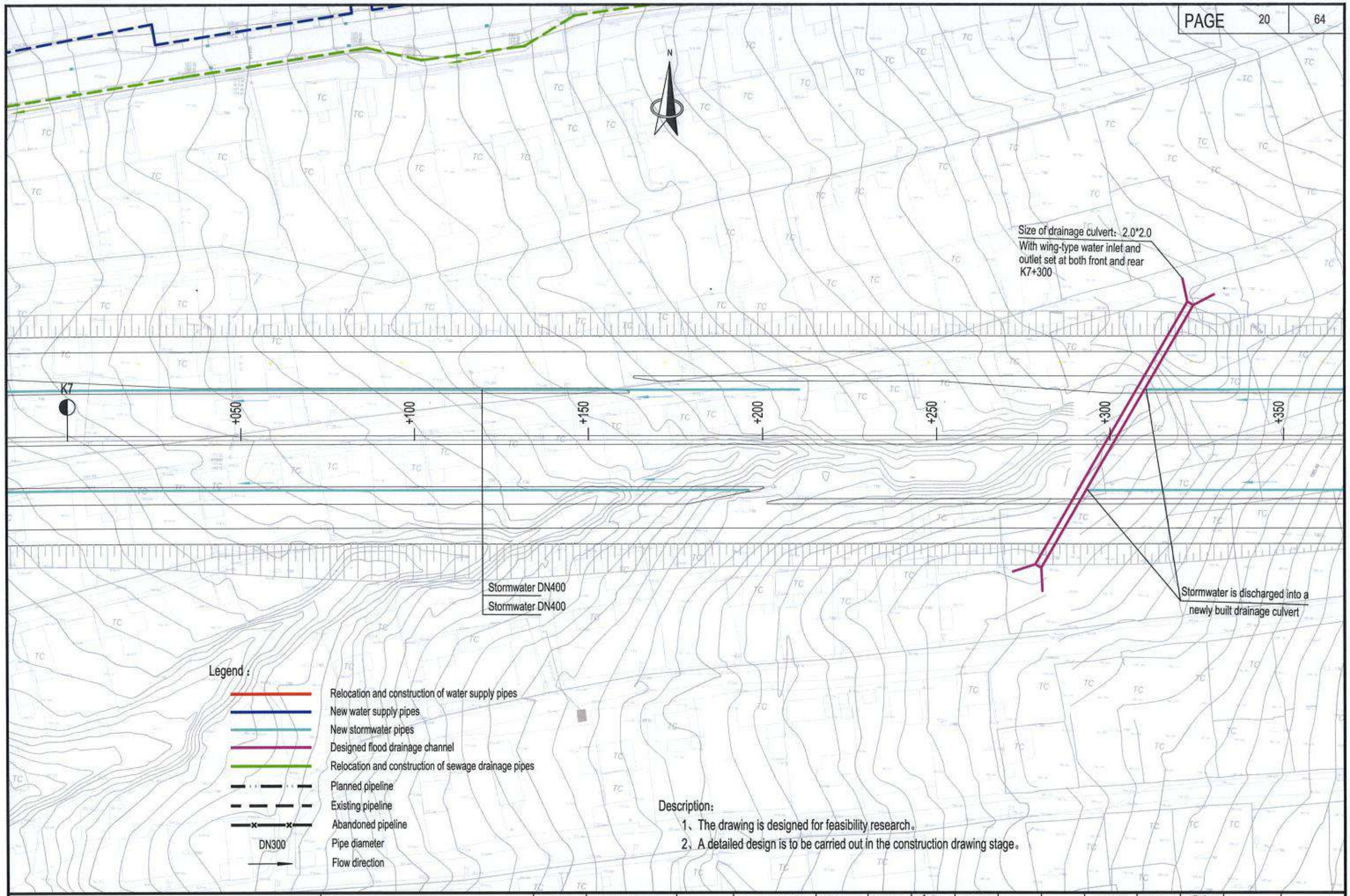
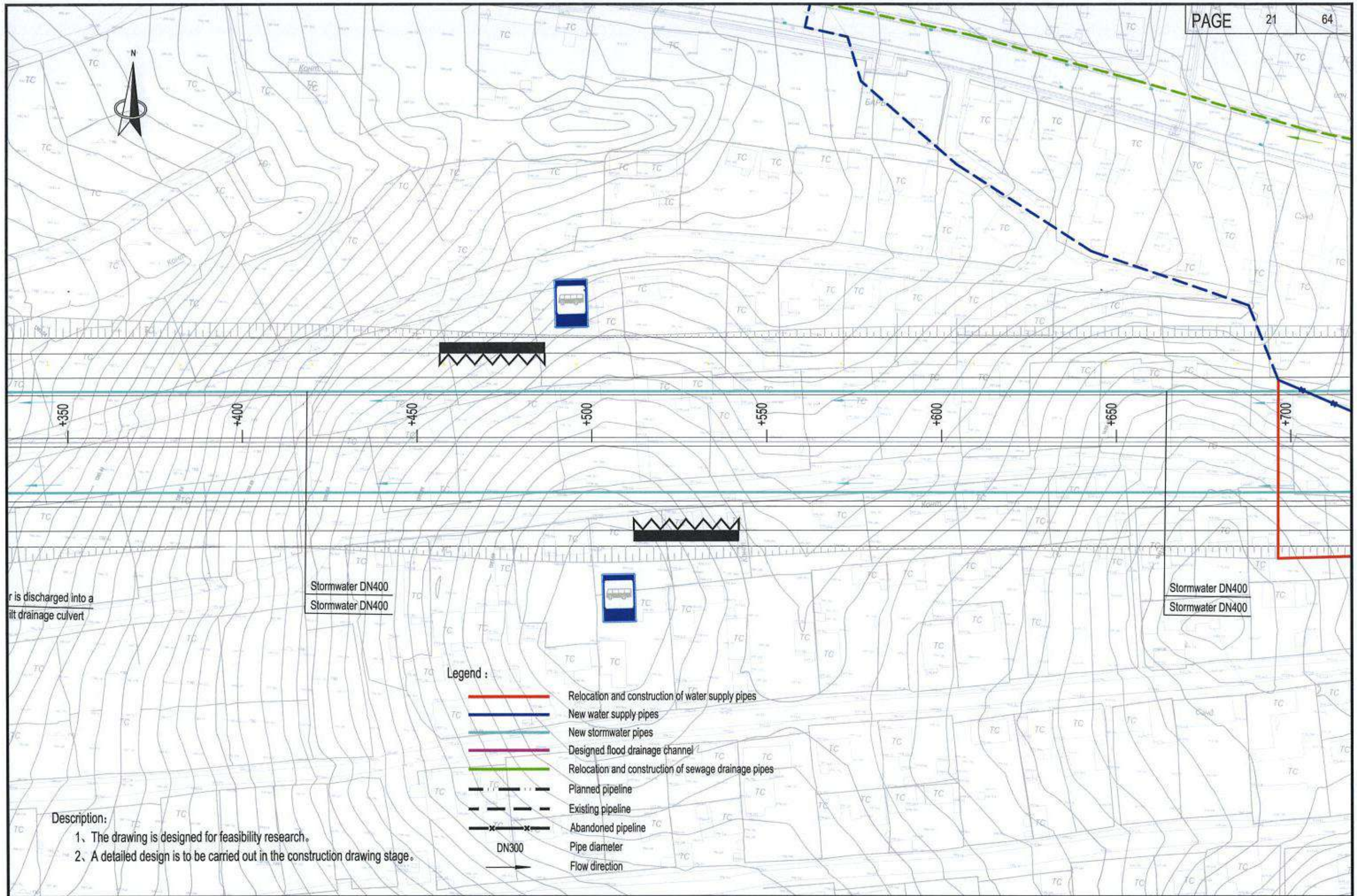
		Layout plan of water supply and drainage pipelines (K6+300~K6+650)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K6+650~K7+000)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K7+000~K7+350)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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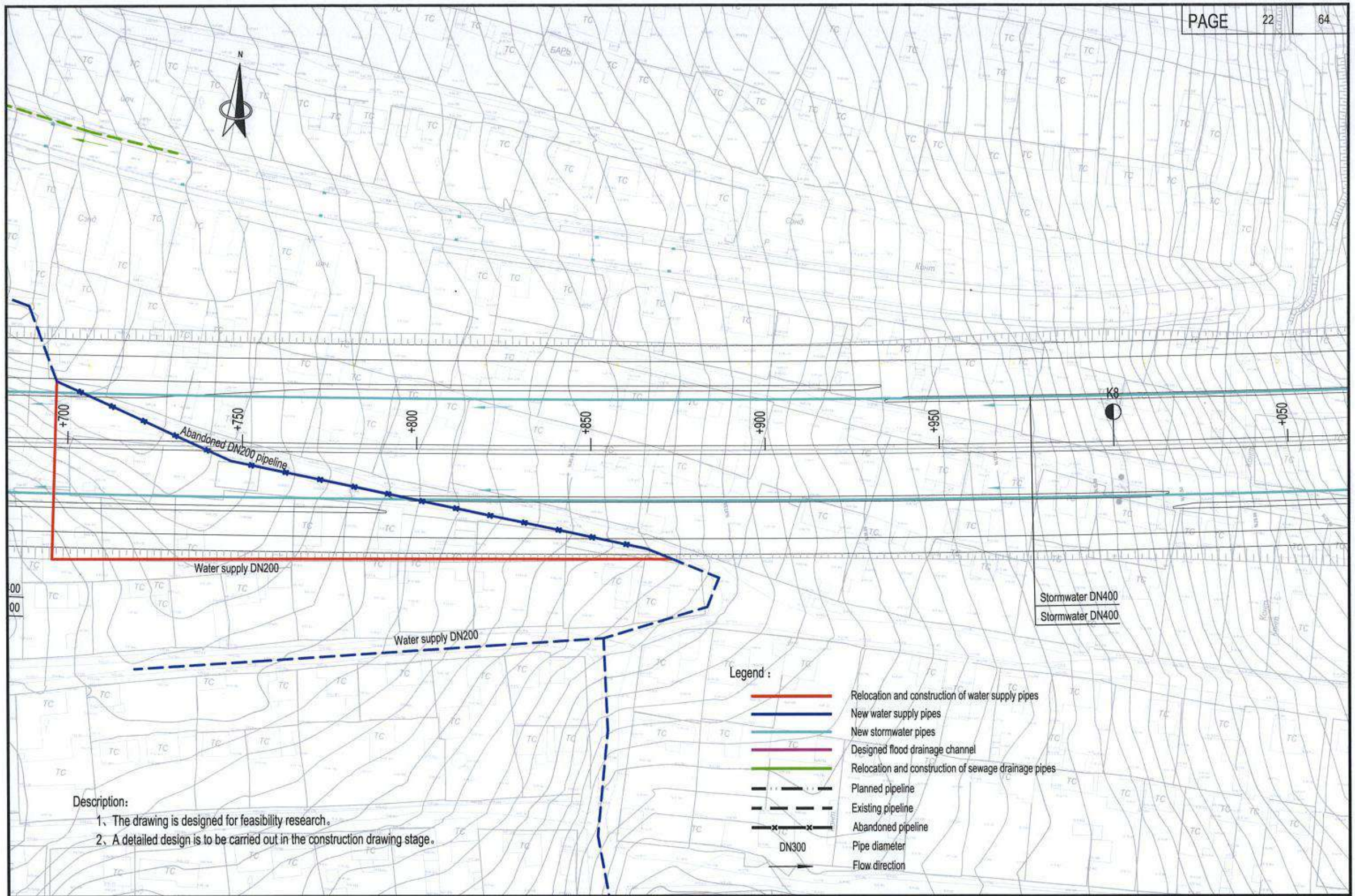
		Layout plan of water supply and drainage pipelines (K7+350~K7+700)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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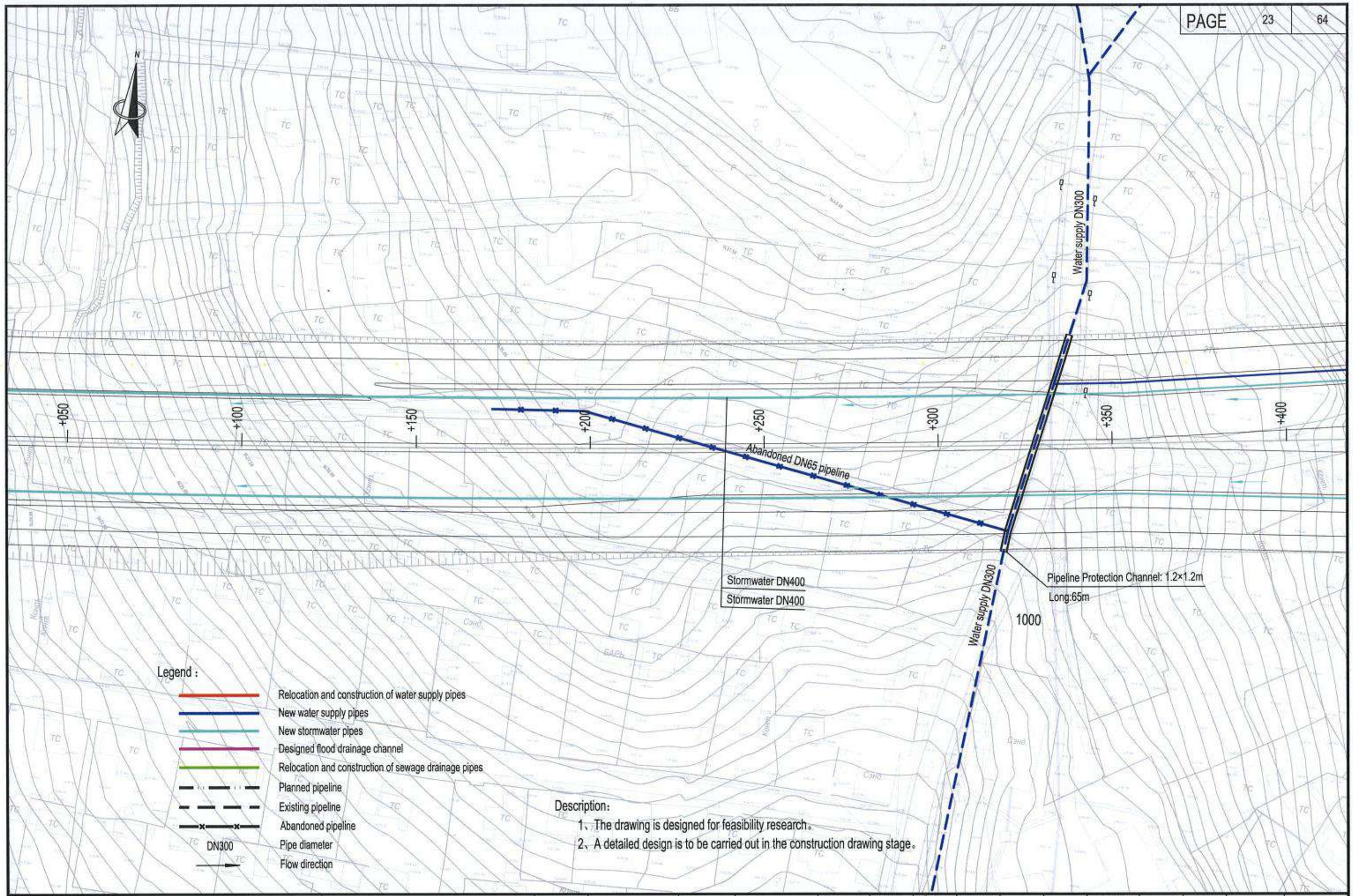
		Layout plan of water supply and drainage pipelines (K7+700~K8+050)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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		Layout plan of water supply and drainage pipelines (K8+050~K8+400)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
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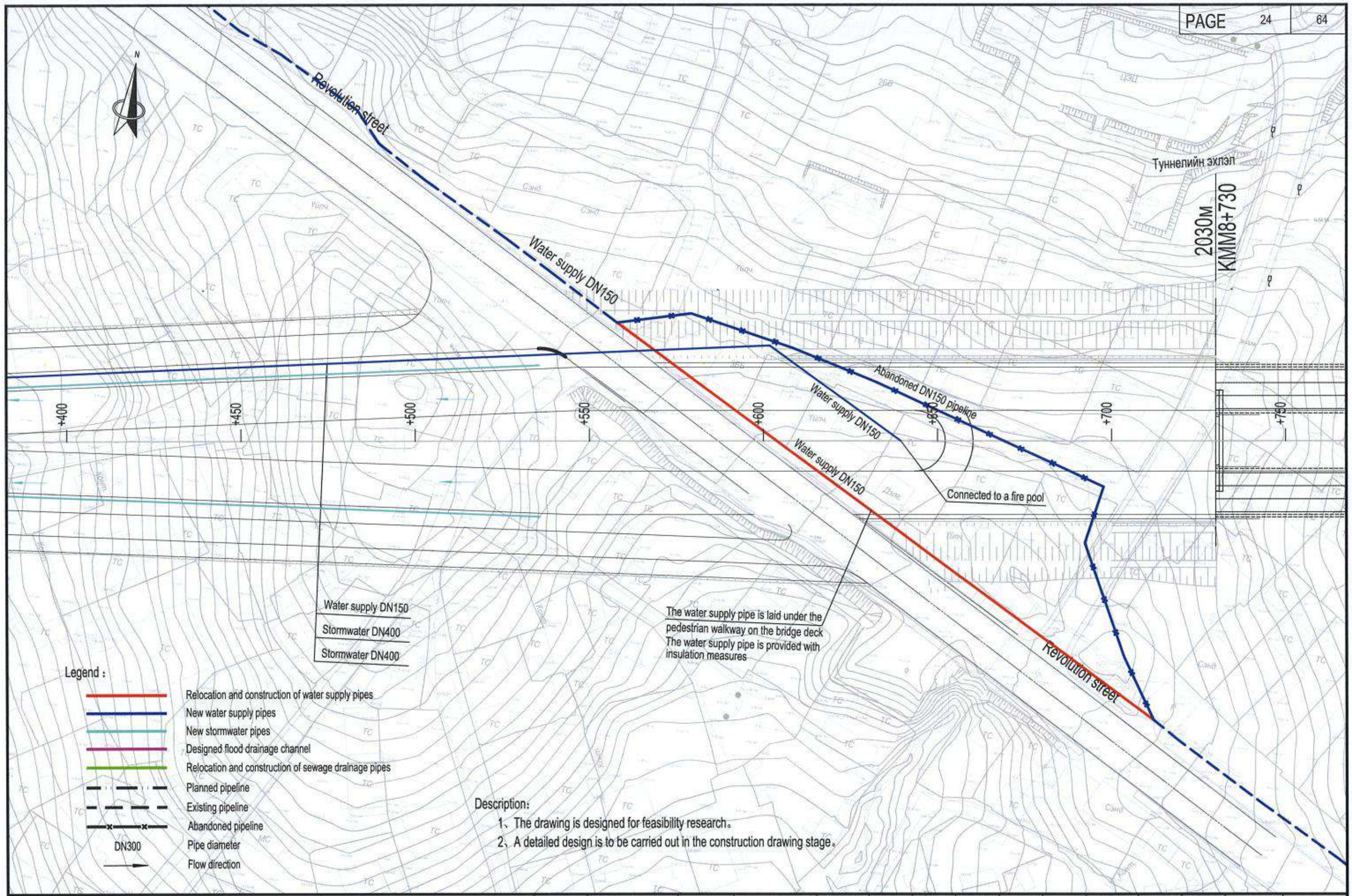

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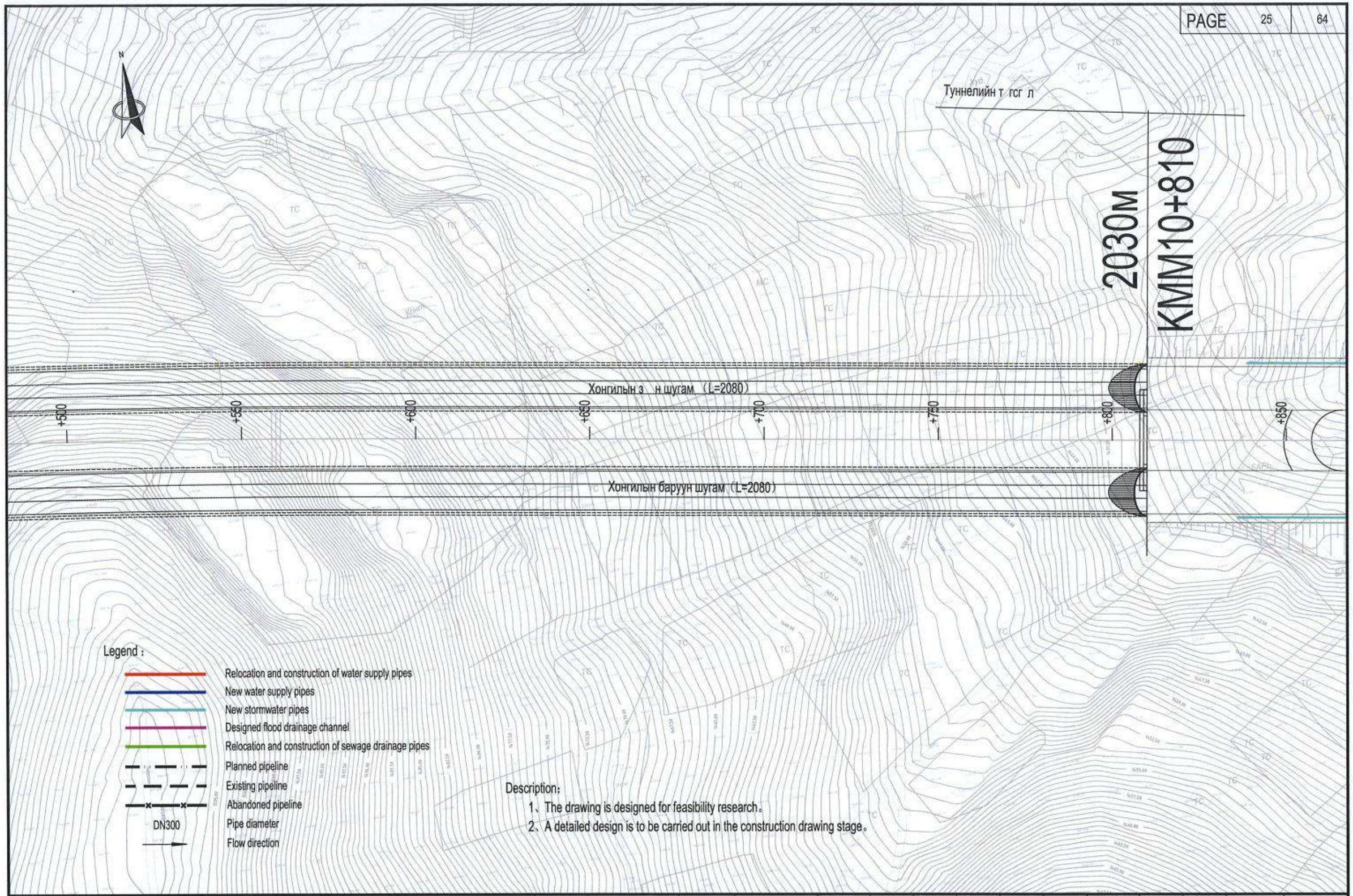
		Layout plan of water supply and drainage pipelines (K8+400~K8+750)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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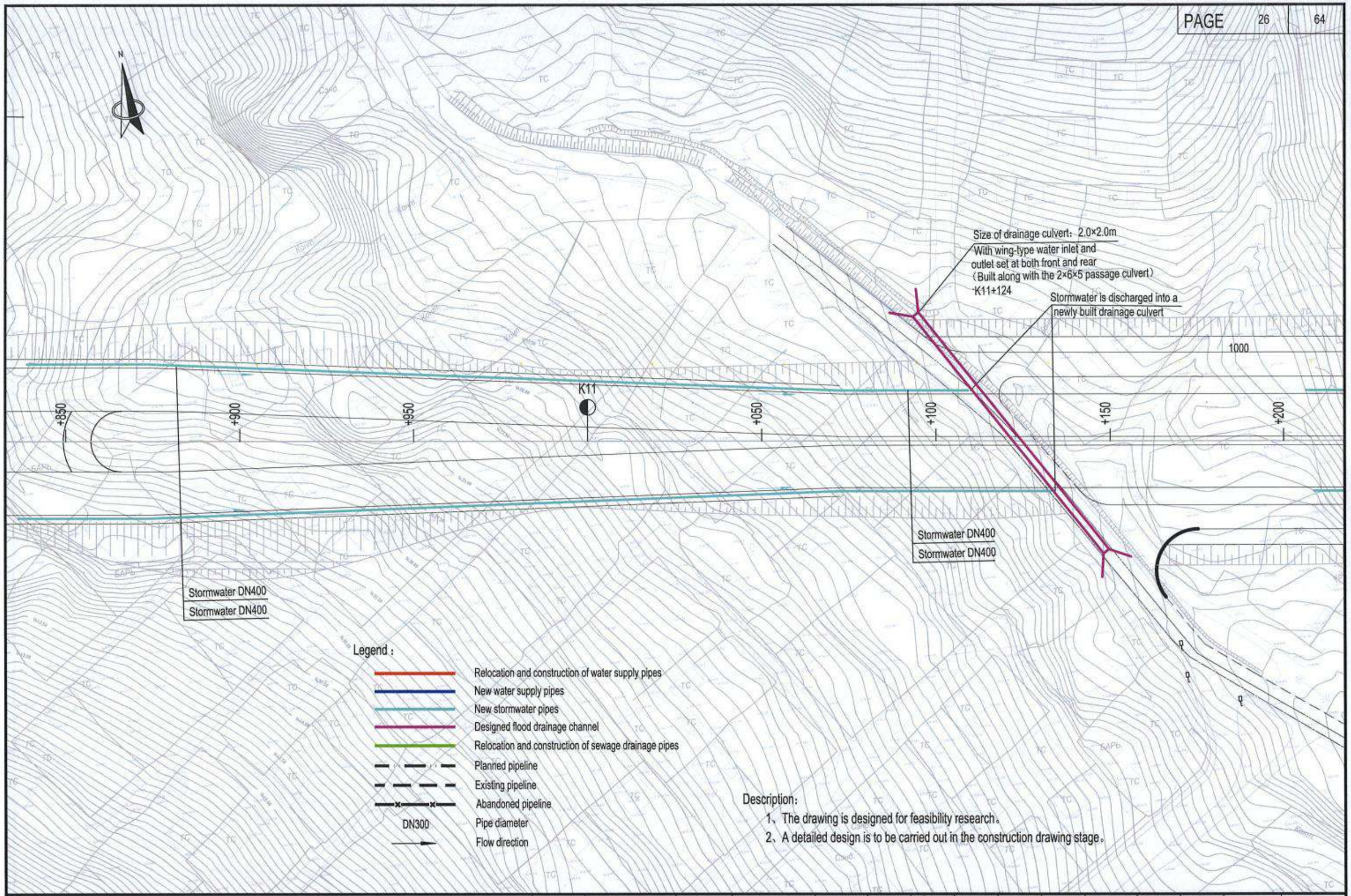
		Layout plan of water supply and drainage pipelines (K10+500~K10+850)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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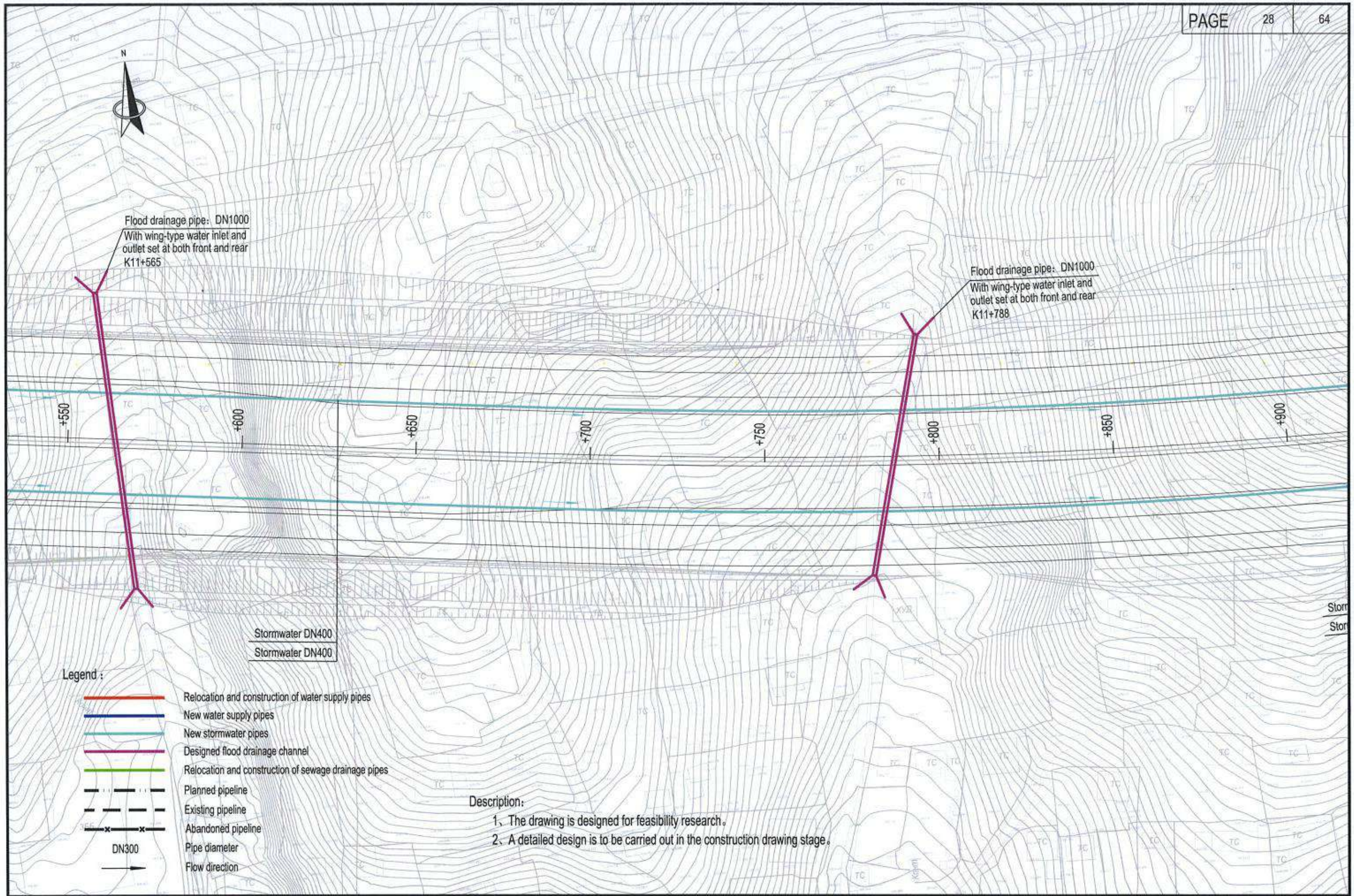
		Layout plan of water supply and drainage pipelines (K10+850~K11+200)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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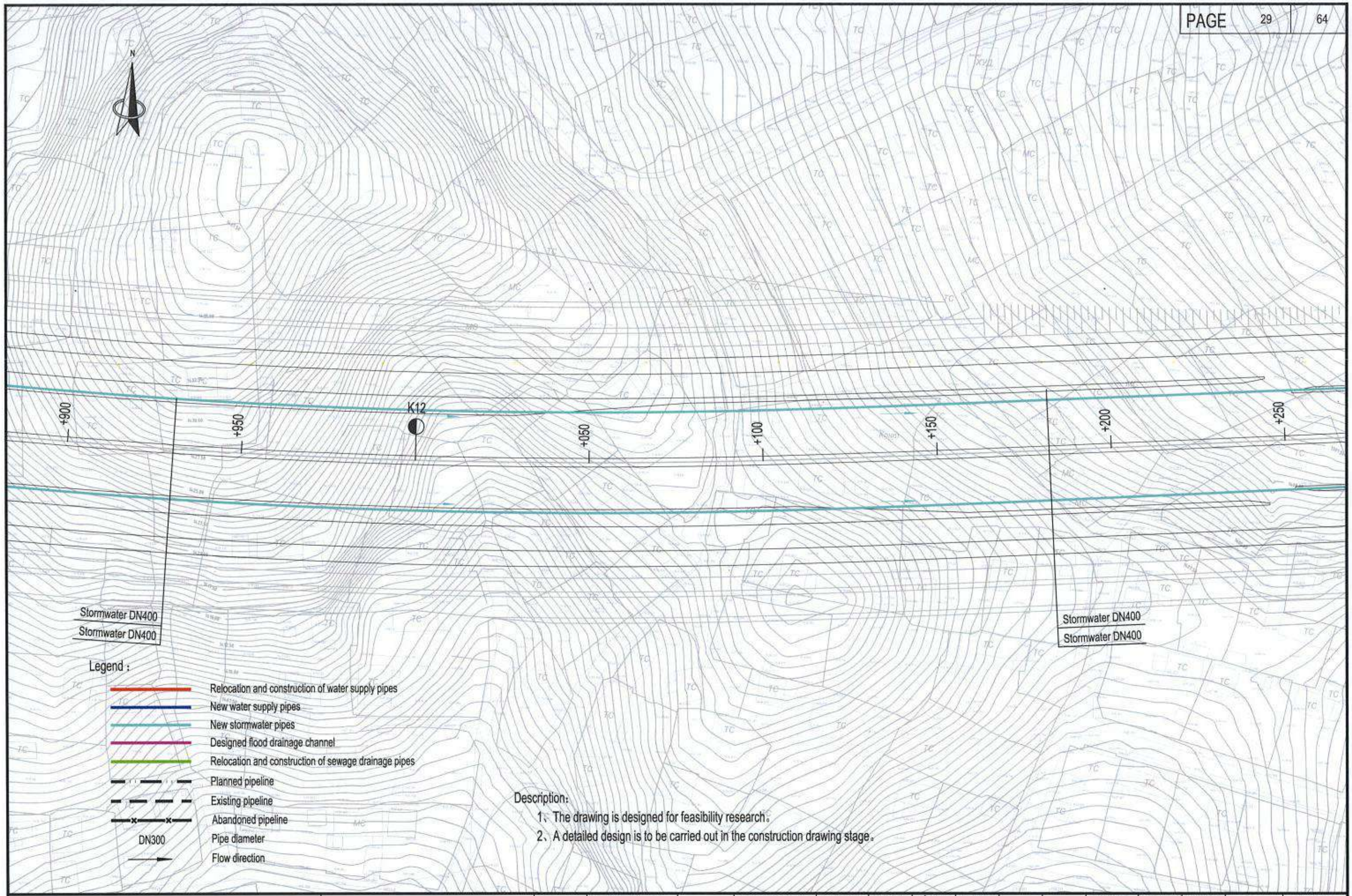
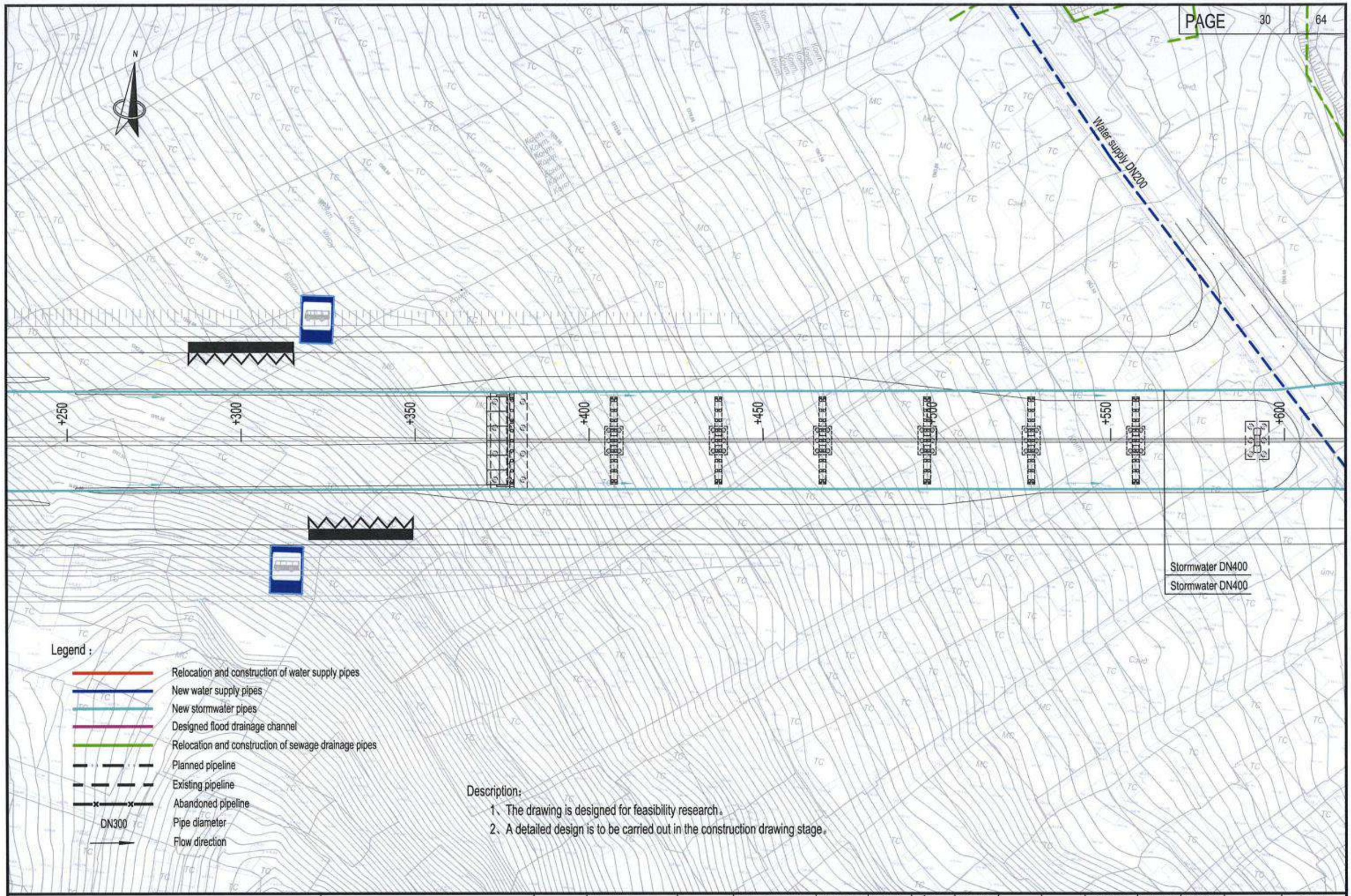
		Layout plan of water supply and drainage pipelines (K11+550~K11+900)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA	CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE	EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO	APPROVED	WANG HAI MEI	DATE	2025.07



中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K11+900~K12+250)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Description:

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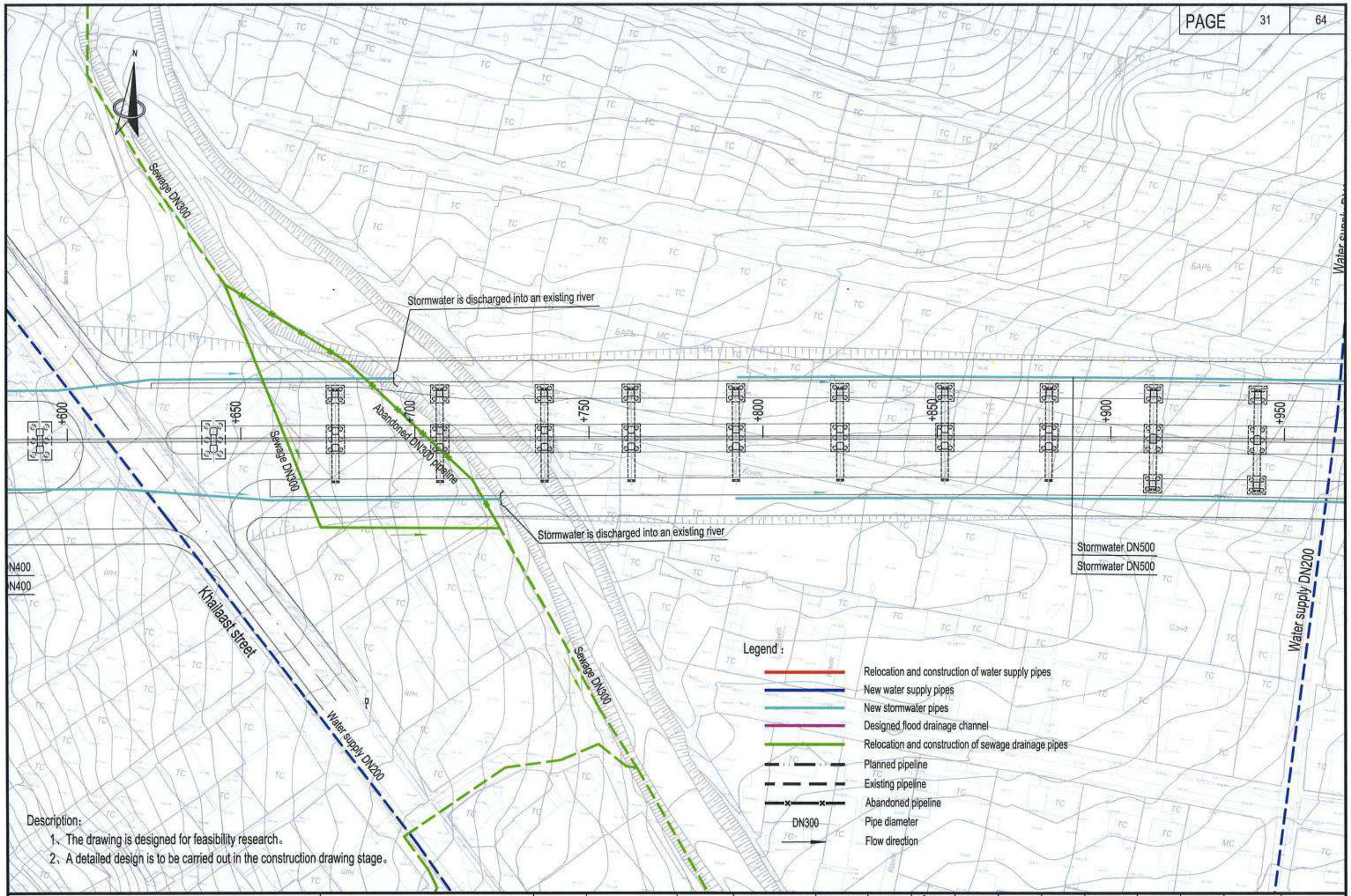
		Layout plan of water supply and drainage pipelines (K12+250~K12+600)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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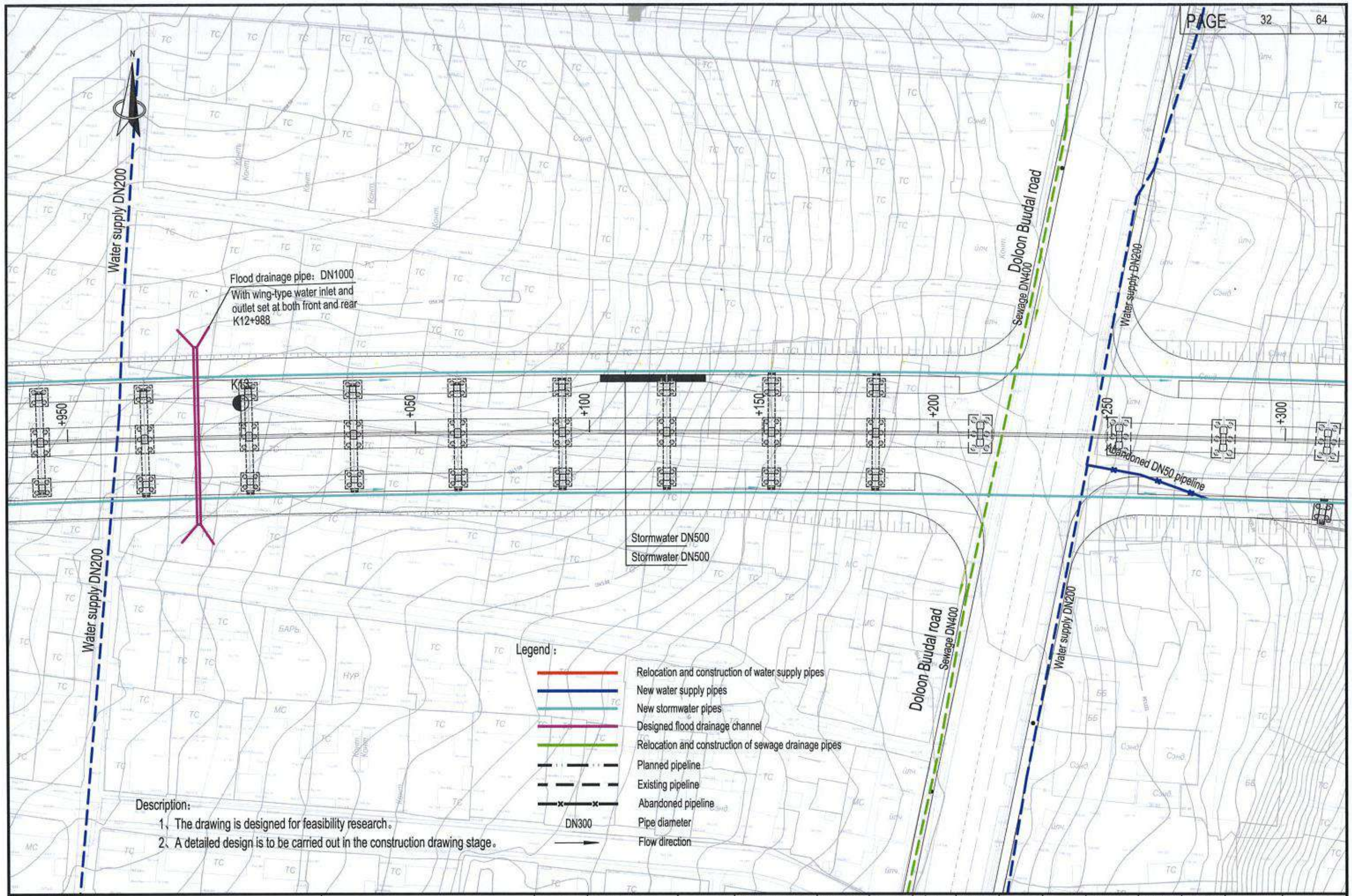
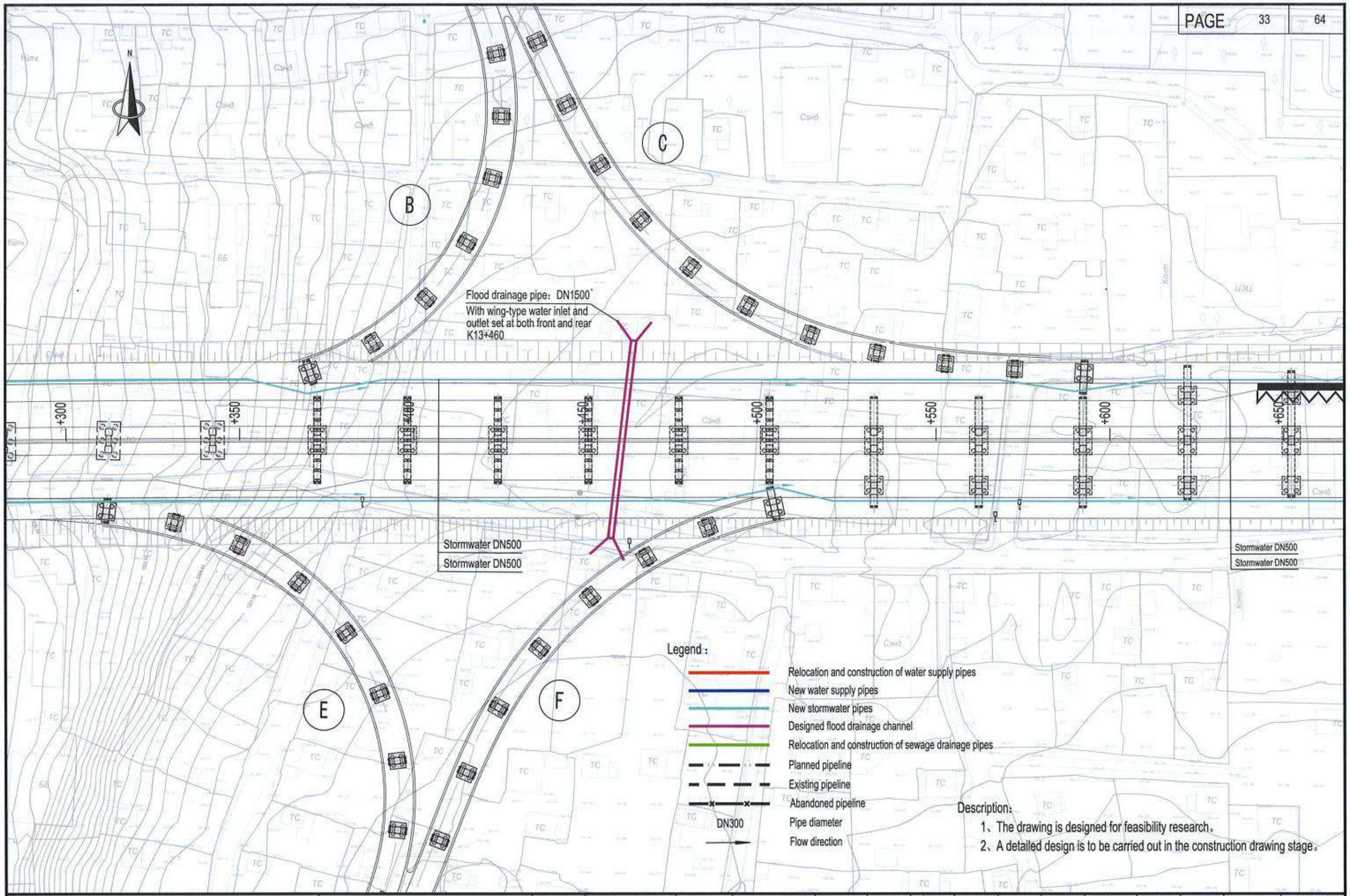
		Layout plan of water supply and drainage pipelines (K12+600~K12+950)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA	CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE	EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO	APPROVED	WANG HAI MEI	DATE	2025.07



中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER		DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K12+950~K13+300)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA	CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE	EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO	APPROVED	WANG HAI MEI	DATE	2025.07



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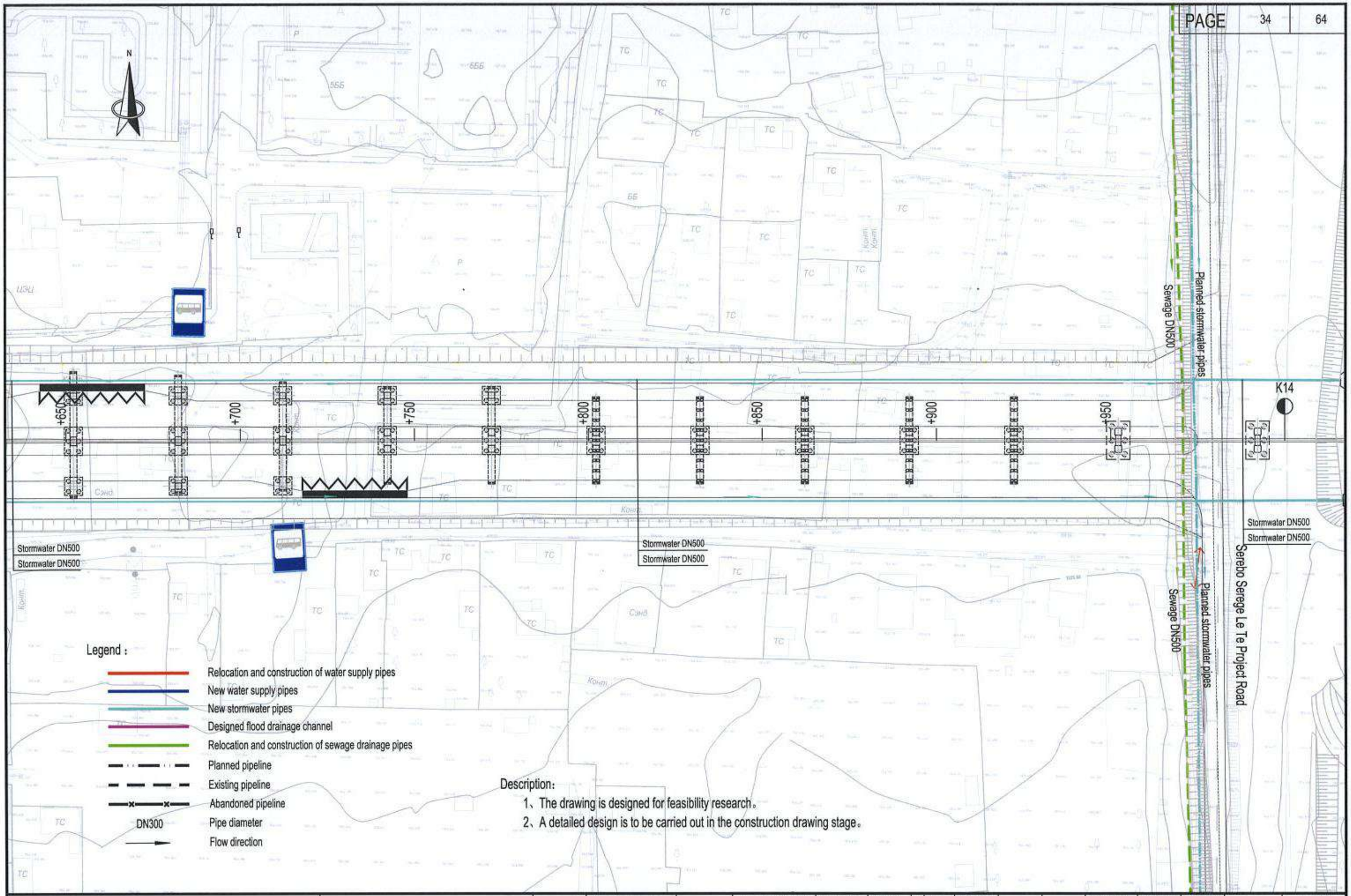
		Layout plan of water supply and drainage pipelines (K13+300~K13+650)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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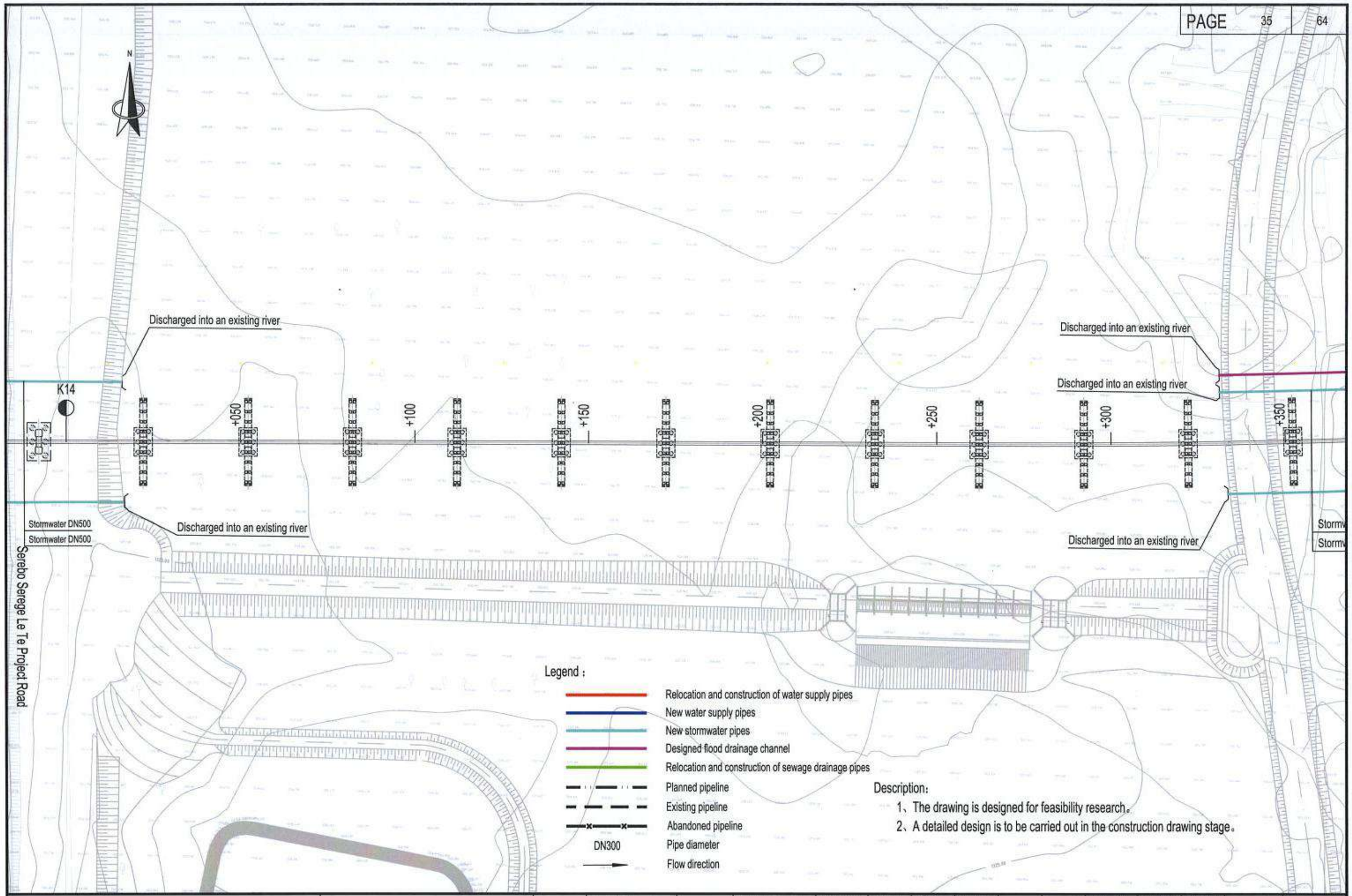
		Layout plan of water supply and drainage pipelines (K13+650~K14+000)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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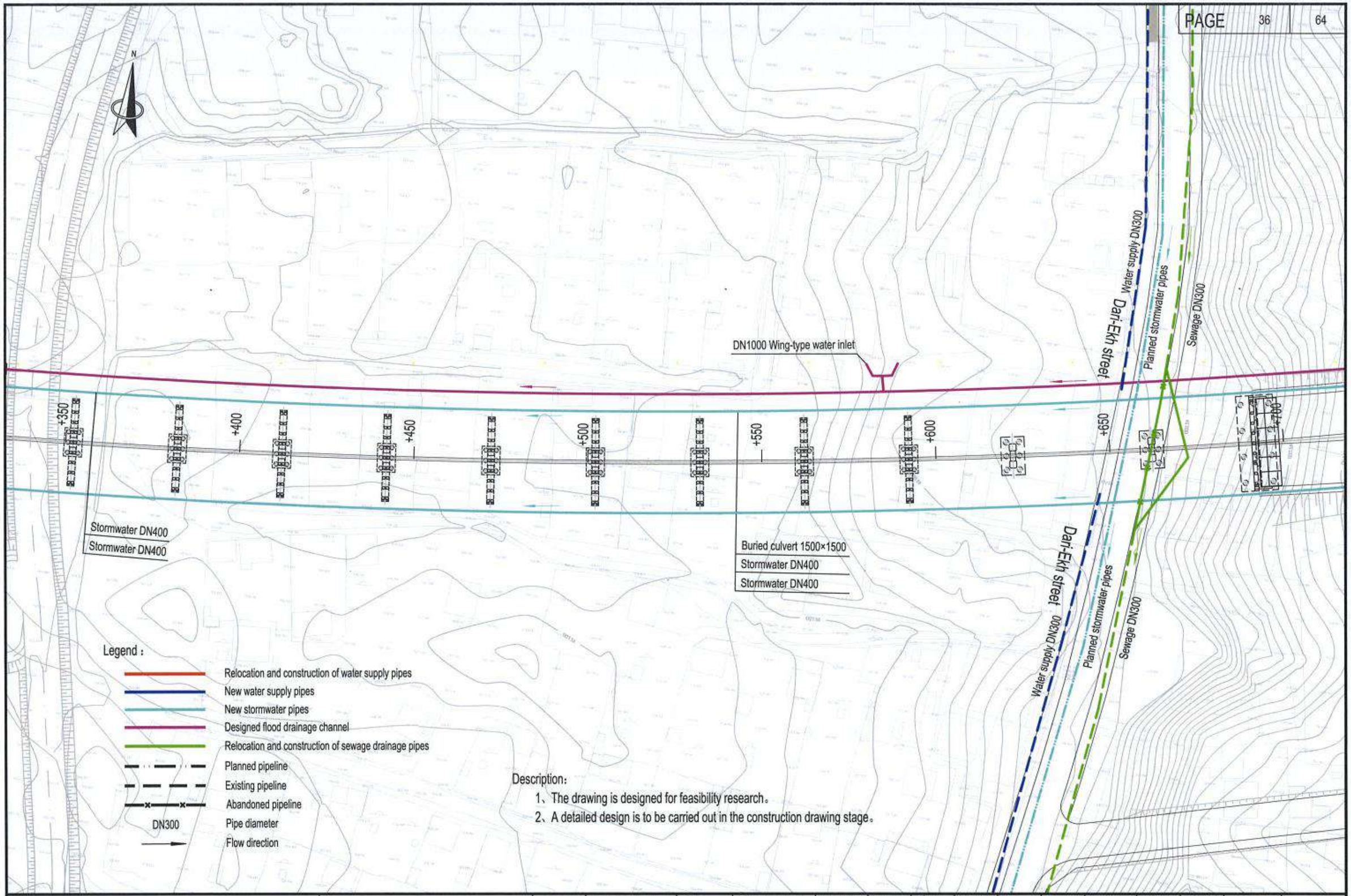
		Layout plan of water supply and drainage pipelines (K14+000~K14+350)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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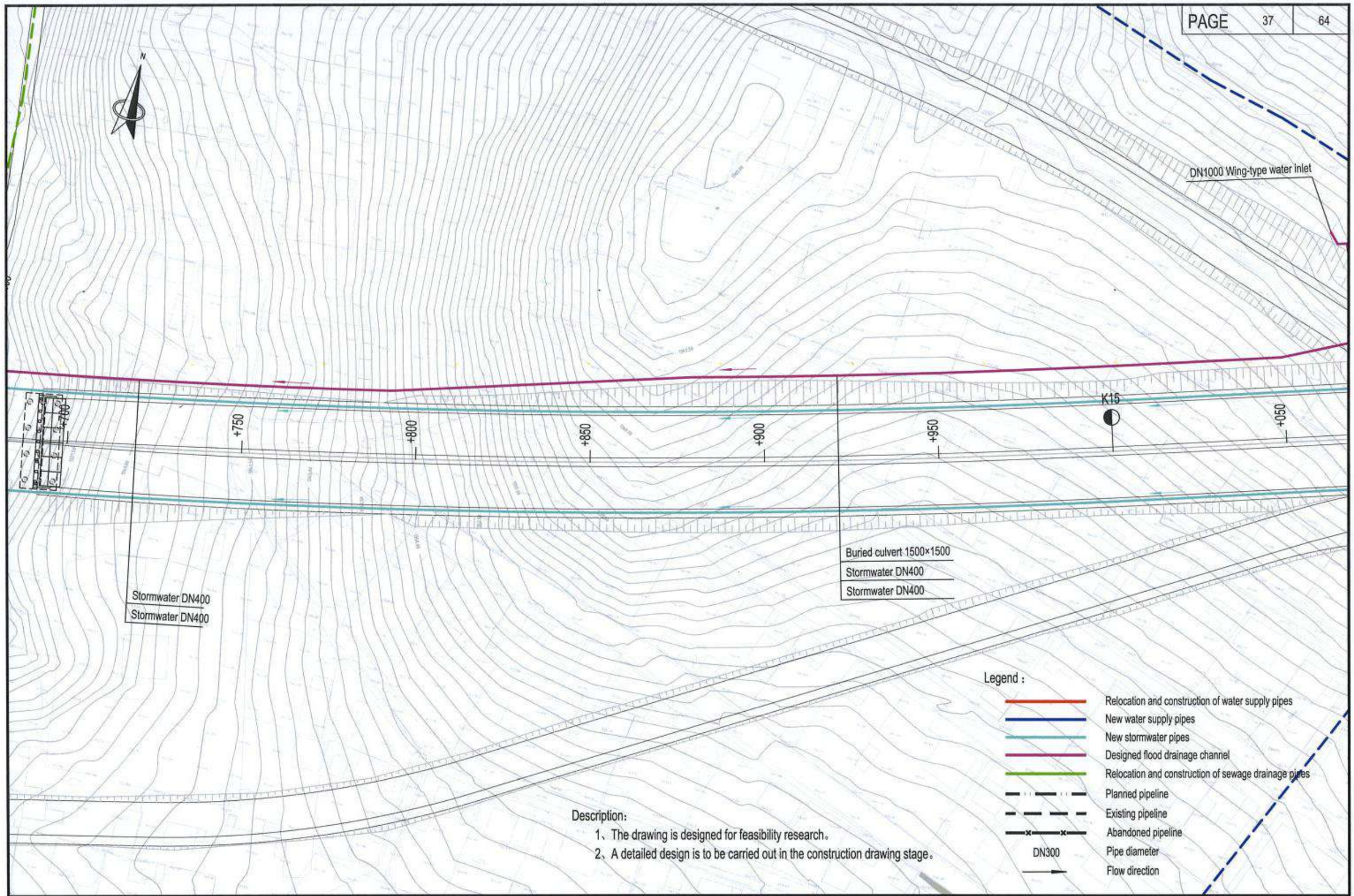
		Layout plan of water supply and drainage pipelines (K14+350~K14+700)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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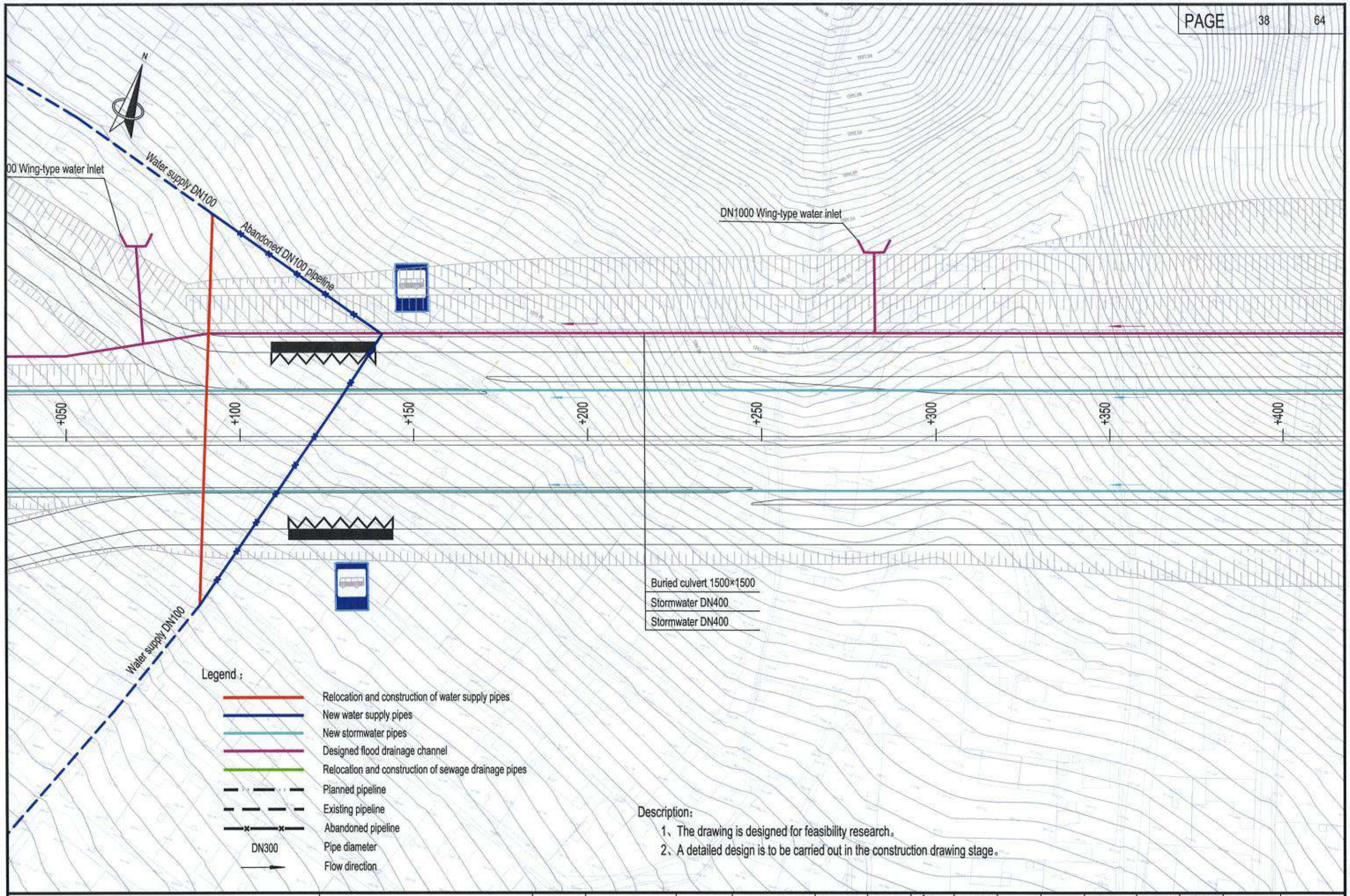
		Layout plan of water supply and drainage pipelines (K14+700~K15+050)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Description:

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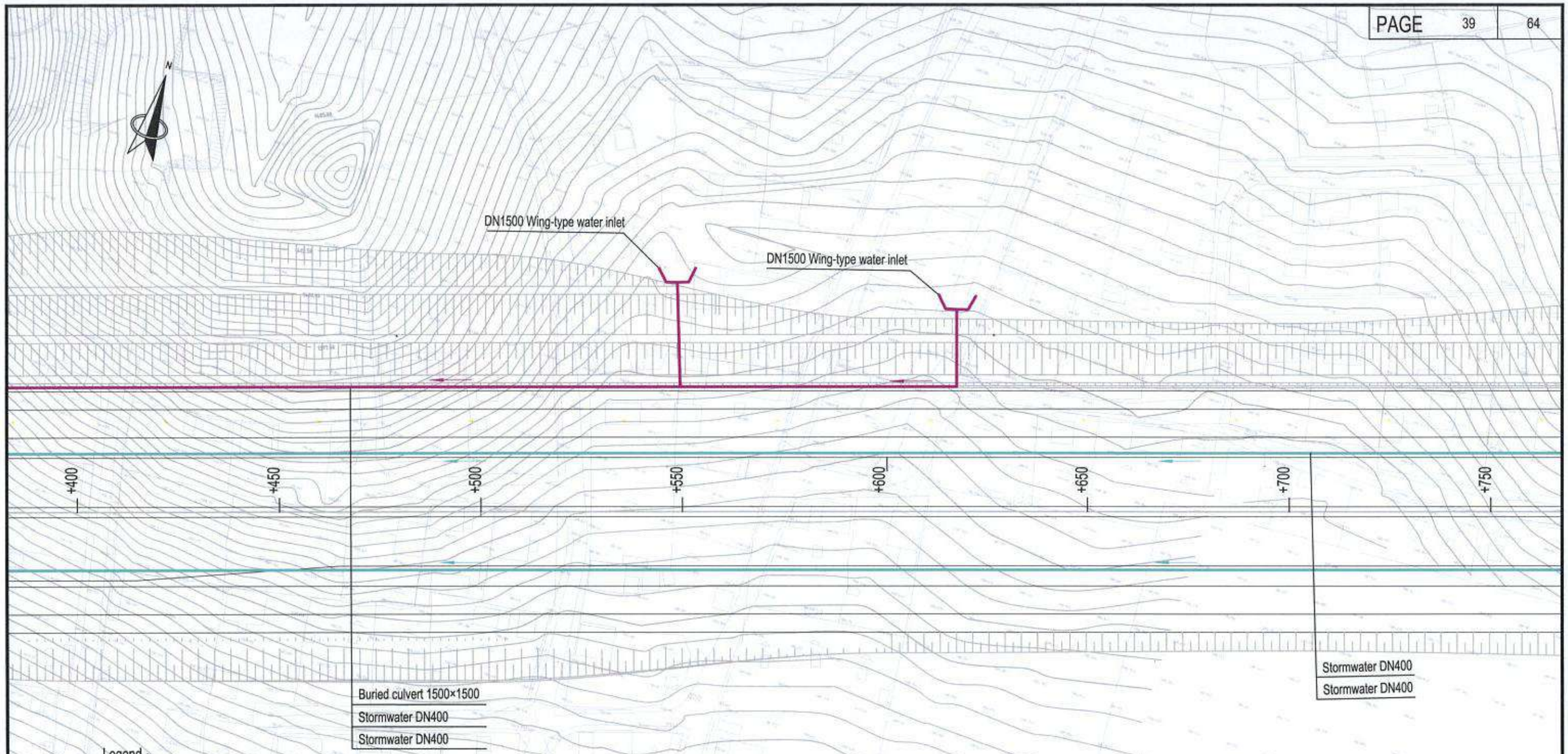
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K15+050~K15+400)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Legend：

- Relocation and construction of water supply pipes
- New water supply pipes
- New stormwater pipes
- Designed flood drainage channel
- Relocation and construction of sewage drainage pipes
- Planned pipeline
- Existing pipeline
- Abandoned pipeline
- DN300 Pipe diameter
- Flow direction

Description:

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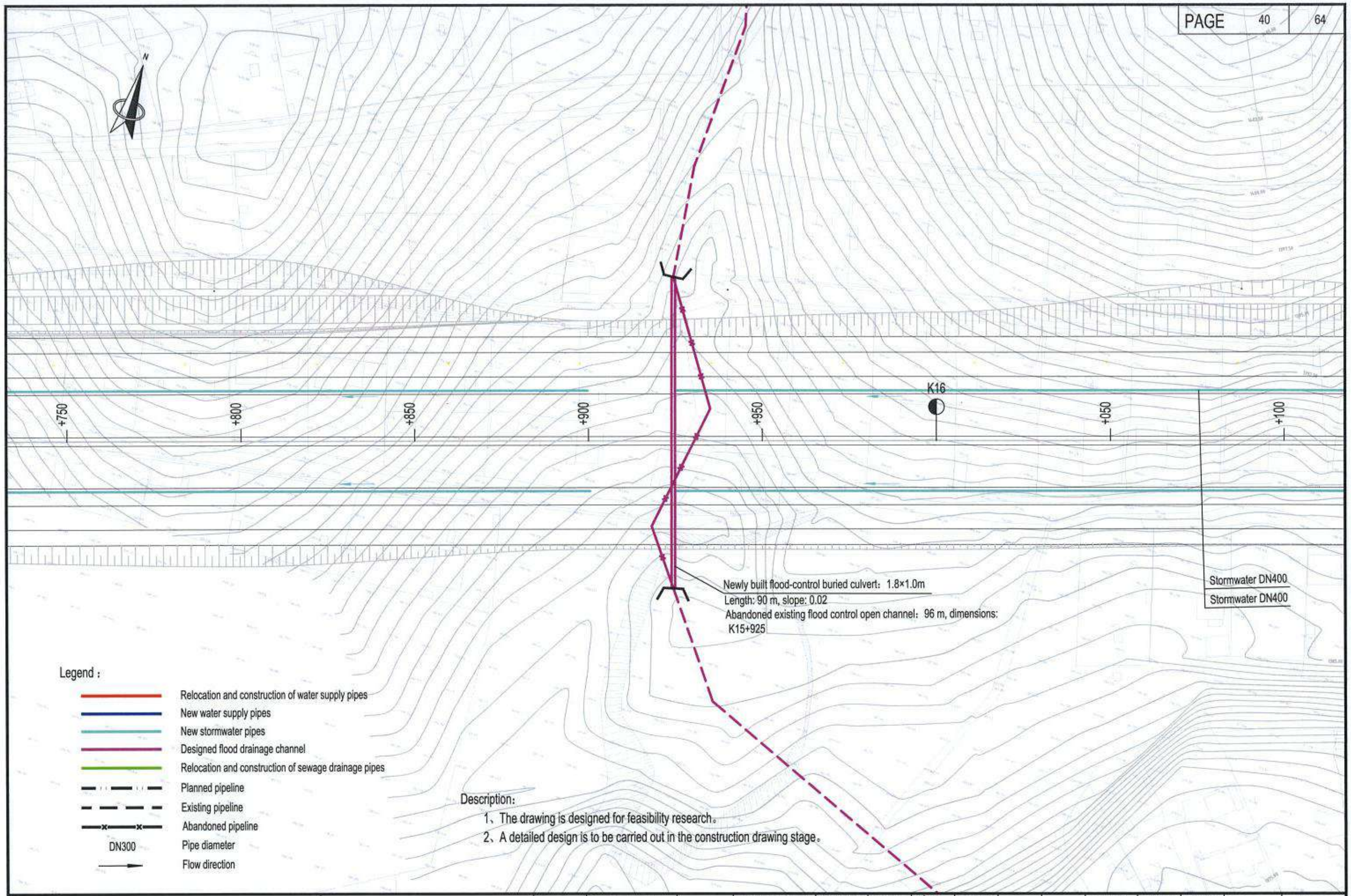
		Layout plan of water supply and drainage pipelines (K15+400~K15+750)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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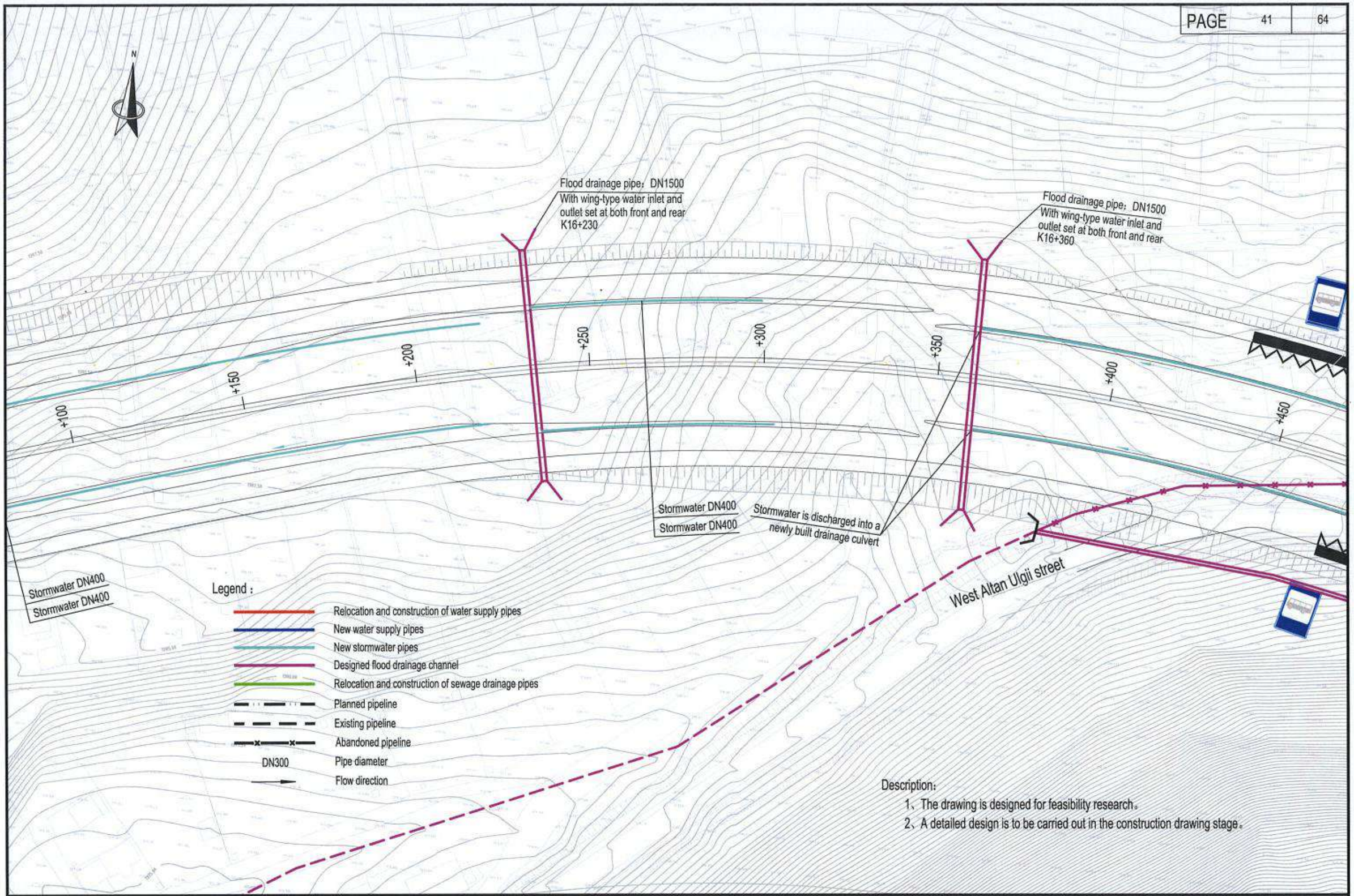
		Layout plan of water supply and drainage pipelines (K15+750~K16+100)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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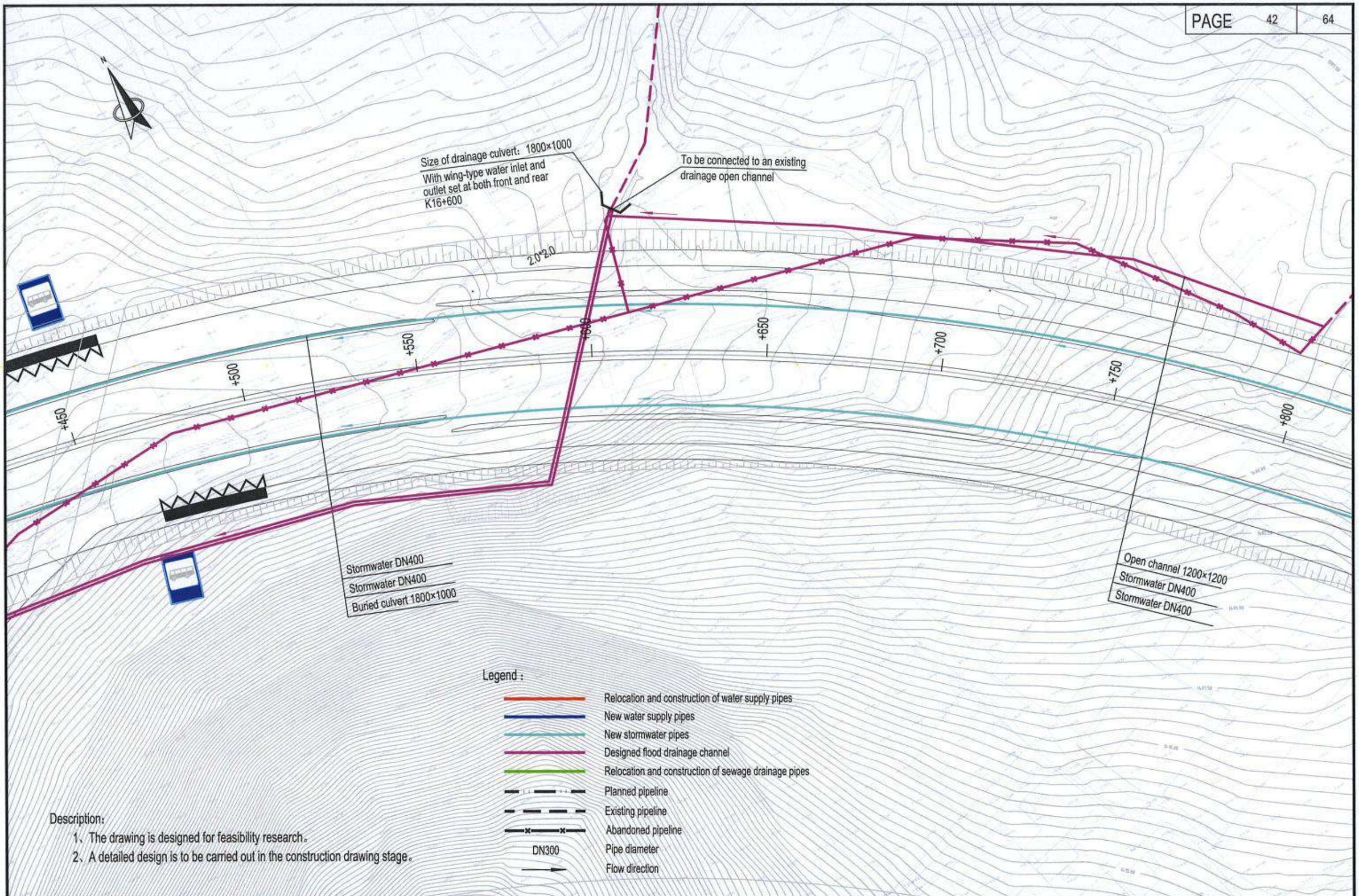
		Layout plan of water supply and drainage pipelines (K16+100~K16+450)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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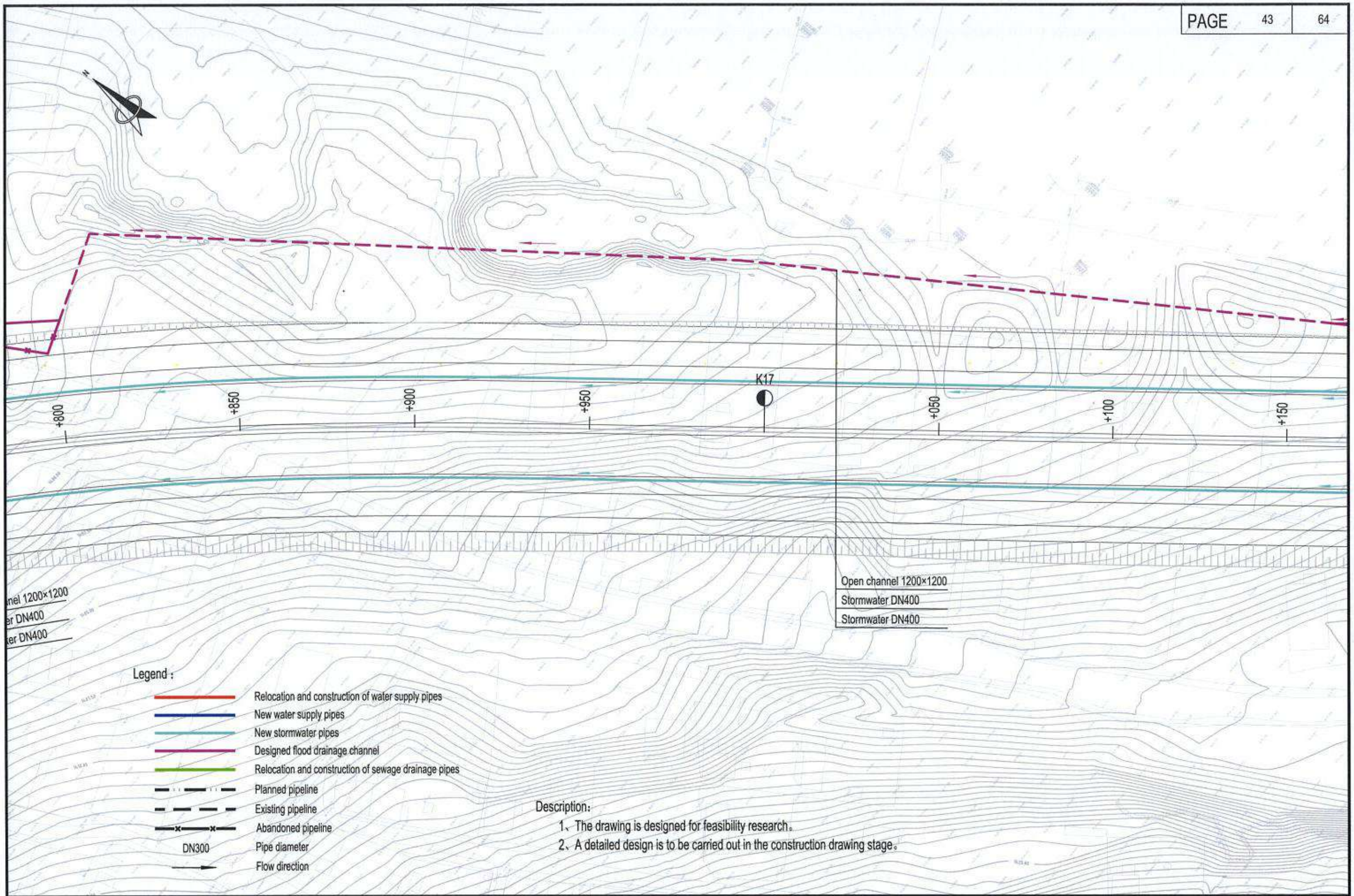
		Layout plan of water supply and drainage pipelines (K16+450~K16+800)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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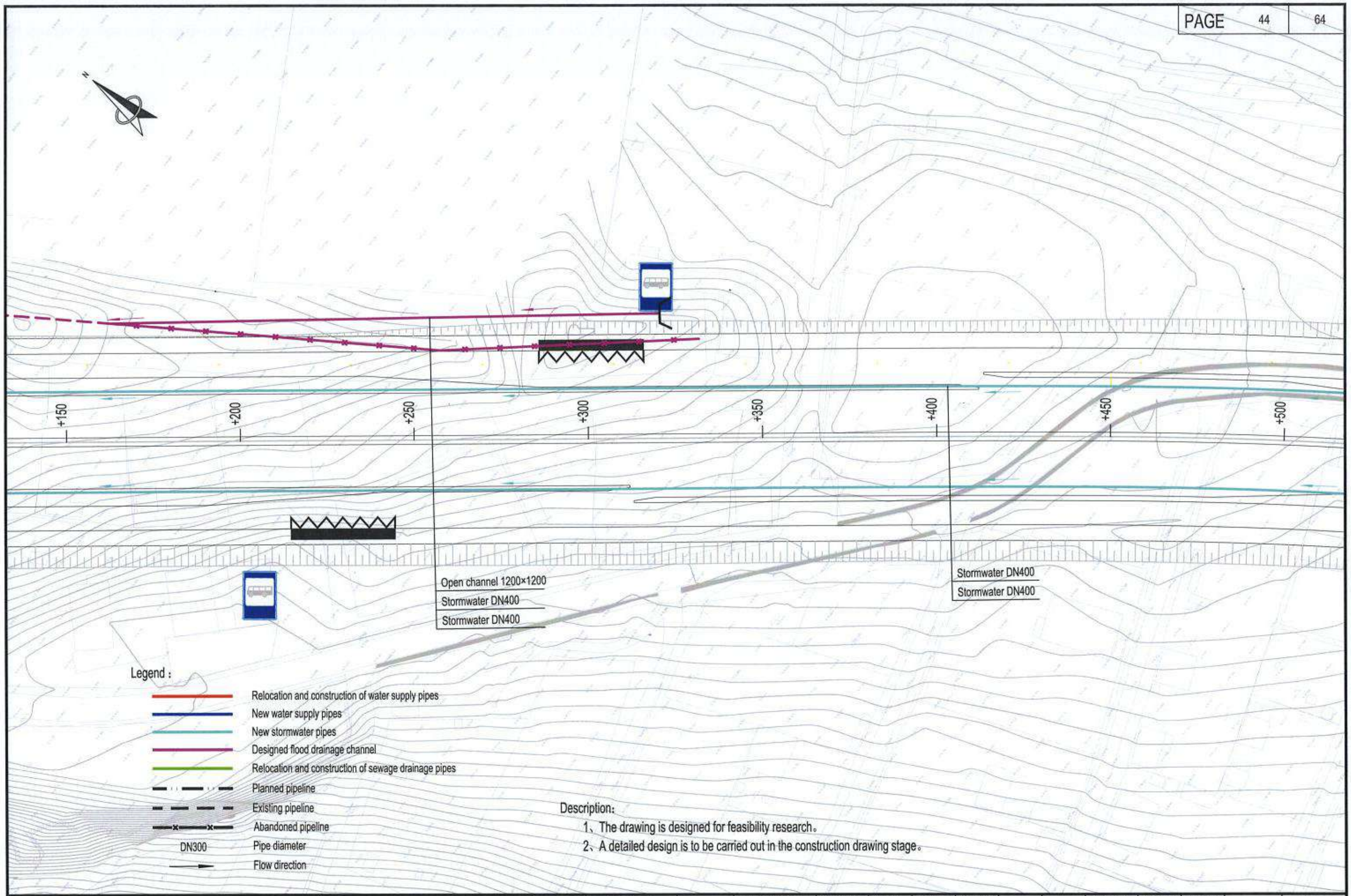
		Layout plan of water supply and drainage pipelines (K16+800~K17+150)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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		Layout plan of water supply and drainage pipelines (K17+150~K17+500)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
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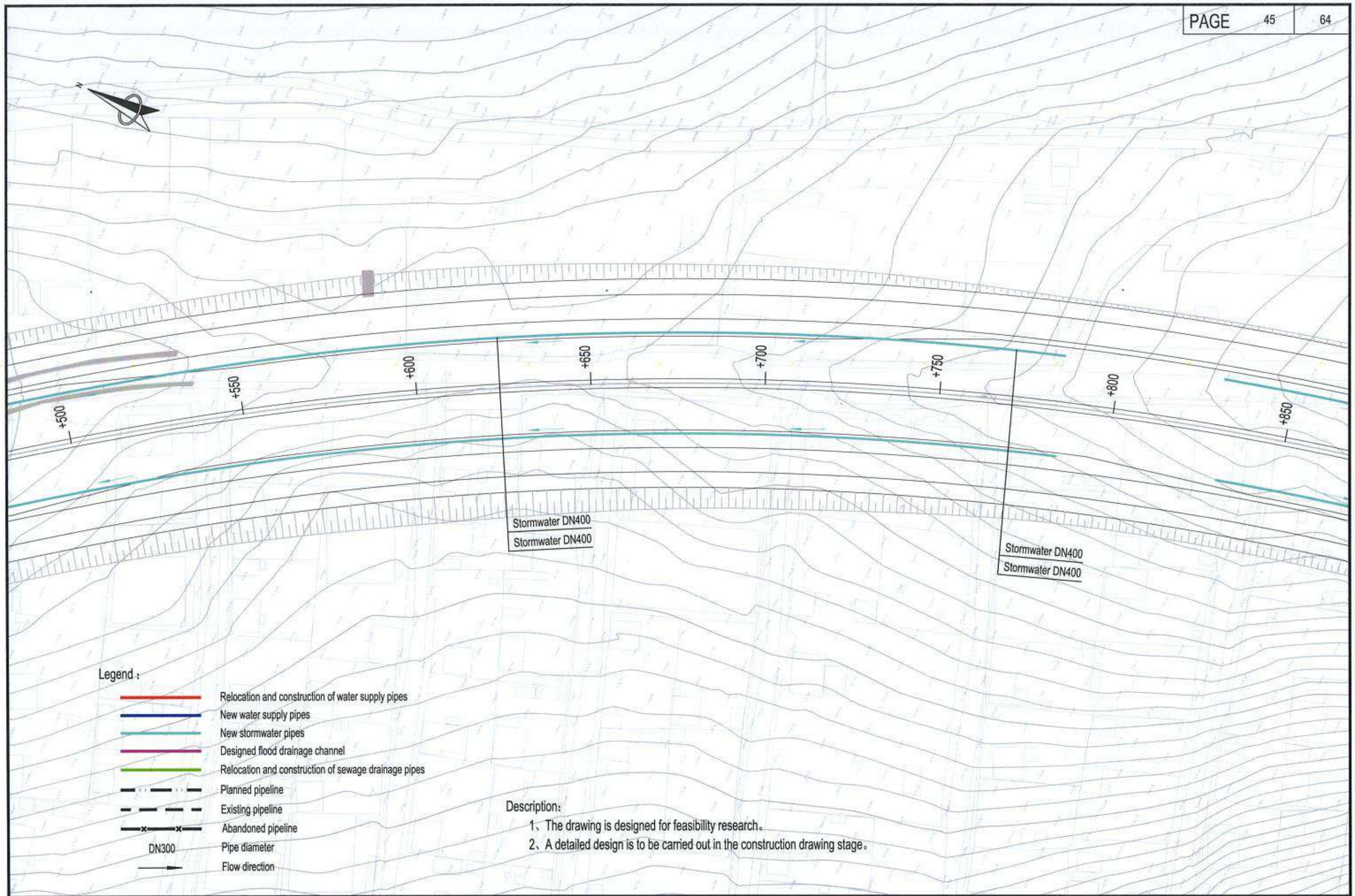

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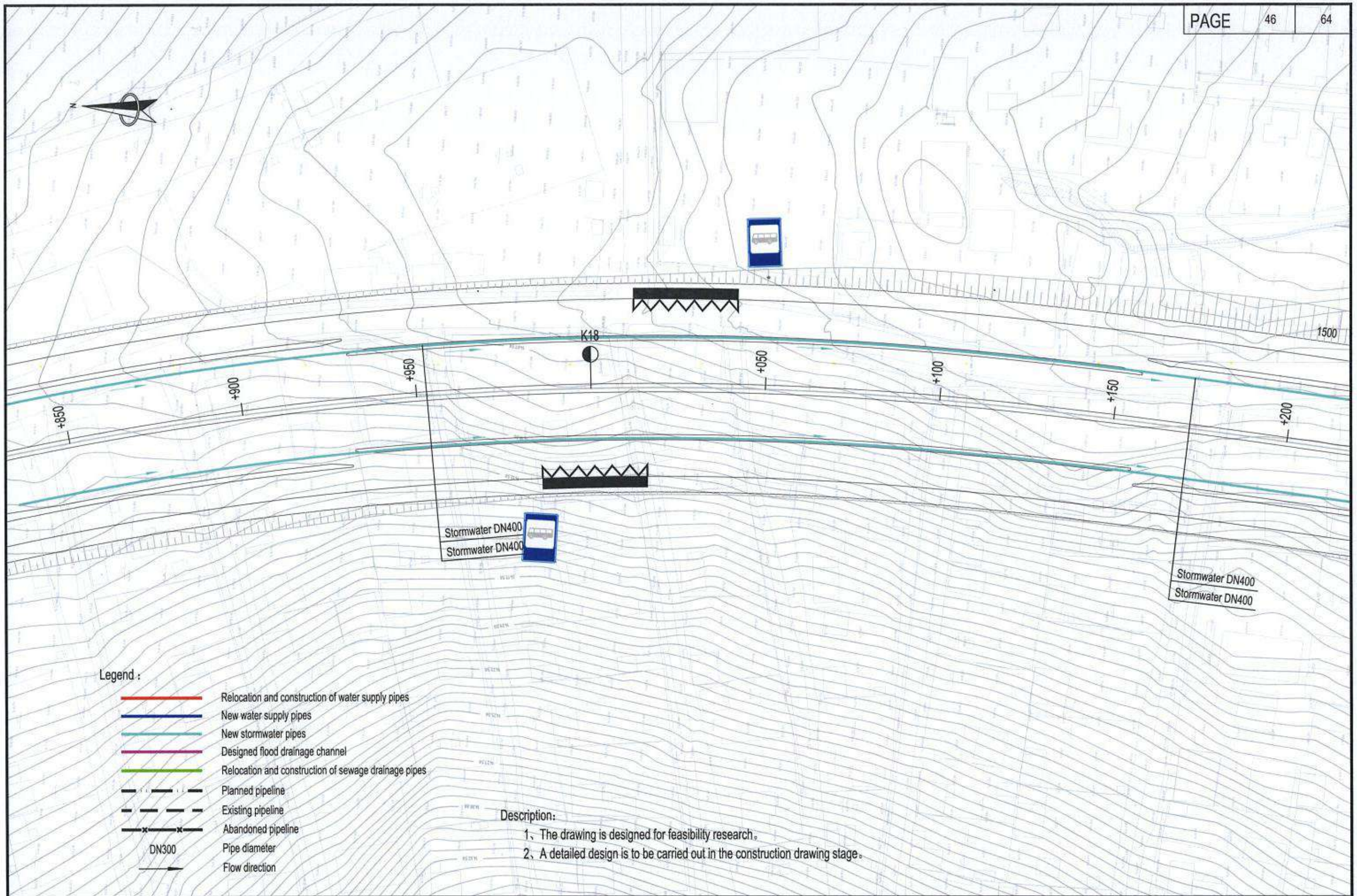
		Layout plan of water supply and drainage pipelines (K17+500~K17+850)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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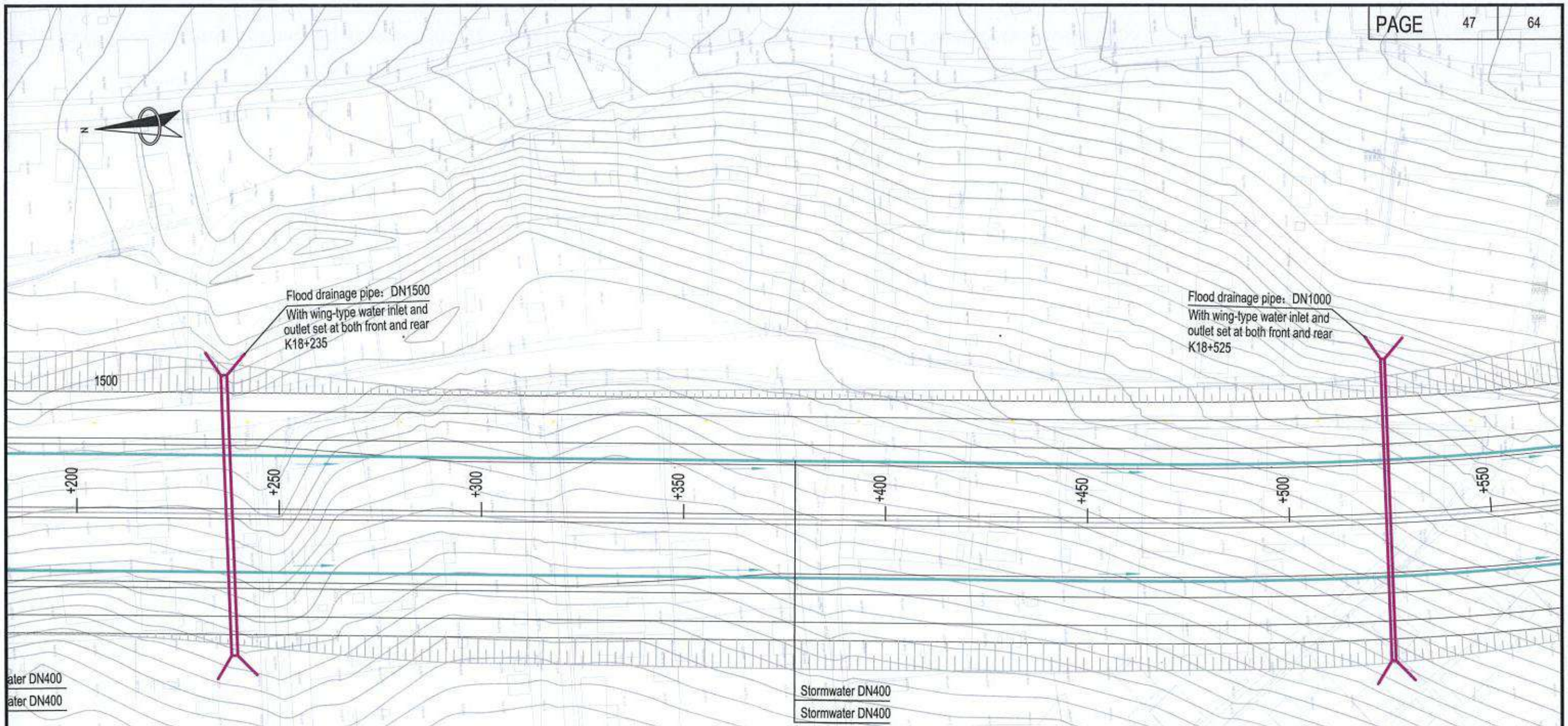
		Layout plan of water supply and drainage pipelines (K17+850~K18+200)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Legend：

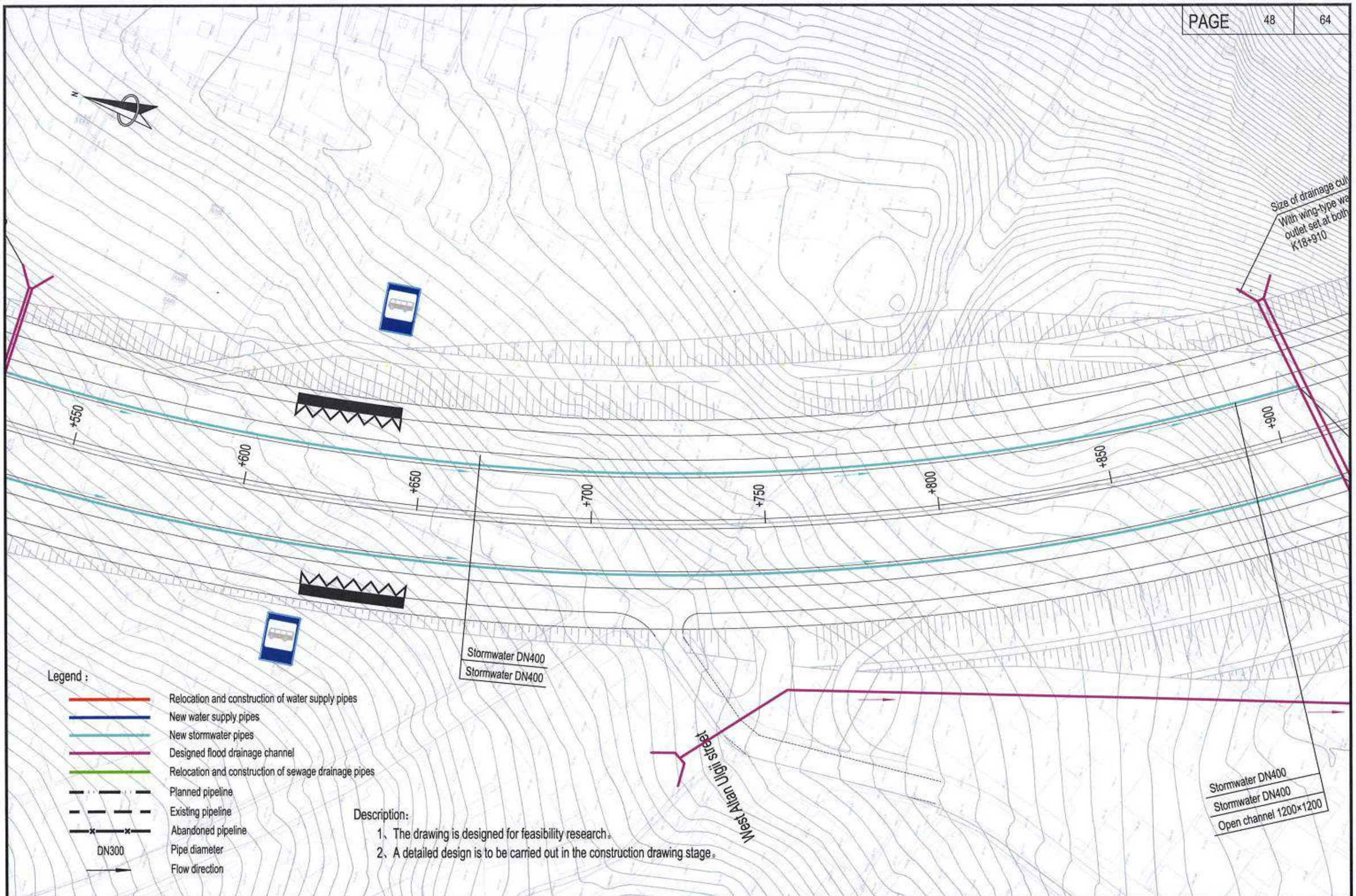
- Relocation and construction of water supply pipes
- New water supply pipes
- New stormwater pipes
- Designed flood drainage channel
- Relocation and construction of sewage drainage pipes
- Planned pipeline
- Existing pipeline
- Abandoned pipeline
- DN300 Pipe diameter
- Flow direction

Description:

1、The drawing is designed for feasibility research。

2、A detailed design is to be carried out in the construction drawing stage。

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K18+200~K18+550)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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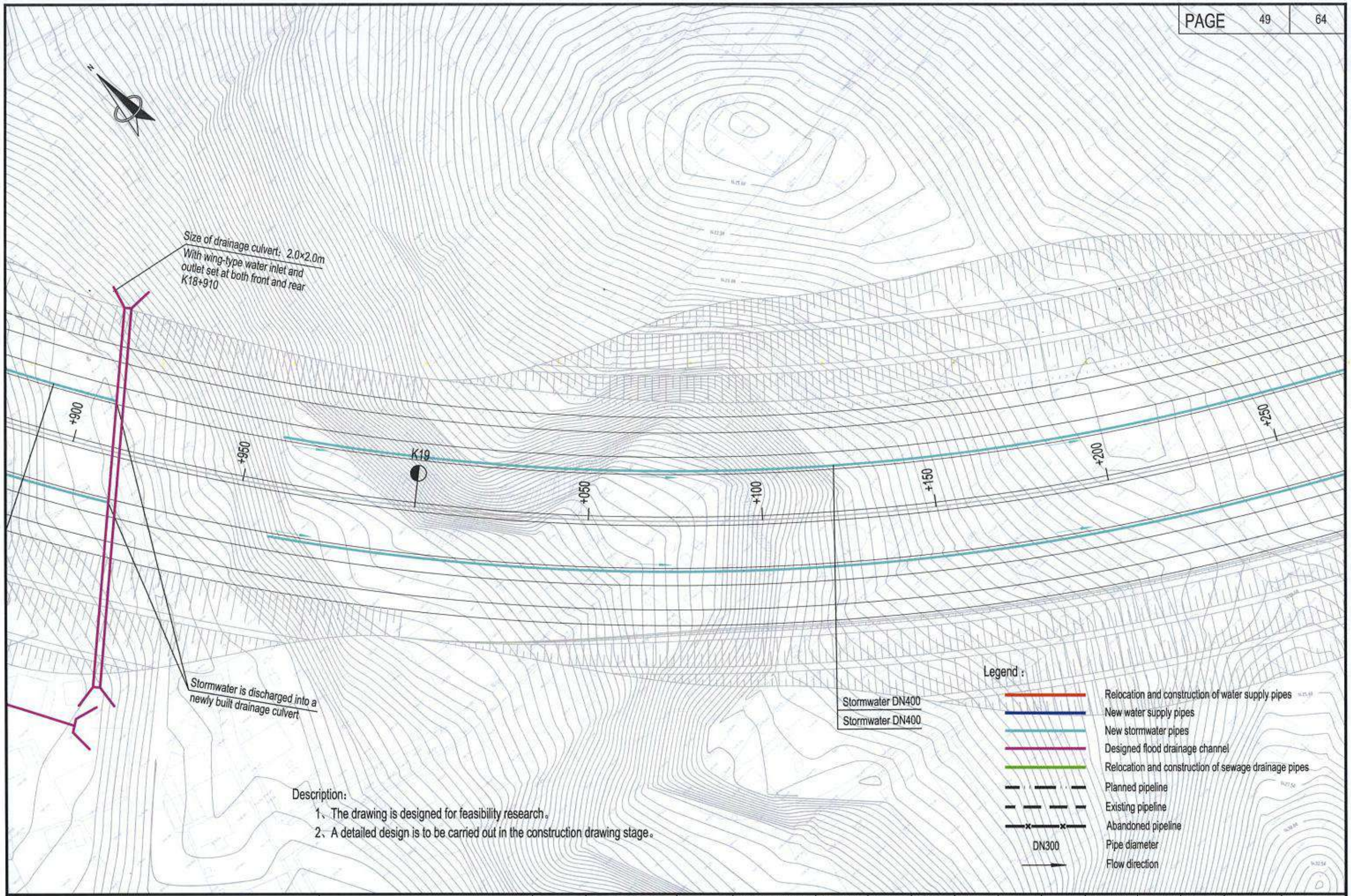
		Layout plan of water supply and drainage pipelines (K18+550~K18+900)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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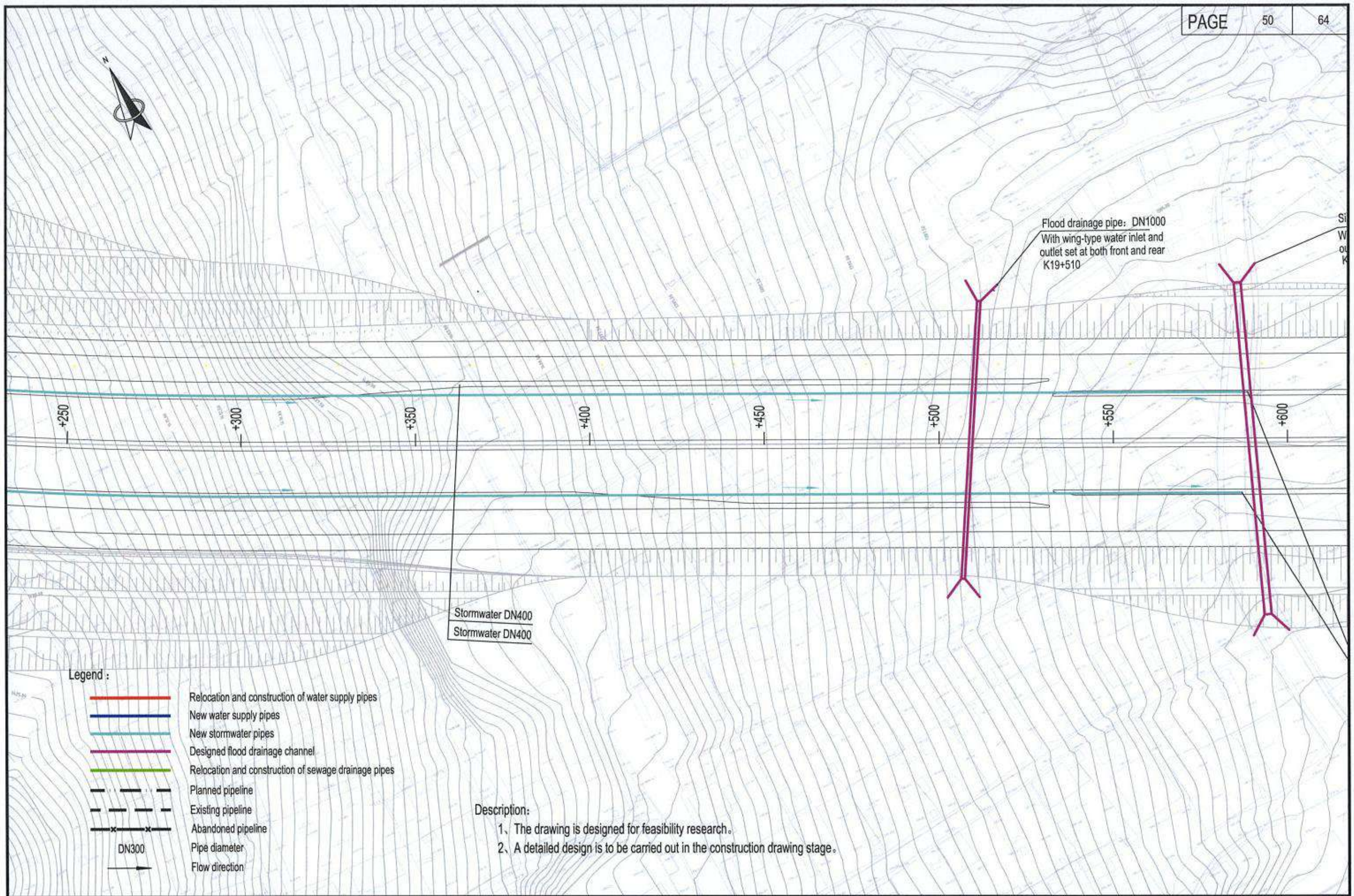
		Layout plan of water supply and drainage pipelines (K18+900~K19+250)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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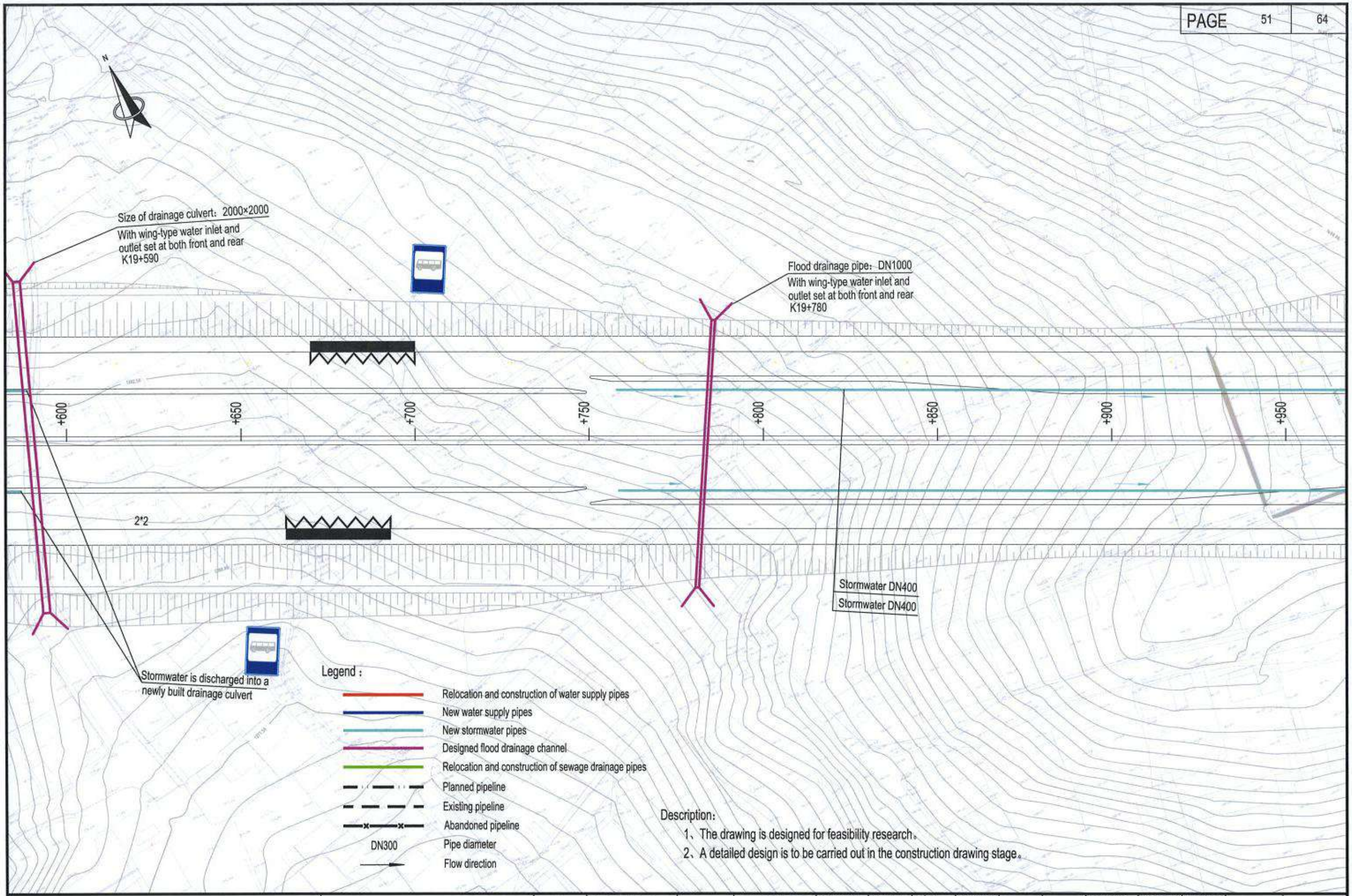
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K19+250~K19+600)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Description:

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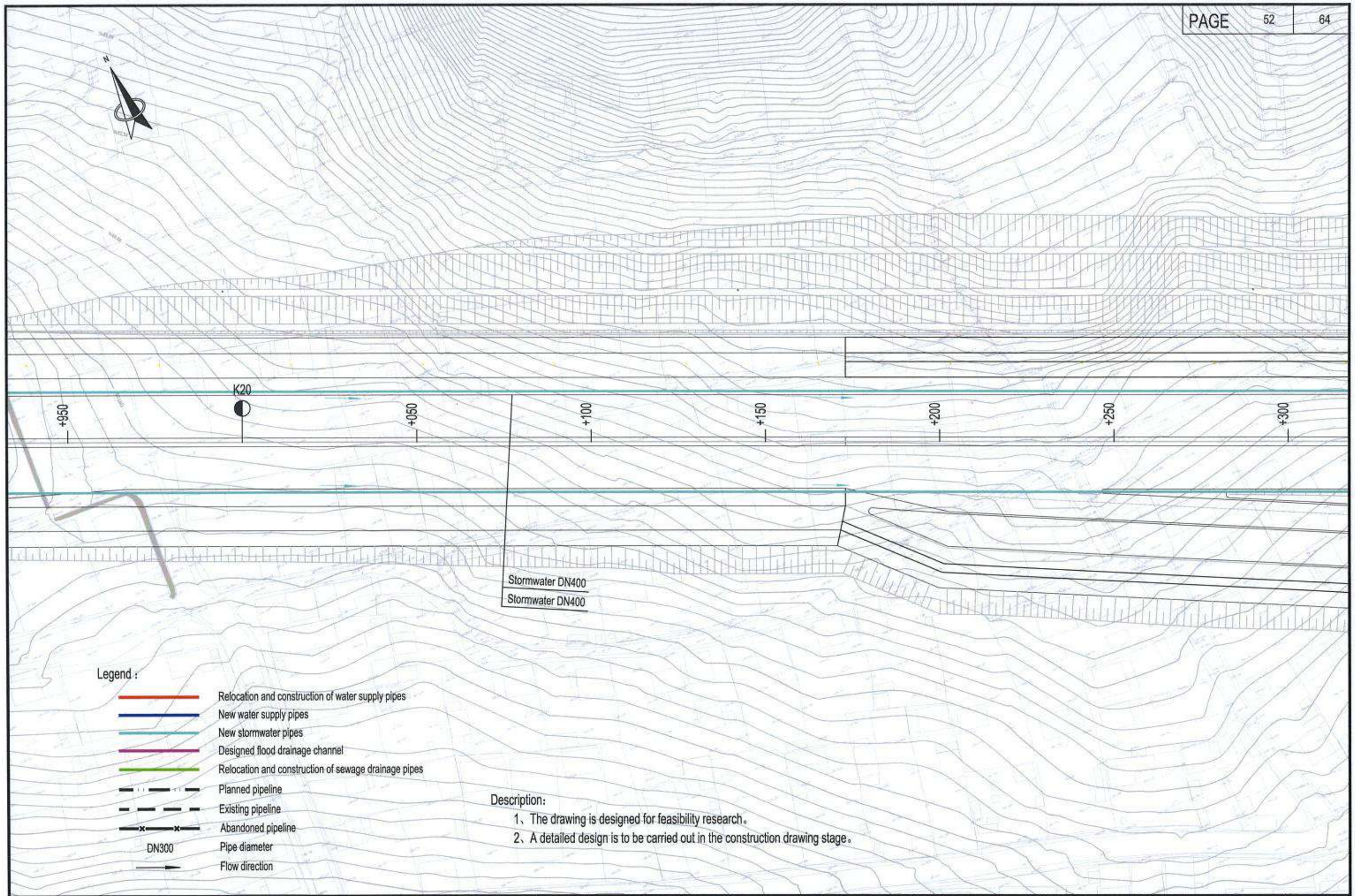
		Layout plan of water supply and drainage pipelines (K19+600~K19+950)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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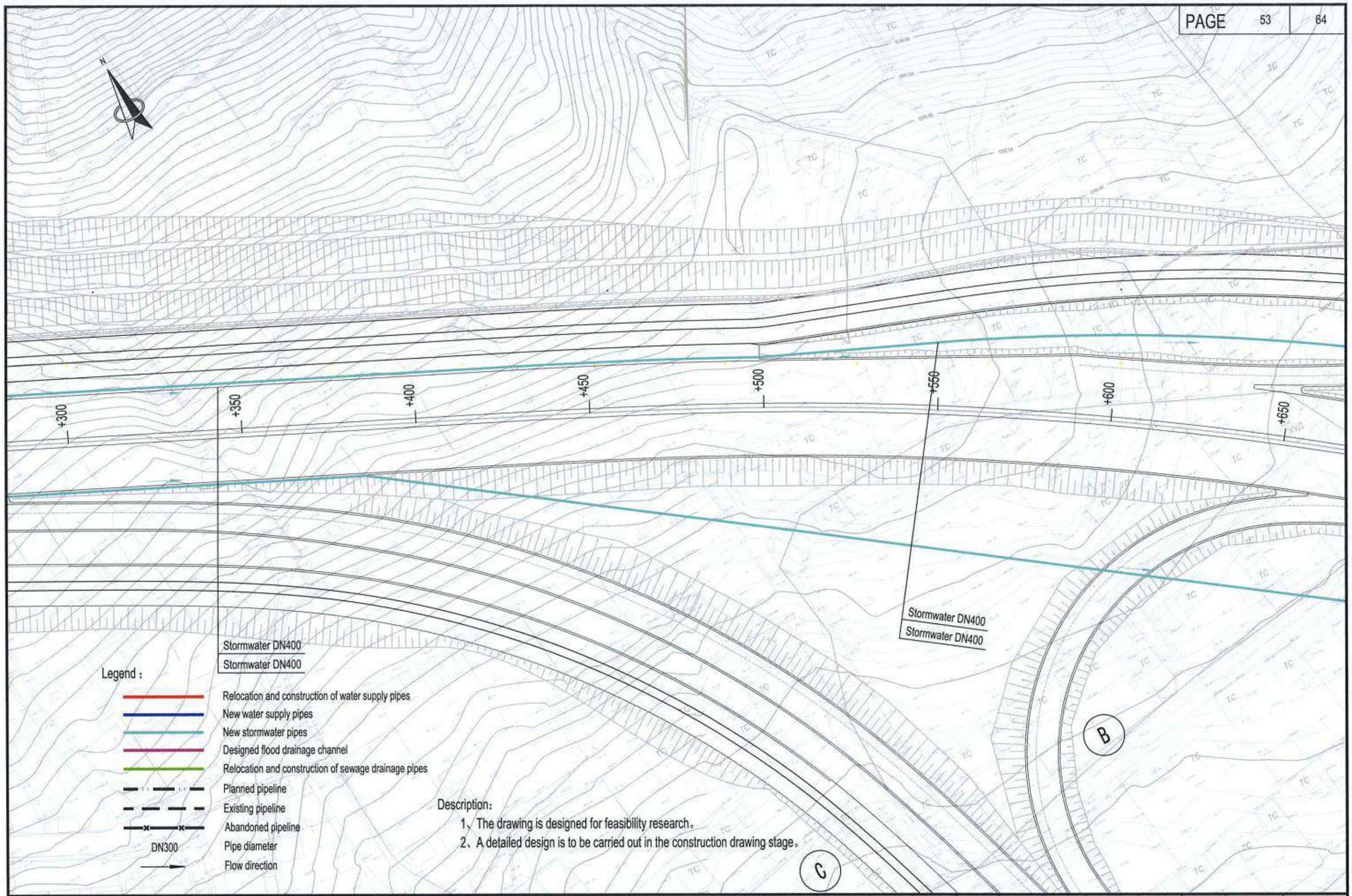
		Layout plan of water supply and drainage pipelines (K19+950~K20+300)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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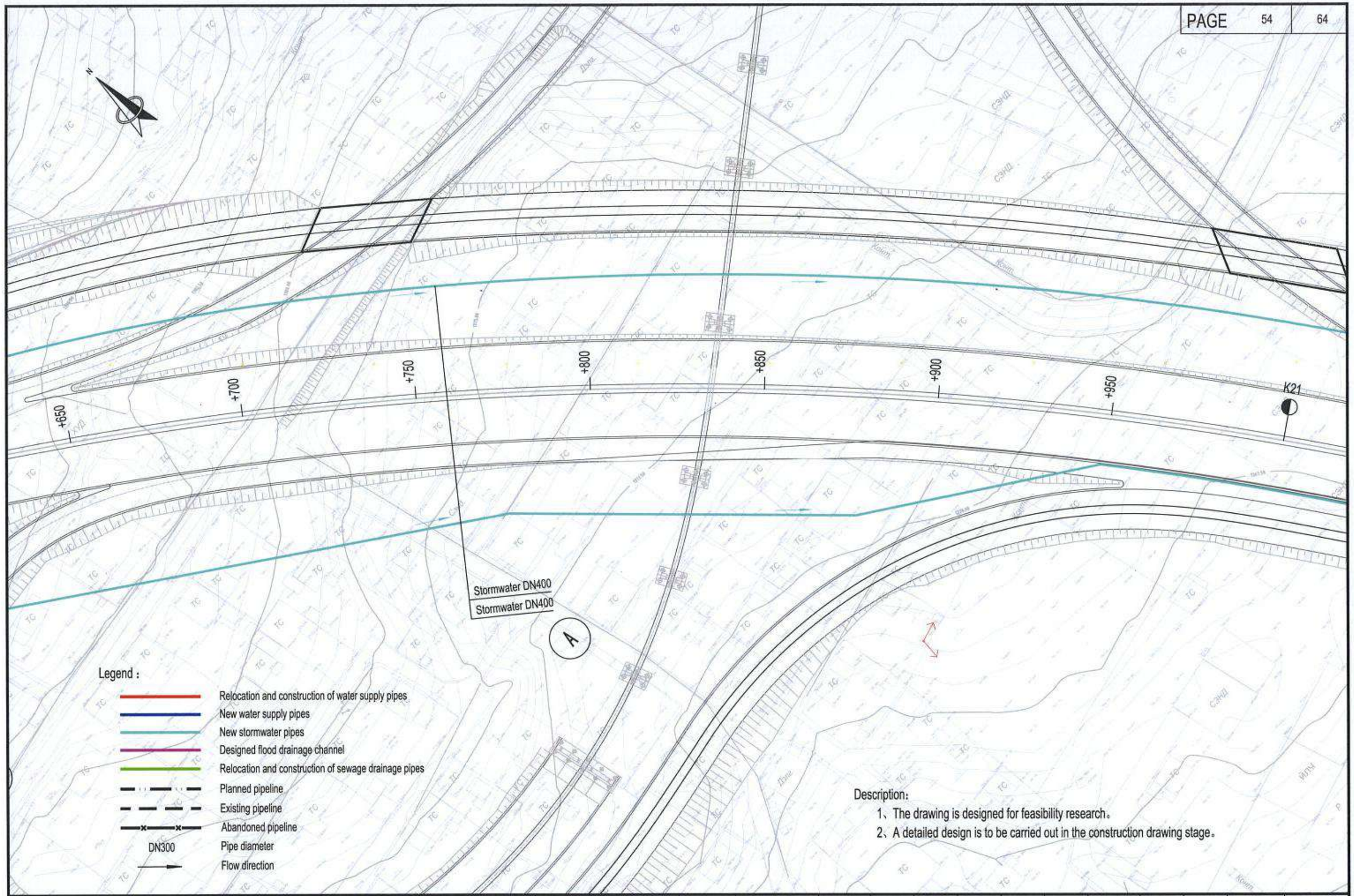
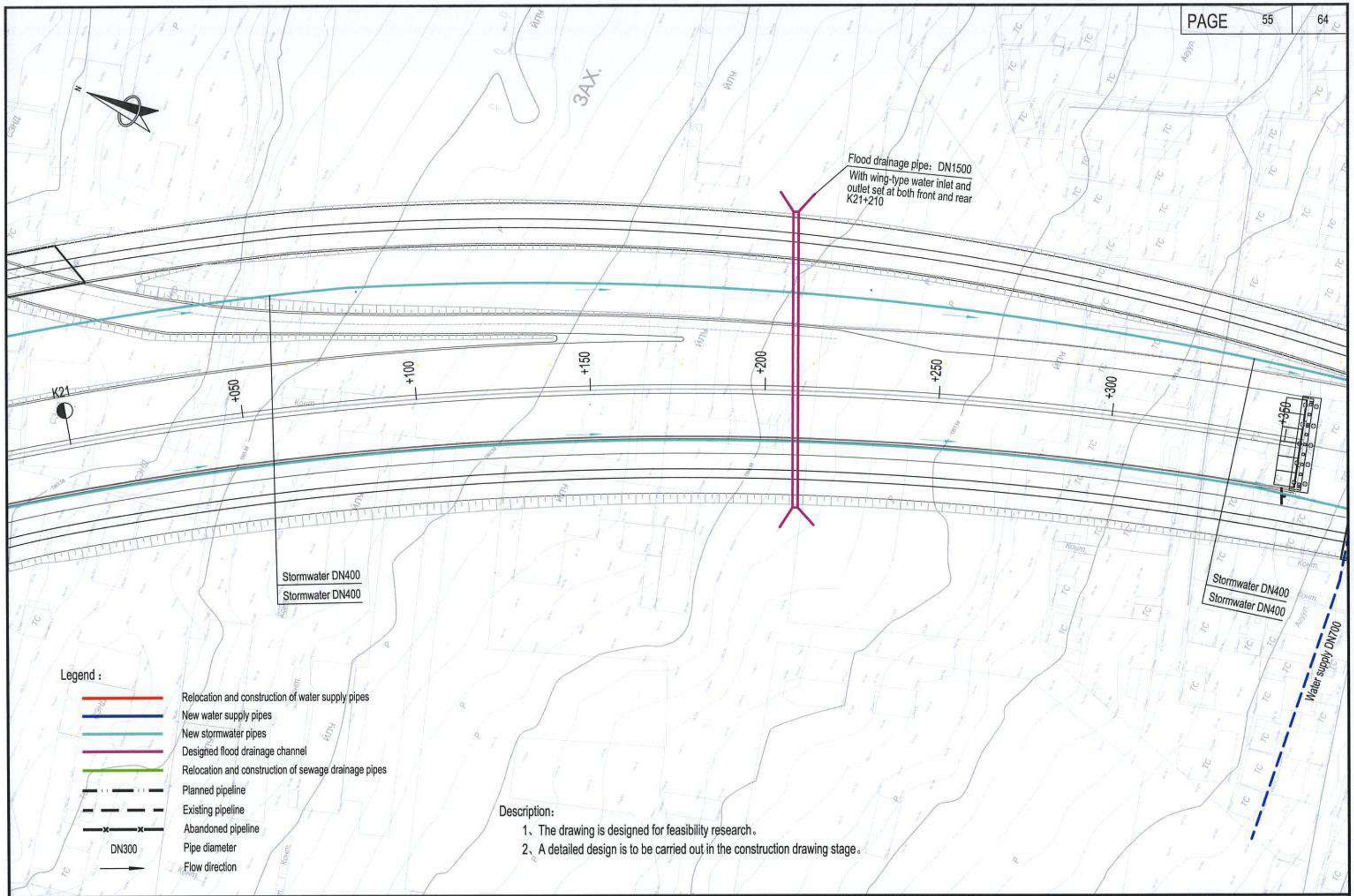
		Layout plan of water supply and drainage pipelines (K20+300~K20+650)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K20+650~K21+000)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



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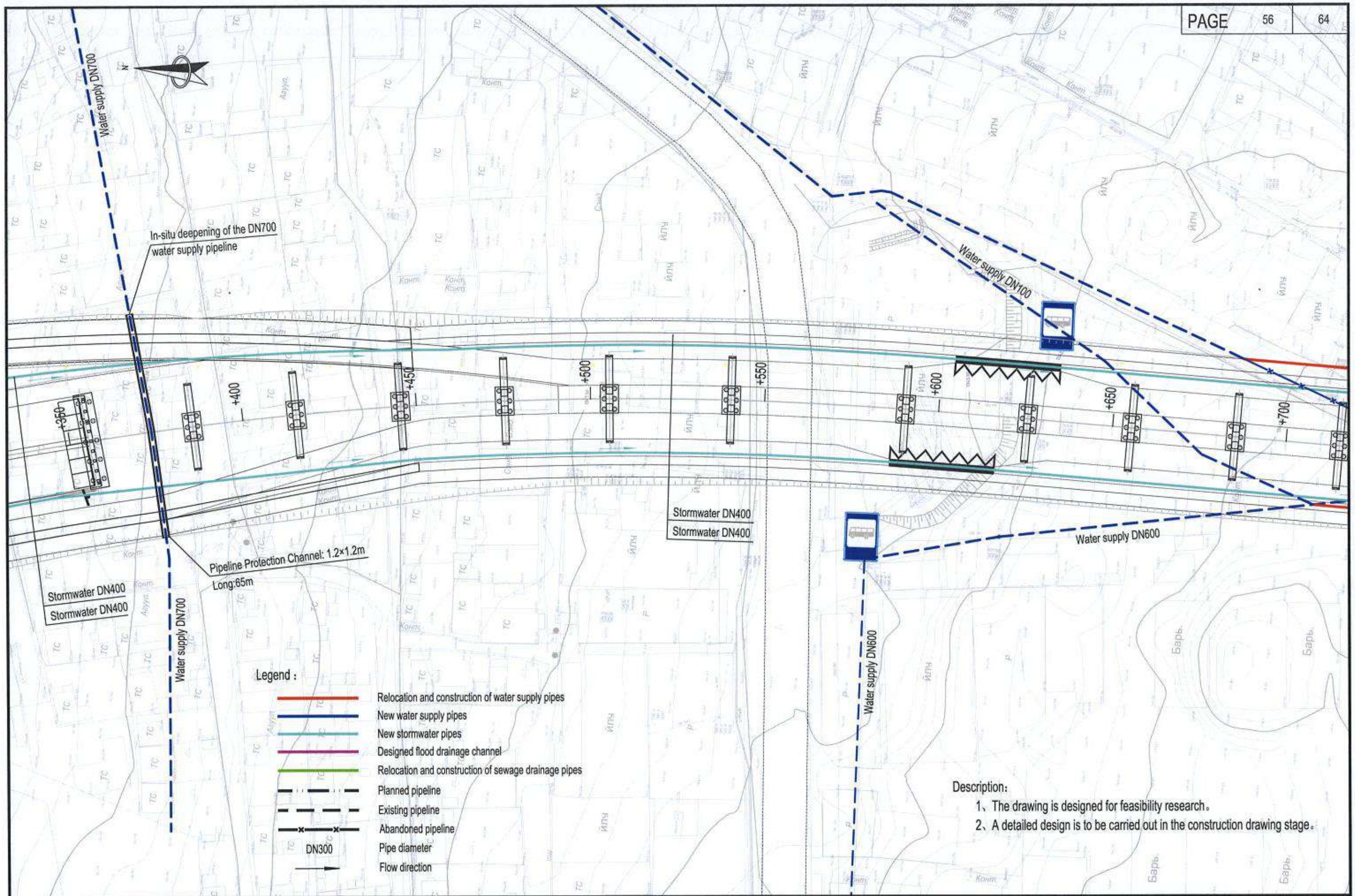
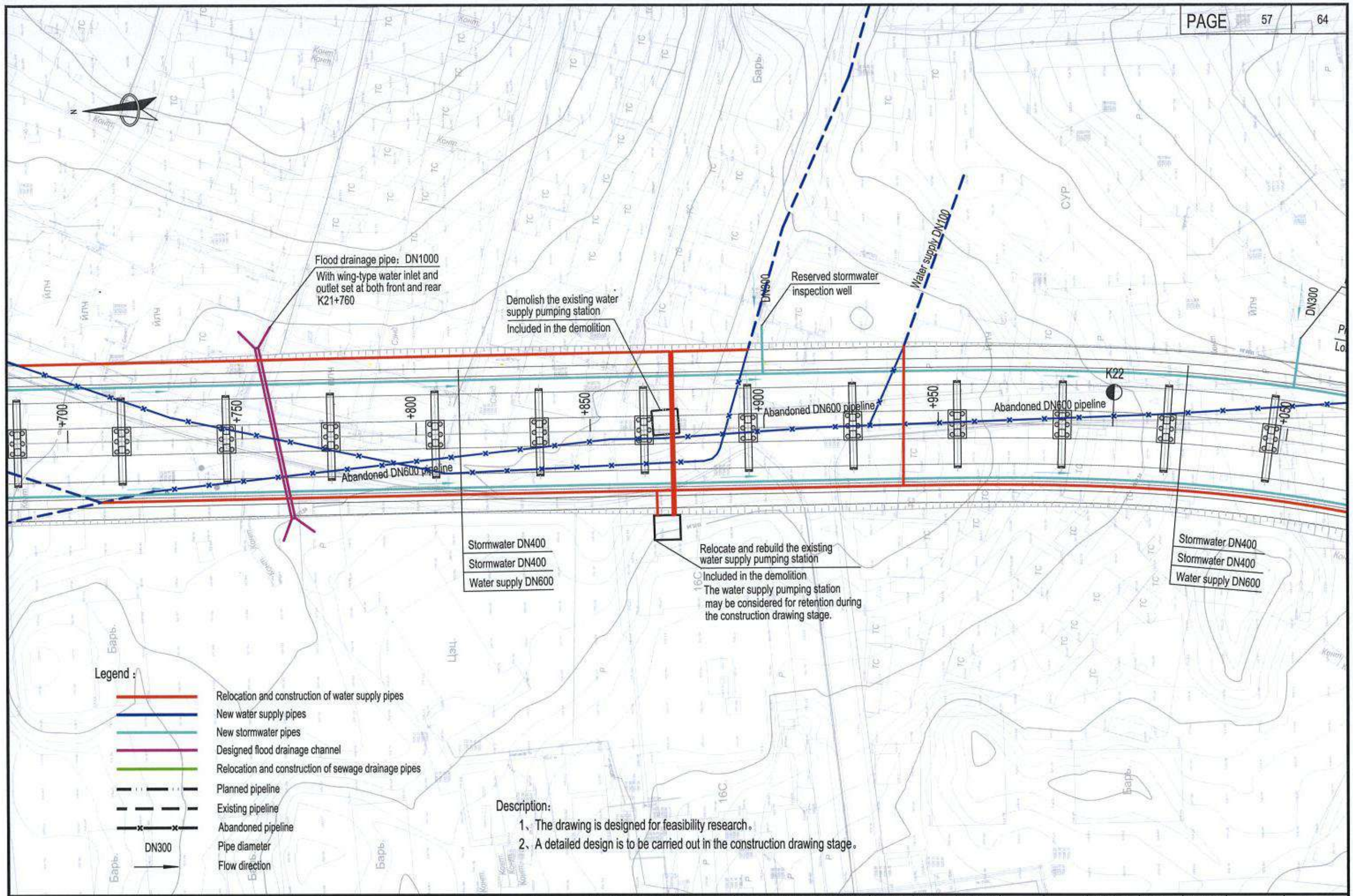
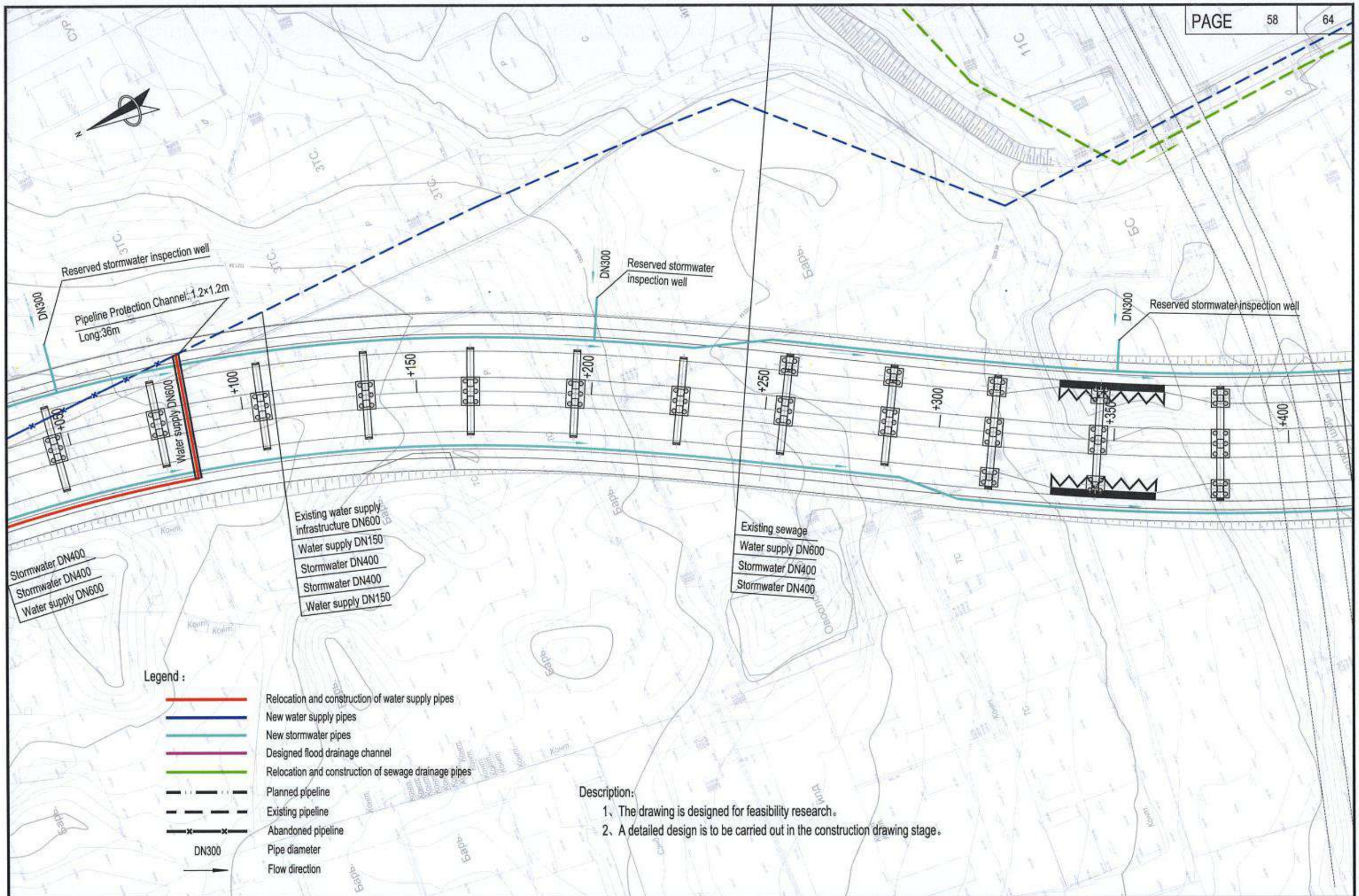
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K21+000~K21+350)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



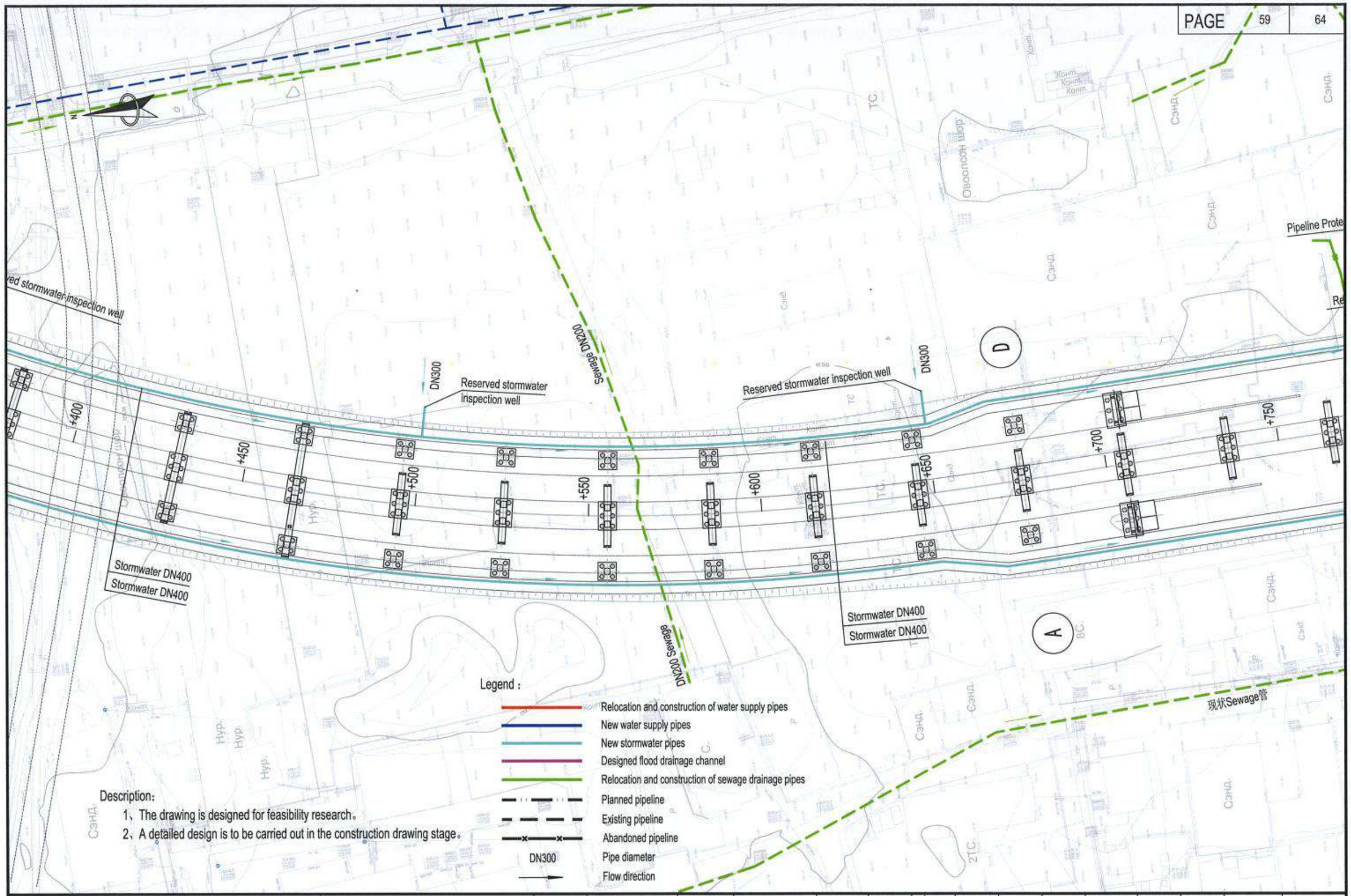
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K21+350~K21+700)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



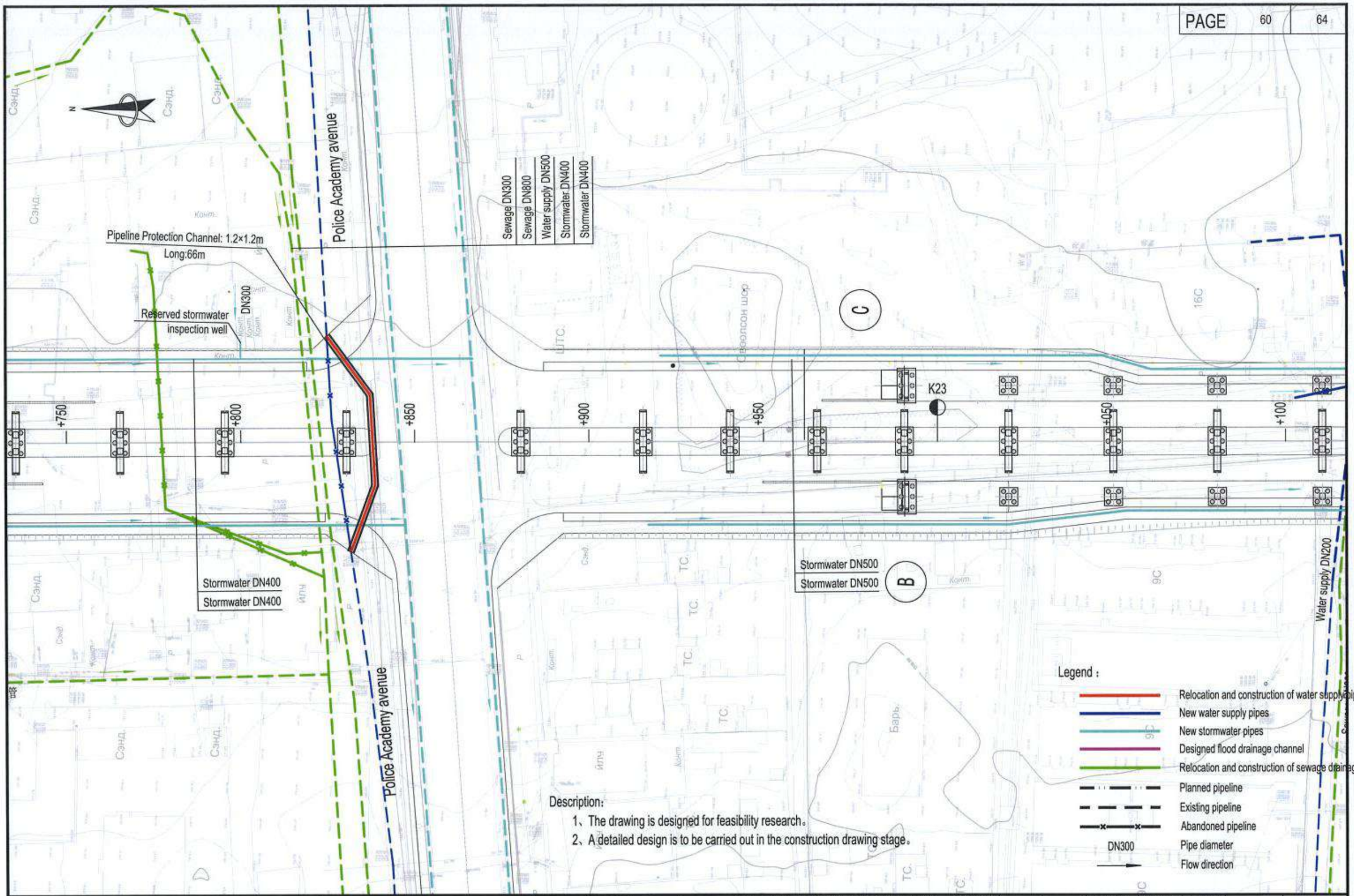
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K21+700~K22+050)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K22+050~K22+400)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K22+400~K22+750)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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		Layout plan of water supply and drainage pipelines (K22+750~K23+100)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
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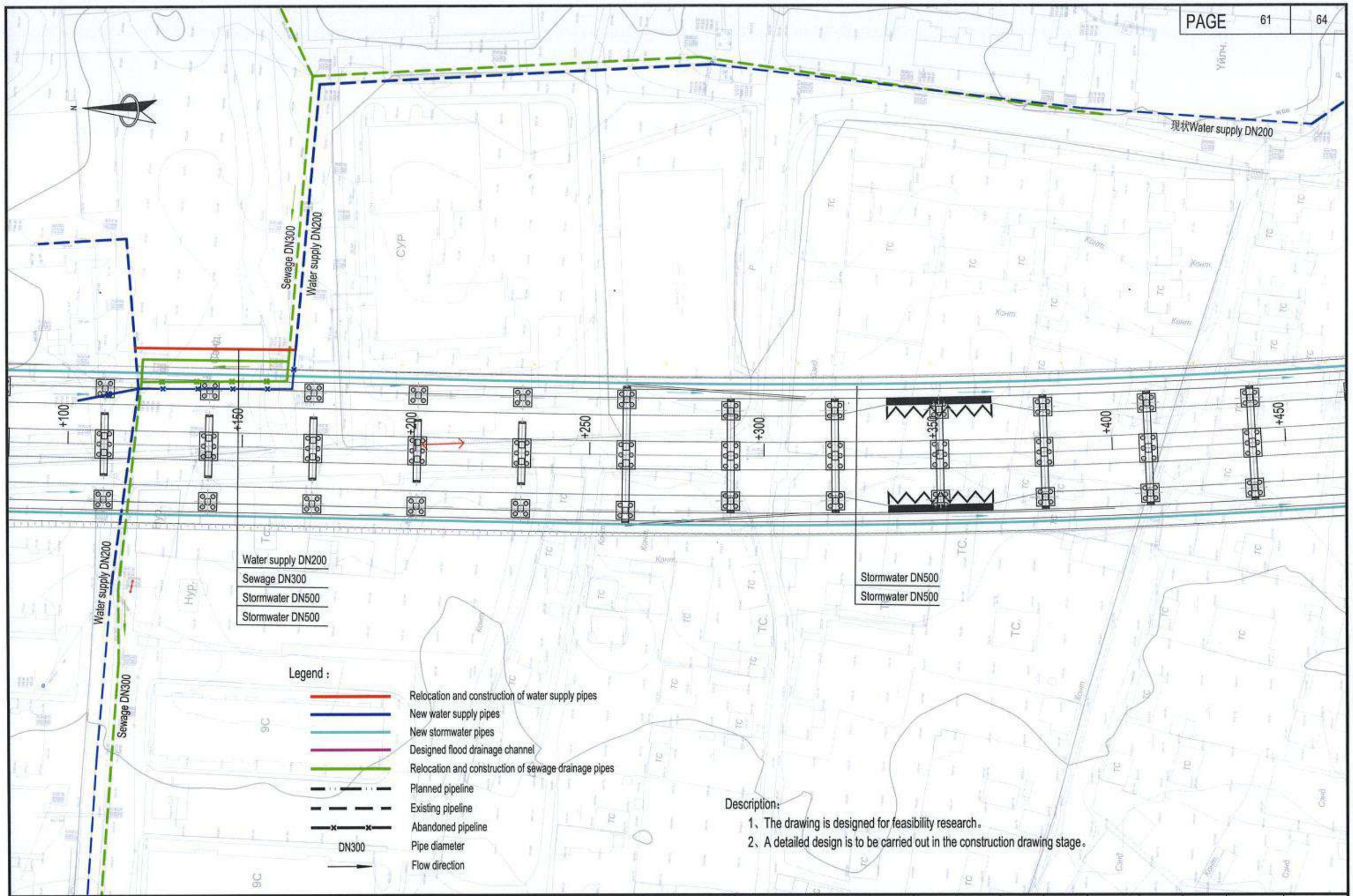

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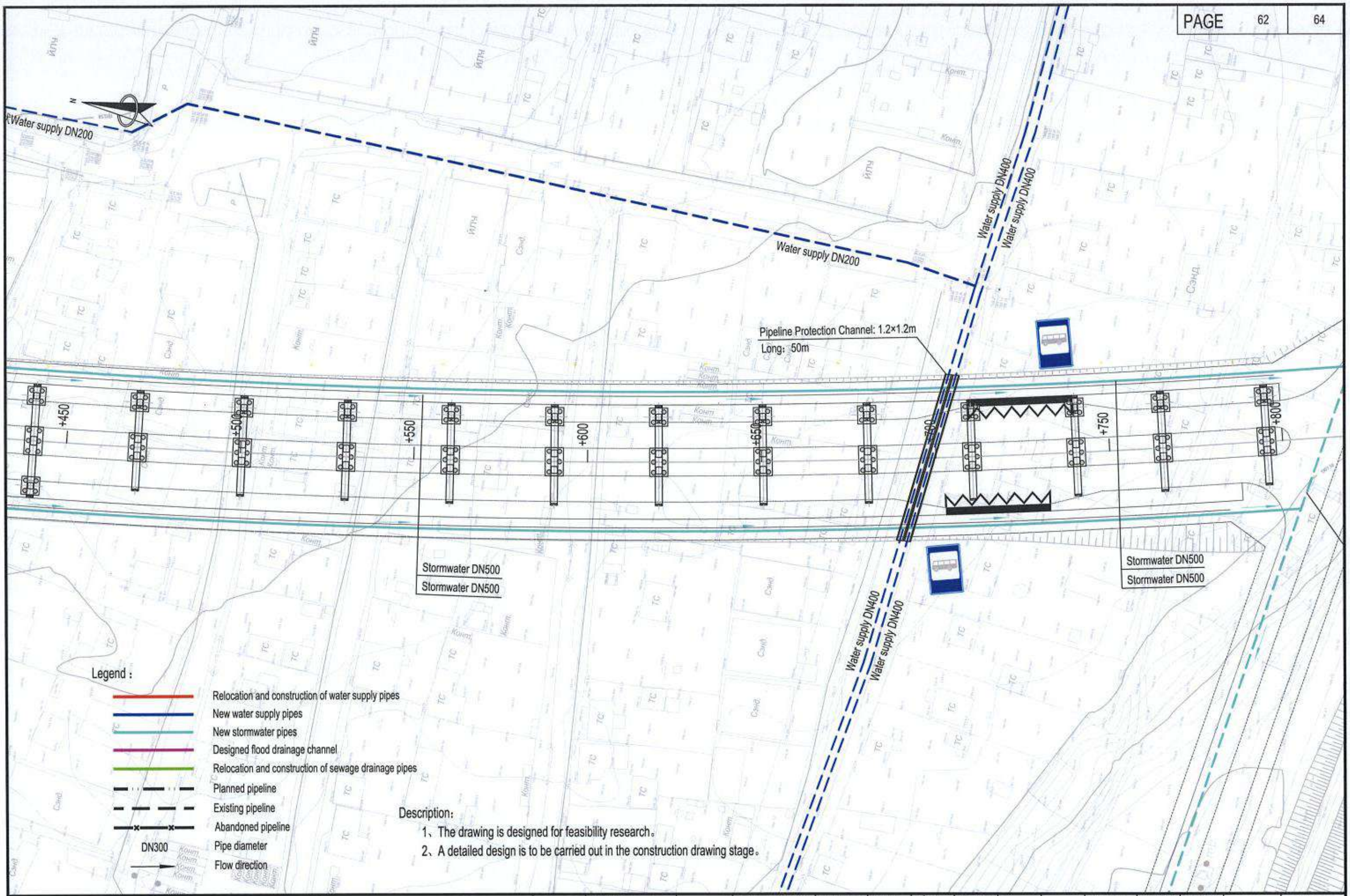
		Layout plan of water supply and drainage pipelines (K23+100~K23+450)				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA	CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE	EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO	APPROVED	WANG HAI MEI	DATE	2025.07



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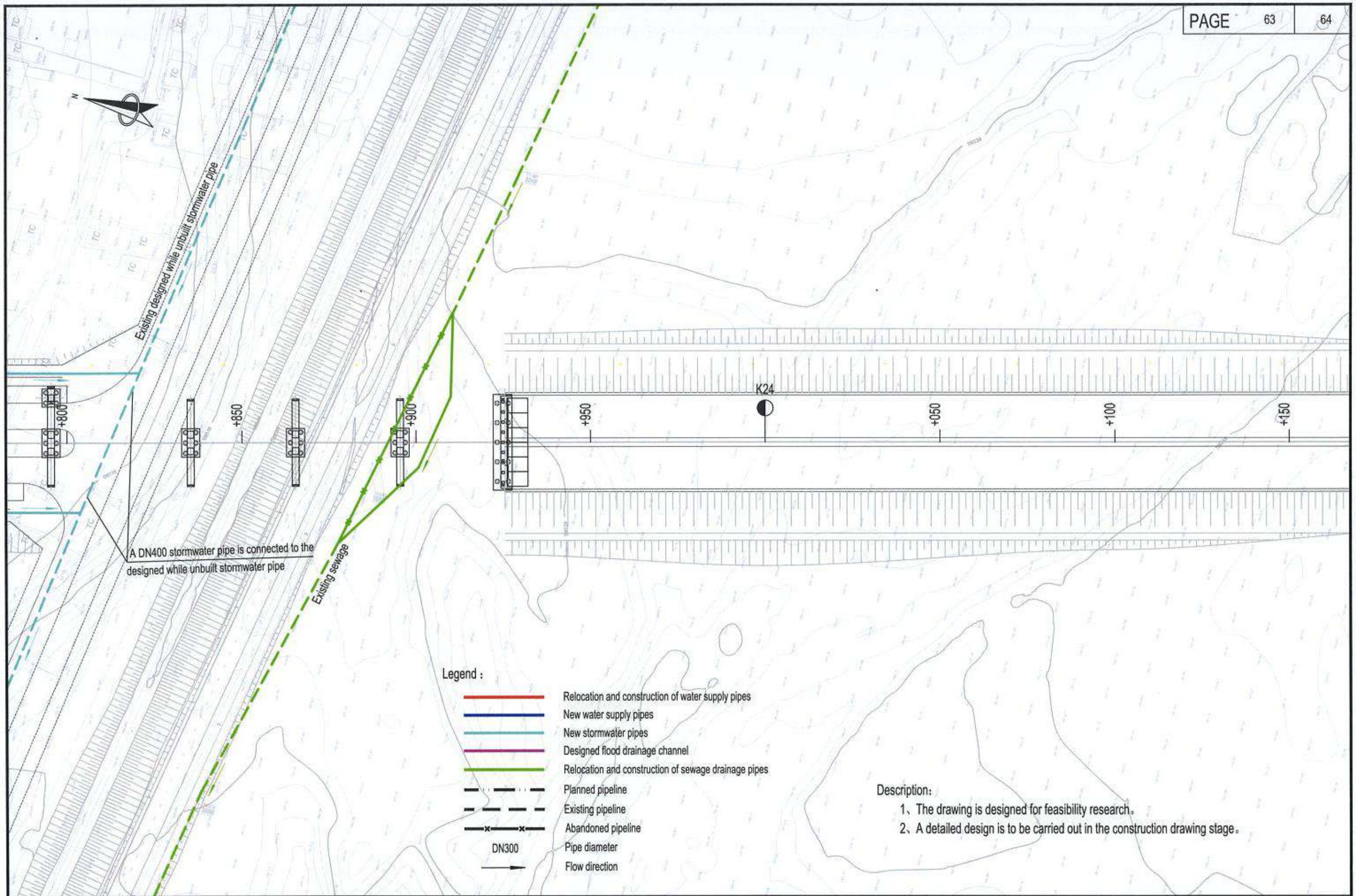
		Layout plan of water supply and drainage pipelines (K23+450~K23+800)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



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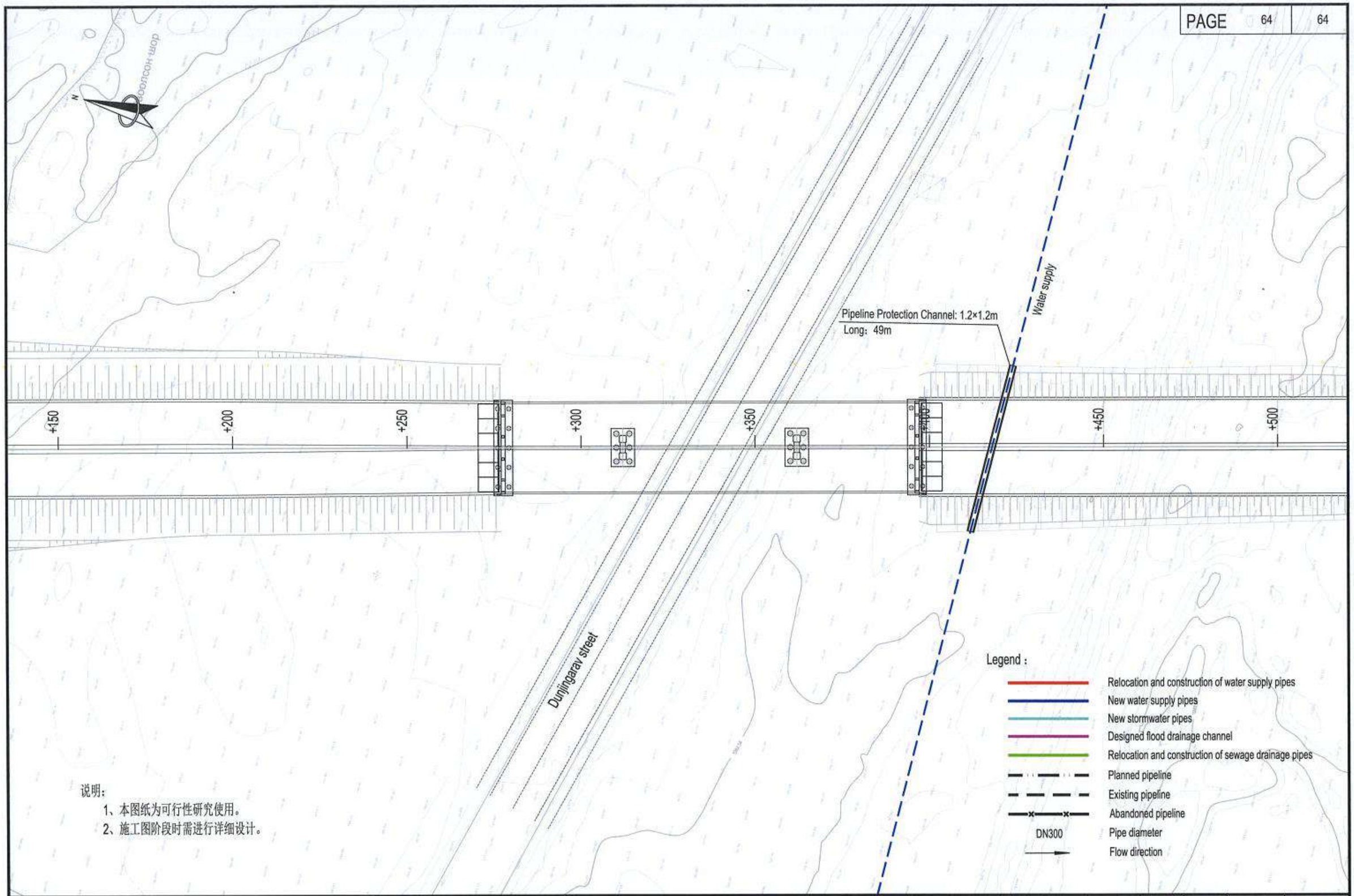
		Layout plan of water supply and drainage pipelines (K23+800~K24+150)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07

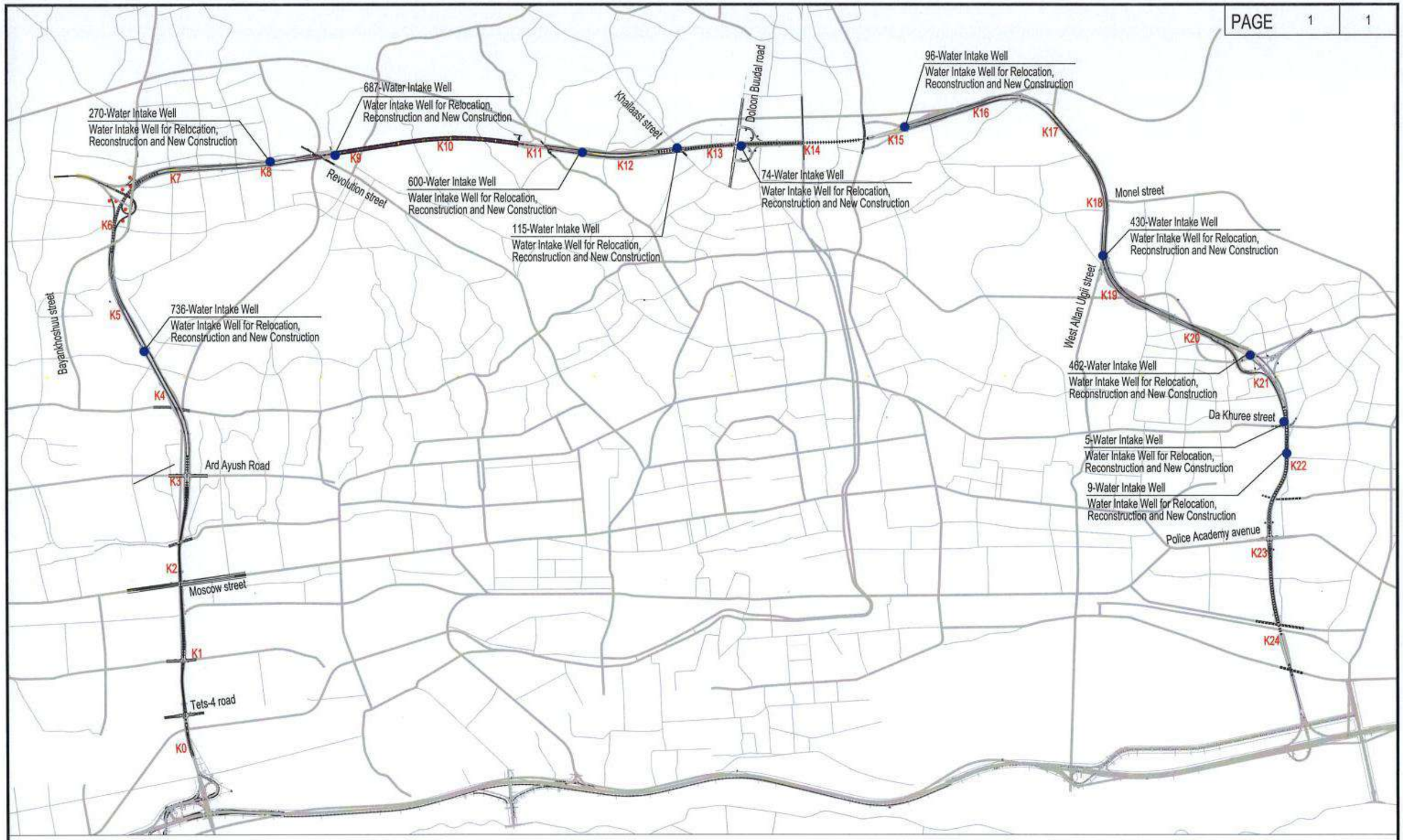


说明：

1、本图纸为可行性研究使用。

2、施工图阶段时需进行详细设计。

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	1:1000
		Layout plan of water supply and drainage pipelines (K24+150~K24+500)				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-06
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Description:

1、The drawing is designed for feasibility research.
2、A detailed design is to be carried out in the construction drawing stage.
3、There are 11 water intake wells along the road, all of which will be relocated and rebuilt, and the costs are included in the demolition.

Legend:

● Existing Water Intake Well

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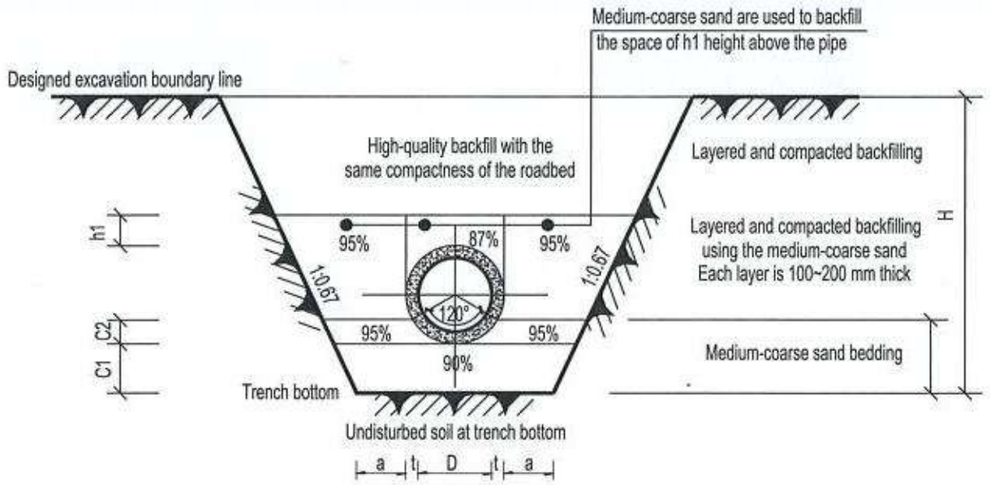
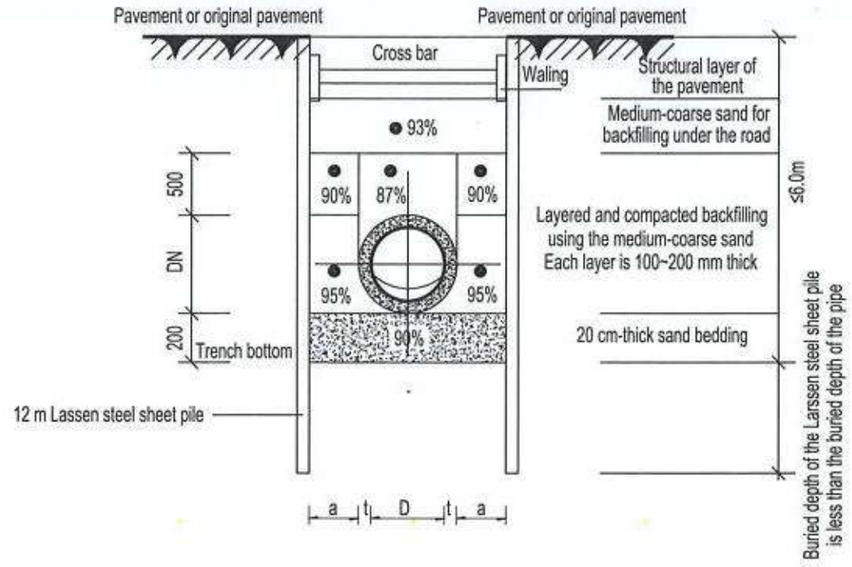
		Water Intake Well Location Map				MASTER DES.	CAO YONG XIANG	SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-07
						MASTER DES.	PAN HAO GUO	SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA	DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



Pipe Excavation Section I

Suitable for the pipeline with a buried depth of ≤4.5m



Pipe Excavation Section II

Suitable for the pipeline with a depth of 4.5m < buried depth ≤6.0m

Pipe diameter(mm) \ Depth(m)	H≤3.0	3.0<H≤6.0
DN300	900	1100
DN400	1000	1200
DN500	1100	1400
DN600	1400	1600

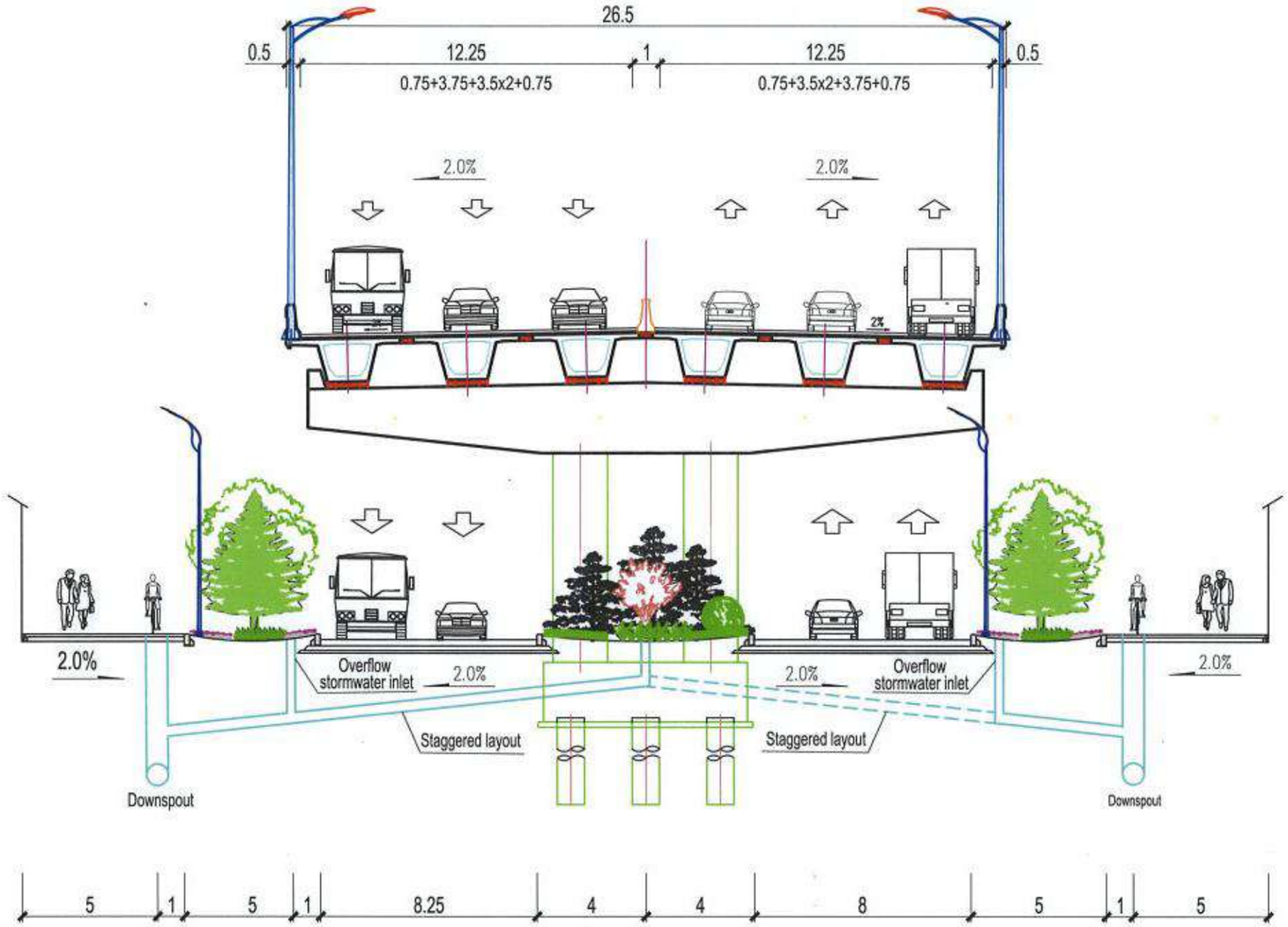
Unit:mm

B value in Trench Width Table for Pipe Excavation

(Suitable for water supply and sewage and stormwater pipes with a diameter of ≤ 600 mm)

Pipe diameter D	Pipe wall thickness t	Size of pipe foundation		
		a	C1	C2
d300	30	400	100	150
d400	40	400	100	185
d500	50	400	100	225
d600	60	500	100	265
d700	70	500	100	310
d800	80	500	150	355
d900	90	500	150	400
d1000	100	500	150	445
d1100	110	600	150	490
d1200	120	600	200	353

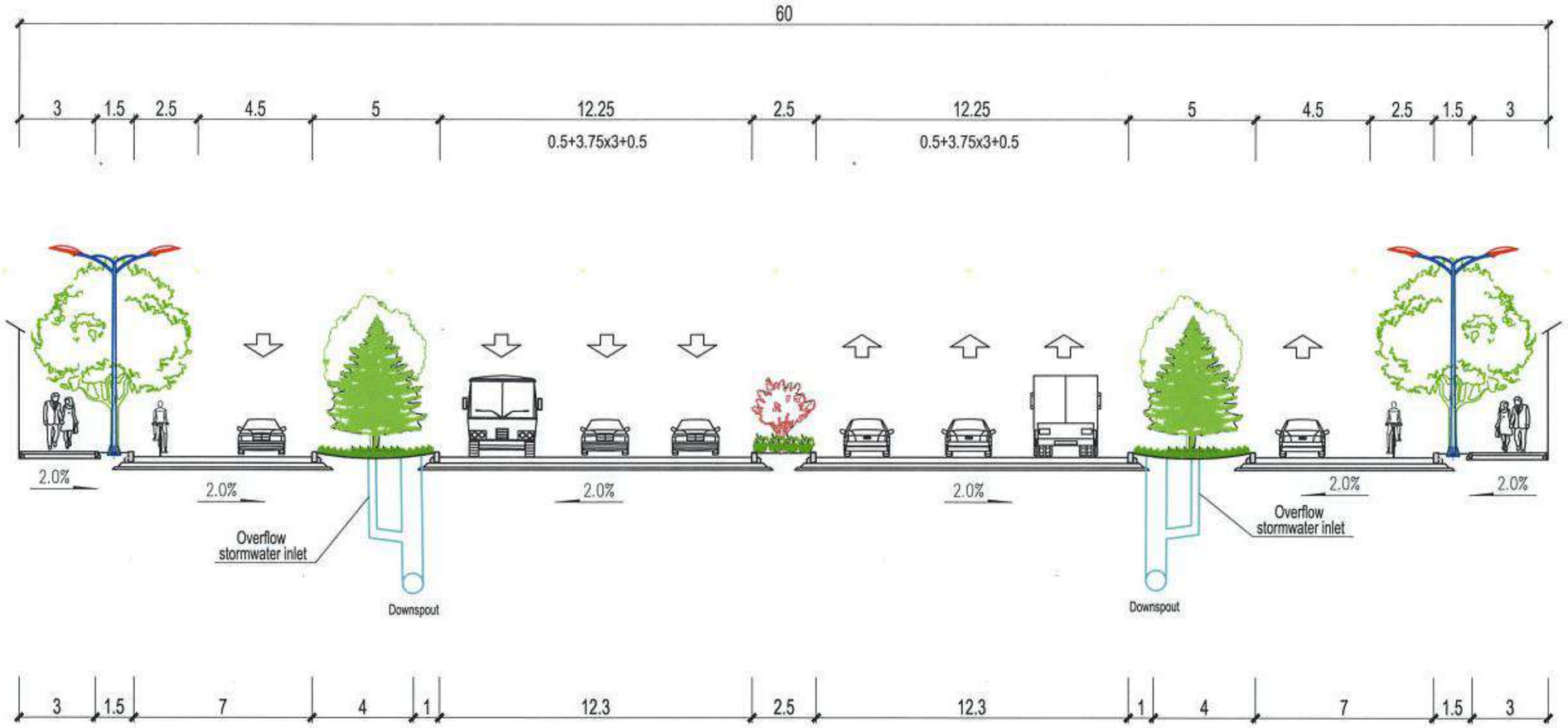
t、a、C1、C2 Parameter Selection Table



Standard Cross Section Layout Plan for the Sponge City with a 45 m-Wide Road

1:200

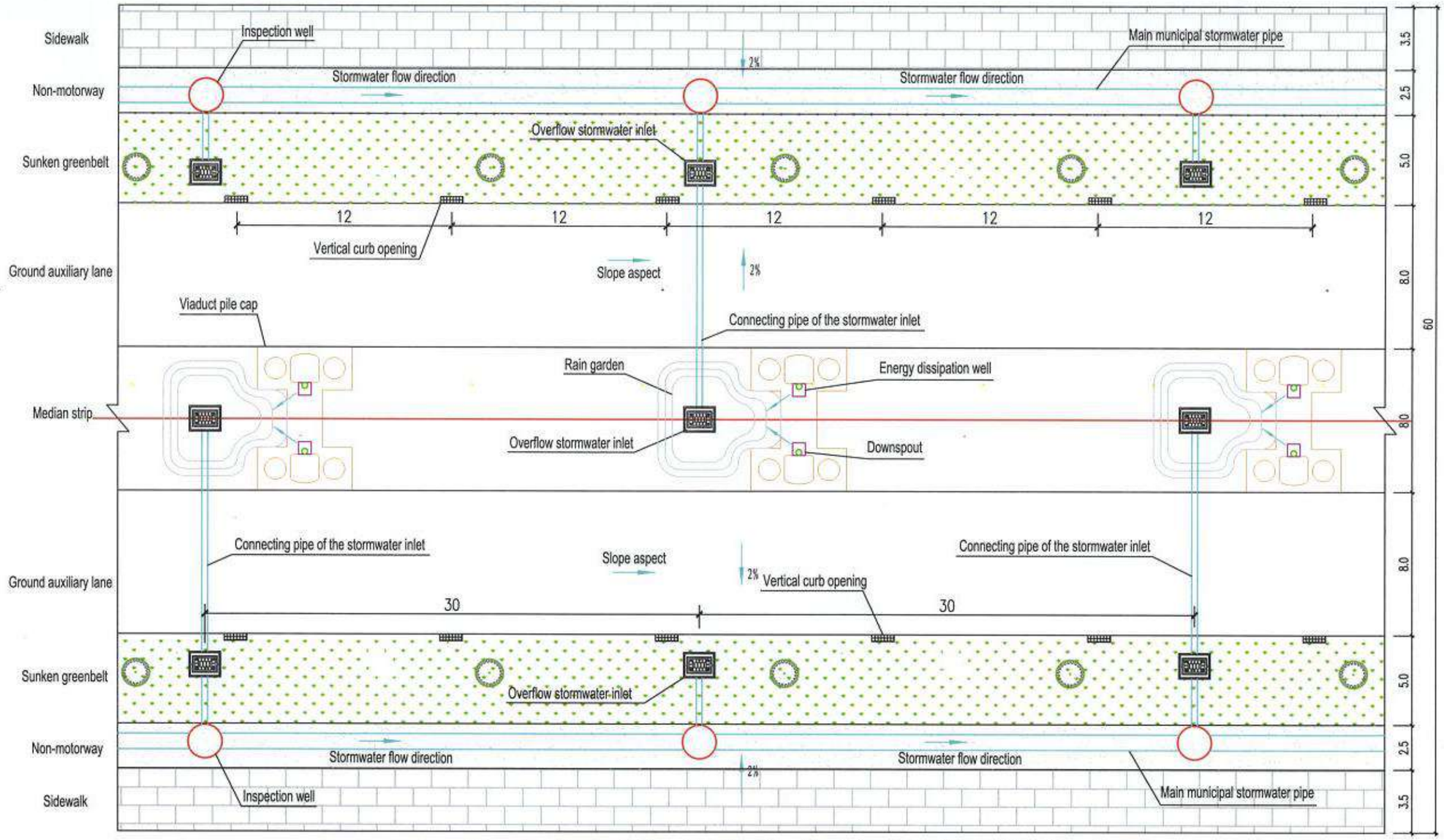
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	—
		Standard Cross Section Layout Plan for the Sponge City with a 45 m-Wide Road				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-09
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Standard Cross Section Layout Plan for the Sponge City with a 60 m-Wide Road

1: 200

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	—
		Standard Cross Section Layout Plan for the Sponge City with a 60 m-Wide Road				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-10
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



Standard Layout Plan for Pipeline Facilities of a 45 m-Wide Road

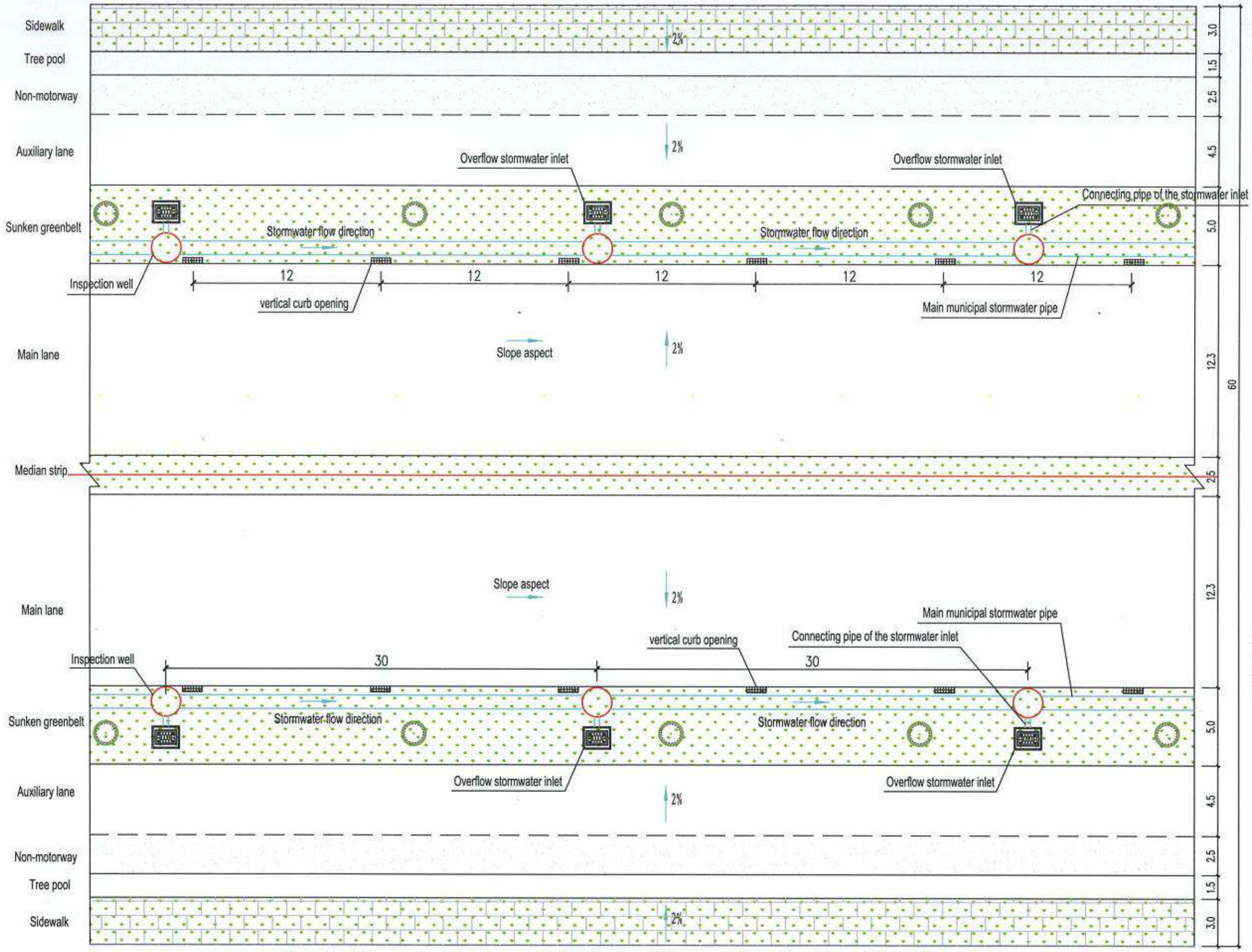
1、(45 m-wide) Process for stormwater drainage:

Stormwater on the surface of the viaduct → Energy dissipation well at the pier

Stormwater of the auxiliary lane → Vertical curb opening → Rain garden Sunken greenbelt → Overflow stormwater inlet → Connecting pipe of the stormwater inlet → Connecting pipe of the stormwater inlet

Stormwater of the sidewalk and the non-motorway → Sunken greenbelt → Overflow stormwater inlet → Connecting pipe of the stormwater inlet → Connecting pipe of the stormwater inlet

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG	SCALE	—
		Standard Layout Plan for Pipeline Facilities of a 45 m-Wide Road				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU	DRAWING NO.	IV-11
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG		
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI	DATE	2025.07



1、(60 m-wide) Process for stormwater drainage:

Stormwater of the main lane, the auxiliary lane, the sidewalk and the non-motorway

↓

Sunken greenbelt

↓

Overflow stormwater inlet

↓

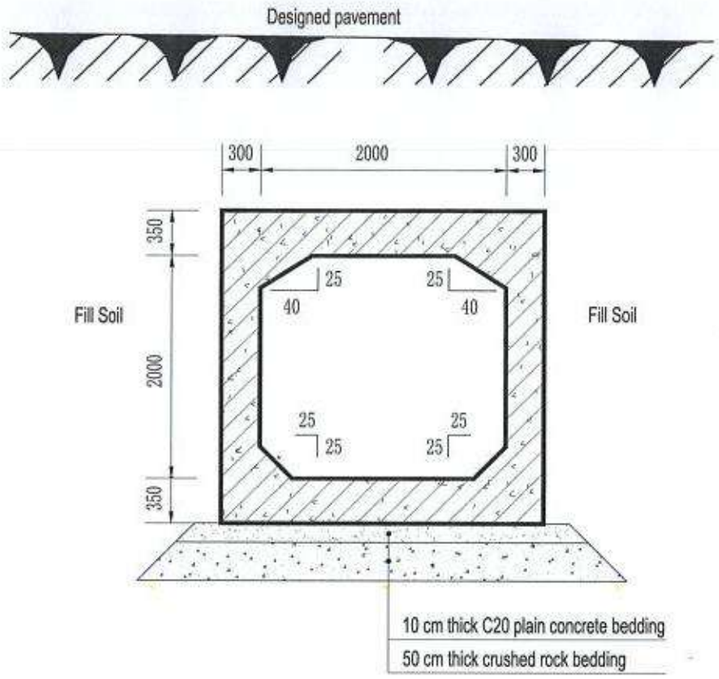
Connecting pipe of the stormwater inlet

↓

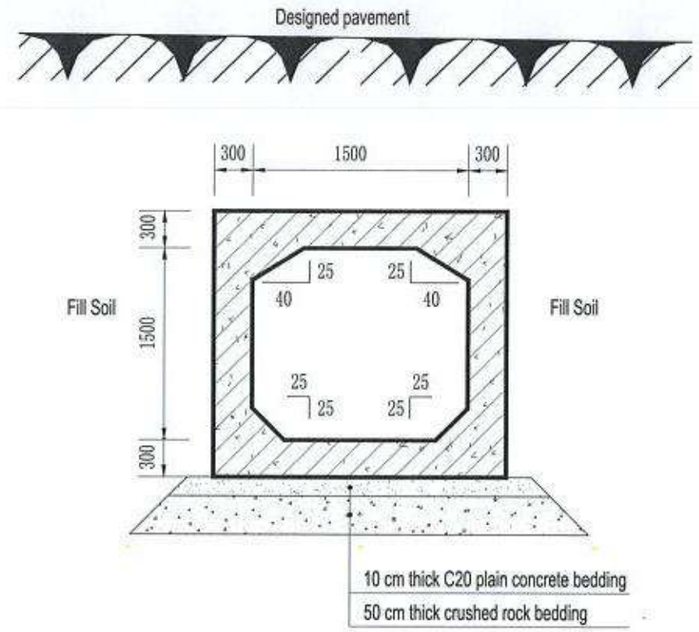
Main municipal stormwater pipe

Standard Cross Section Layout Plan for the Sponge City with a 60 m-Wide Road

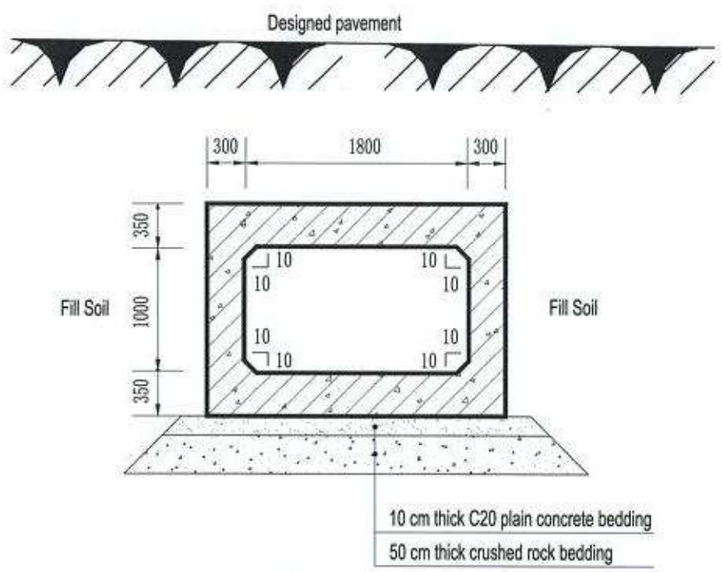
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the "First Ring Road" Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	—
		Standard Layout Plan for Pipeline Facilities of a 45 m-Wide Road				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-12
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07



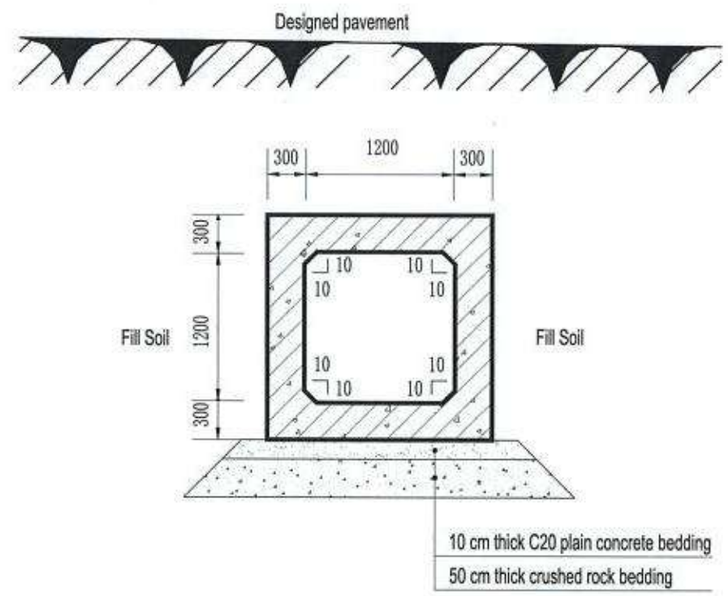
Detailed Drawing of the 2000x2000 Culvert



Detailed Drawing of the 1500x1500 Culvert



Detailed Drawing of the 1800x1000 Culvert



Detailed Drawing of the 1200x1200 Culvert

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			DESIGNED	CAI YONG JIANG		SCALE	—
		Detailed Drawing of the Flood Drainage Culvert				MASTER DES.	CAO YONG XIANG		SPE. MANAGER	ZHAO HONG DA		CHECKED	ZHANG RUI YU		DRAWING NO.	IV-13
						MASTER DES.	PAN HAO GUO		SPE. MANAGER	CHEN JUN JIE		EXAMINED	CUI YONG			
						SUB. MANAGER	ZHAO HONG DA		DESIGNED	XIE CHEN HAO		APPROVED	WANG HAI MEI		DATE	2025.07

Bill of Quantities for Water Supply Works（K0+100～K8+600）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	New water supply pipes	DN600	Nodular cast iron pipe	m	2207	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "УХАТ-6", pages 1-24.
2	Relocation and construction of water supply pipes	DN150	PE	m	192	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	
3	Relocation and construction of water supply pipes	DN200	PE	m	136	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	
4	Relocation and construction of water supply pipes	DN400	Nodular cast iron pipe	m	43	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	
5	Relocation and construction of water supply pipes	DN600	Nodular cast iron pipe	m	494	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	
6	Relocation and construction of water supply pipes	DN700	Nodular cast iron pipe	m	48	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	

Bill of Quantities for Stormwater Drainage Works（K0+100～K8+600）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	New connecting pipes for stormwater drainage	DN200	Grade II reinforced concrete pipes	m	3350		1.0~1.5m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "УХАТ-6", pages 1-24.
2	New stormwater pipes	DN300	Grade II reinforced concrete pipes	m	134		4.0~4.5m	
3	New stormwater pipes	DN400	Grade II reinforced concrete pipes	m	9773		4.0~4.5m	
4	New stormwater pipes	DN500	Grade II reinforced concrete pipes	m	2791		4.0~4.5m	
5	New stormwater pipes	DN600	Grade II reinforced concrete pipes	m	201		4.0~4.5m	
6	New stormwater pipes	DN800	Grade II reinforced concrete pipes	m	167 7.20		4.0~4.5m	
7	New road-crossing flood drainage pipes	DN1000	Grade II reinforced concrete pipes	m	68	Including 2 DN1000 wing-type outlets, refer to the Page 7 on atlas 20S517 for more details		
8	New road-crossing flood drainage pipes	DN1500	Grade II reinforced concrete pipes	m	152	Including 4 DN1500 wing-type outlets, refer to the Page 7 on atlas 20S517 for more details		
9	New road-crossing flood drainage buried culverts	2000×2000	Reinforced concrete	m	239	Including 6 2000×2000wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		
10	New flood drainage open channels	1200×1200	Reinforced concrete	m	1362	Including 2 1200×1200wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		
11	Relocation and construction of stormwater pipes	DN500	Grade II reinforced concrete pipes	m	327			
12	Relocation and construction of stormwater pipes	DN800	Grade II reinforced concrete pipes	m	103			
13	Automatic water level detector			套	1	Used for existing river bridge pier in lot K0+250		

Bill of Quantities for Sewage Drainage Works（K0+100～K8+600）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	Relocation and construction of sewage drainage pipes	DN300	HDPE reinforced structural wall pipe (B)	m	82		4.5~6.0m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "УХАТ-6", pages 1-24.
2	Relocation and construction of sewage drainage pipes	DN400	HDPE reinforced structural wall pipe (B)	m	1712		4.5~6.0m	

Bill of Quantities for Water Supply Works（K8+600~K15+500）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	Relocation and construction of water supply pipes	DN300	PE	m	43	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "YXAT-6", pages 25-39.

Bill of Quantities for Stormwater Drainage Works（K8+600~K15+500）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	New connecting pipes for stormwater drainage	DN200	Grade II reinforced concrete pipes	m	2211		1.0~1.5m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "УХАТ-6", pages 25-39.
2	New stormwater pipes	DN400	Grade II reinforced concrete pipes	m	5912		4.0~4.5m	
3	New stormwater pipes	DN500	Grade II reinforced concrete pipes	m	2378		4.0~4.5m	
4	New road-crossing flood drainage pipes	DN1000	Grade II reinforced concrete pipes	m	123	Including 4 DN1000 wing-type outlets, refer to the Page 7 on atlas 20S517 for more details		
5	New road-crossing flood drainage pipes	DN1500	Grade II reinforced concrete pipes	m	200	Including 6 DN1500 wing-type outlets, refer to the Page 7 on atlas 20S517 for more details		
6	New road-crossing flood drainage buried culverts	2000×2000	Reinforced concrete	m	88	Including 2 2000×2000wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		
7	New flood drainage buried culverts	1500×1500	Reinforced concrete	m	1279	Including 2 1500×1500wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		
8	Automatic water level detector			套	1	Used for new Selbe River bridge piers in lot K14+500		

Bill of Quantities for Sewage Drainage Works（K8+600~K15+500）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	Relocation and construction of sewage drainage pipes	DN300	HDPE reinforced structural wall pipe (B)	m	127		4.5~6.0m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "УХАТ-6", pages 25-39.

Bill of Quantities for Water Supply Works（K15+500~K24+793）

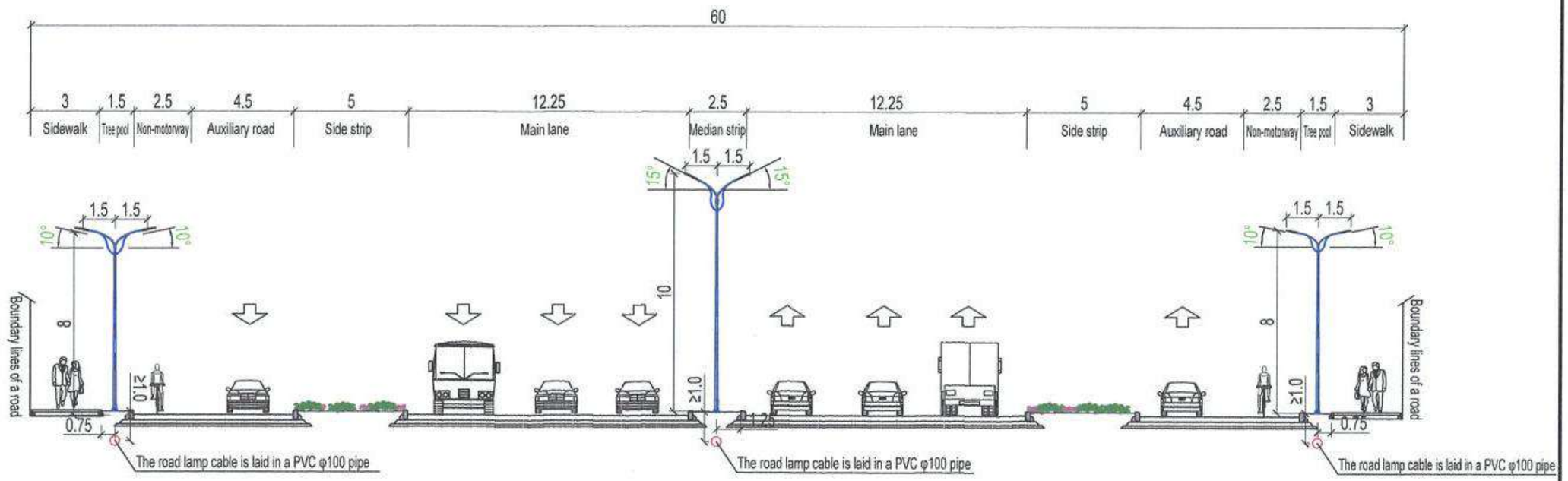
No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	Relocation and construction of water supply pipes	DN100	PE	m	40	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "YXAT-6", pages 40-63.
2	Relocation and construction of water supply pipes	DN200	PE	m	46	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	
3	Relocation and construction of water supply pipes	DN500	Nodular cast iron pipe	m	68	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	
4	Relocation and construction of water supply pipes	DN600	Nodular cast iron pipe	m	407	Bearing pressure ≥ 1.6 Mpa	3.5~4.0m	

Bill of Quantities for Stormwater Drainage Works（K15+500~K24+793）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	New connecting pipes for stormwater drainage	DN200	Grade II reinforced concrete pipes	m	4235		1.0~1.5m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "YXAT-6", pages 40-63.
2	New stormwater pipes	DN400	Grade II reinforced concrete pipes	m	12835		4.0~4.5m	
3	New stormwater pipes	DN500	Grade II reinforced concrete pipes	m	3048		4.0~4.5m	
4	New road-crossing flood drainage pipes	DN1000	Grade II reinforced concrete pipes	m	283	Including 8 DN1000 wing-type outlets, refer to the Page 7 on atlas 20S517 for more details		
5	New road-crossing flood drainage pipes	DN1500	Grade II reinforced concrete pipes	m	282	Including 8 DN1500 wing-type outlets, refer to the Page 7 on atlas 20S517 for more details		
6	New road-crossing flood drainage buried culverts	2000×2000	Reinforced concrete	m	206	Including 4 2000×2000wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		
7	New flood drainage opening channels	1200×1200	Reinforced concrete	m	222	Including 2 1200×1200wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		
8	Relocation and construction of flood drainage buried culverts	1800×1000	Reinforced concrete	m	358	Including 4 1800×1000wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		
9	Relocation and construction of flood drainage open channels	1200×1200	Reinforced concrete	m	366	Including 2 1200×1200wing-type outlets, refer to the Page 9 on atlas 20S517 for more details		

Bill of Quantities for Sewage Drainage Works（K15+500~K24+793）

No.	Name	Specification（mm）	Material	Unit	Quantity	Remark	Buried depth	Location on the drawing
1	Relocation and construction of sewage drainage pipes	DN300	HDPE reinforced structural wall pipe (B)	m	48		4.5~6.0m	Drawing name "Layout Plan for Water Supply and Drainage Pipelines", and the drawing No. is "YXAT-6", pages 40-63.

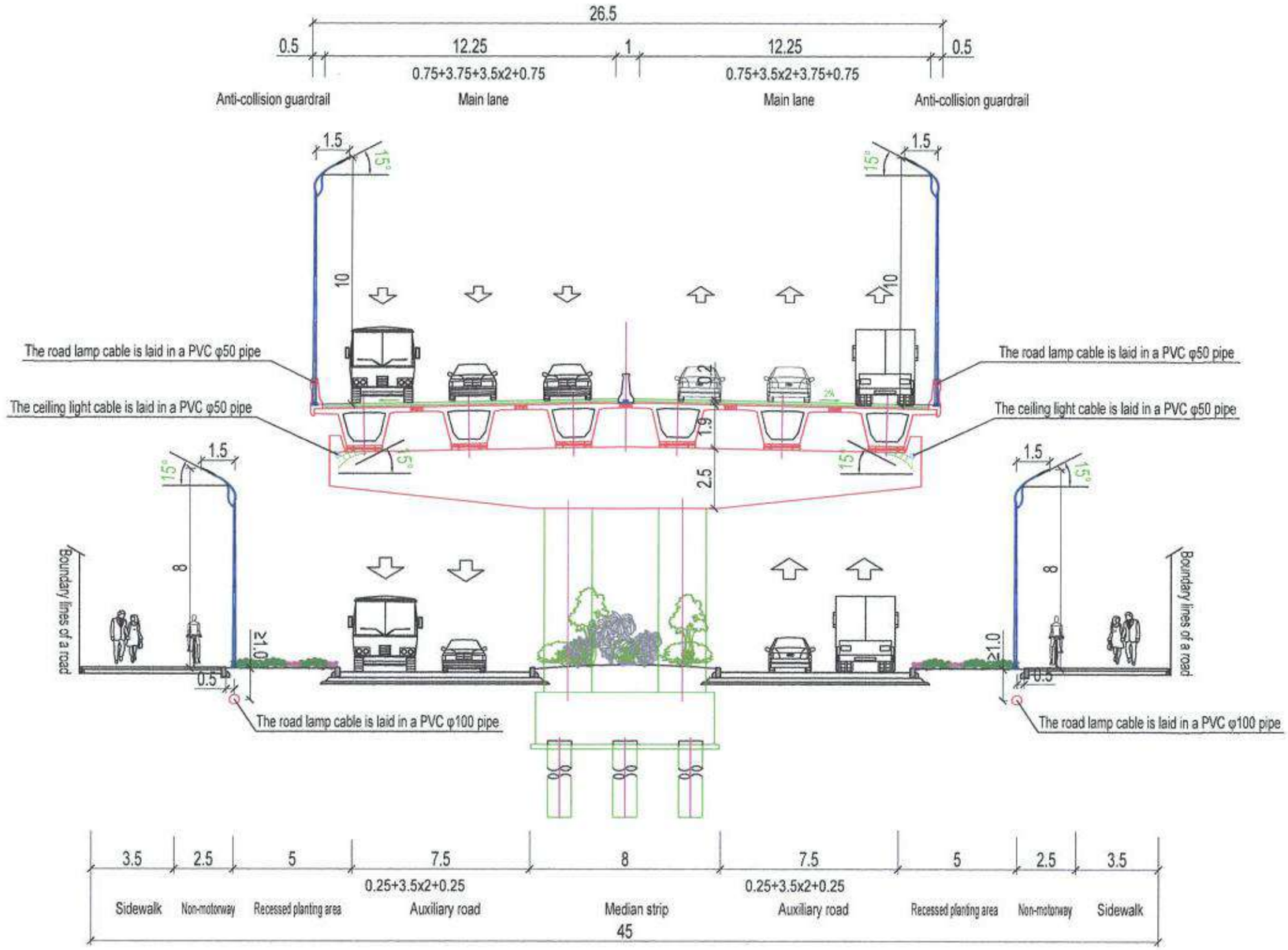


Layout of Road Lamps for Cross Section of a 60 Meter-wide Road

1:200

Note: The dimensions in the figure are in meters.

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Road Cross-Section Lighting Layout				MASTER DES.	CAO YONGLIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-01
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07

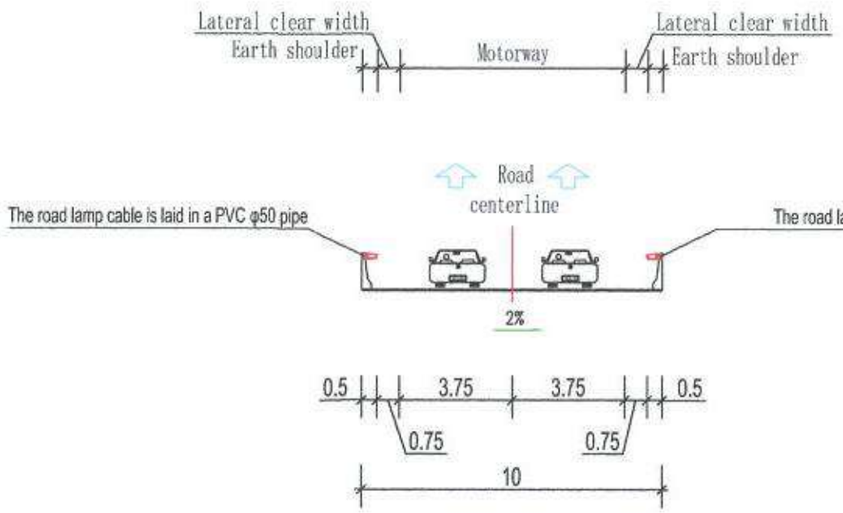


Layout of Road Lamps for Cross Section of a 45 Meter-wide Road

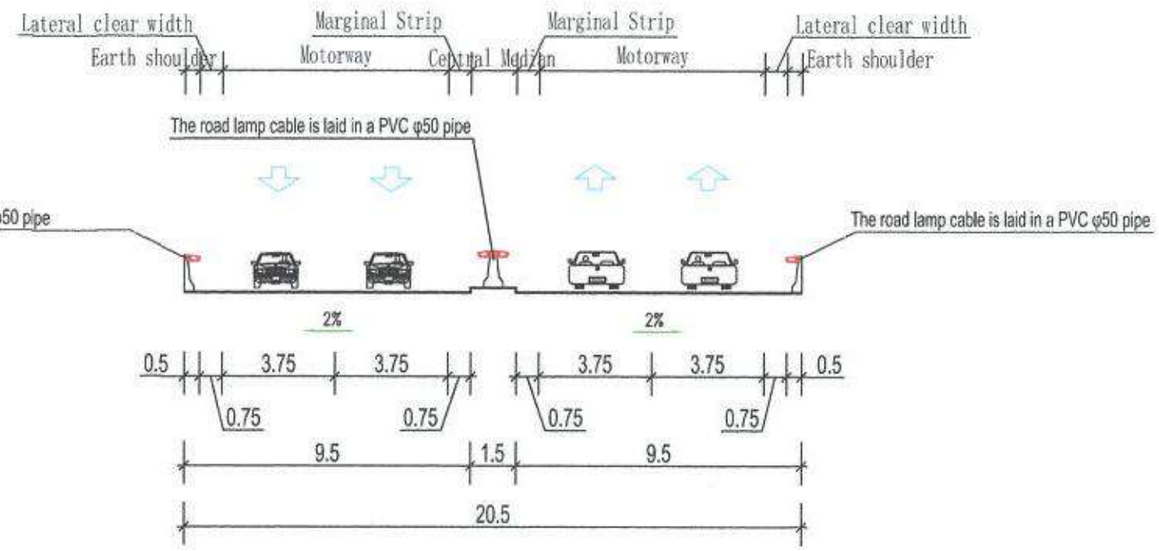
1:200

Note: The dimensions in the figure are in meters.

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Road Cross-Section Lighting Layout				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-01
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JHUI		DATE	2025.07



Layout of Road Lamps for Cross Section of a Typical 2-lane Ramp 1:200



Layout of Road Lamps for Cross Section of a Typical 4-lane Ramp 1:200

Note: The dimensions in the figure are in meters.

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Road Cross-Section Lighting Layout				MASTER DES.	CAO YONGLIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-01
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHAO JIHUI		DATE	2025.07

Calculation Parameter Table for Motorway Lamps on a 60 Meter-wide Road

Road grade	Main road (1B)	Lamp distribution mode	Centered layout of a strip	Type of a light source	LED light source		
Parameters & indexes	Lamp spacing (m)	Lamp pole height (m)	Lamp arm length (m)	Elevation angle (°)	Distance from a lamp pole to a curbstone (m)	Light source power (W)	Light flux/light source power (lm/W)
Design parameters	30	10	1.5	15	1.25	100+100	≥130
Specifications & standards (MNS 6846 : 2020)	Road Surface Luminance			Road Surface Illuminance		Maximum initial value of glare limit threshold increment Ti (%)	Minimum value of surround ratio SR
	Maintenance value of average brightness L (cd/m²)	Minimum value of overall uniformity (Uo)	Minimum value of longitudinal uniformity (UL)	Maintenance value of average illuminance E h,ave (lx)	Minimum value of uniformity (Uh)		
	1.00	0.4	0.7	15	0.35	15	0.50
Design indexes	1.45	0.4	0.77	18	0.495	11	1.1

Calculation Parameter Table for Non-motorway and Sidewalk Lamps on a 60 Meter-wide Road

Roadway Design	Non-motorway+Sidewalk	Lamp distribution mode	Bilateral symmetrical arrangement	Type of a light source	LED light source		
Parameters & indexes	Lamp spacing (m)	Lamp pole height (m)	Lamp arm length (m)	Elevation angle (°)	Distance from a lamp pole to a curbstone (m)	Light source power (W)	Light flux/light source power (lm/W)
Design parameters	30	8	1.5	10	0.75	65+20	≥130
Specifications & standards (MNS 6846 : 2020)	Non-motorway	Maintenance value of average illuminance E h,ave (lx)	Minimum value of uniformity (Uh)	Sidewalk	Maintenance value of average illuminance E h,ave (lx)	Minimum value of uniformity (Uh)	
		15	0.3		10	0.3	
Design indexes		19	0.471		12	0.472	

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		Calculation Parameter Table for Road Lamps		MASTER DES.: CAO YONGXIANG	SPE. MANAGER: KANG QIAN		EXAMINED: KANG QIAN	DRAWING NO.	V-02
				MASTER DES.: PAN HAOGUO	SPE. MANAGER		APPROVED: WANG AN MIN		
				SUB. MANAGER	DESIGNED: ZHANG WEIWEI		APPROVED: ZHANG JIHUI	DATE	2025.07

Calculation Parameter Table for Roadway Lighting on a 45m-Wide Interchange Bridge

Road grade	Main road (1B)	Lamp distribution mode	Bilateral symmetrical arrangement	Type of a light source	LED light source		
Parameters & indexes	Lamp spacing (m)	Lamp pole height (m)	Lamp arm length (m)	Elevation angle (°)	Distance from a lamp pole to an anti-collision guardrail (m)	Light source power (W)	Light flux/light source power (lm/W)
Design parameters	30	15	1.5	15	0	100	≥130
Specifications & standards (MNS 6846 : 2020)	Road Surface Luminance			Road Surface Illuminance		Maximum initial value of glare limit threshold increment Ti (%)	Minimum value of surround ratio SR
	Maintenance value of average brightness L $\bar{}$ (cd/m²)	Minimum value of overall uniformity (Uo)	Minimum value of longitudinal uniformity (UL)	Maintenance value of average illuminance E h, av (lx)	Minimum value of uniformity (Uh)		
	1.00	0.4	0.7	15	0.35	15	0.50
Design indexes	1.06	0.62	0.81	19	0.551	8	0.7

Calculation Parameter Table for Auxiliary Road Lighting on 45m-Wide Ground-Level Roads

Road grade	Main road (1B)	Lamp distribution mode	Symmetrical installation on both sides and ceiling installation under an overpass	Type of a light source	LED light source		
Parameters & indexes	Lamp spacing (m)	Lamp pole height (m)	Lamp arm length (m)	Elevation angle (°)	Distance from a lamp pole to a curbstone (m)	Light source power (W)	Light flux/light source power (lm/W)
Design parameters	30	4.9~13	0	15	0	80	≥130
Specifications & standards (MNS 6846 : 2020)	Road Surface Luminance			Road Surface Illuminance		Maximum initial value of glare limit threshold increment Ti (%)	Minimum value of surround ratio SR
	Maintenance value of average brightness L $\bar{}$ (cd/m²)	Minimum value of overall uniformity (Uo)	Minimum value of longitudinal uniformity (UL)	Maintenance value of average illuminance E h, av (lx)	Minimum value of uniformity (Uh)		
	1.00	0.4	0.7	15	0.35	15	0.50
Design indexes	1.04	0.63	0.82	18	0.662	5	1.16

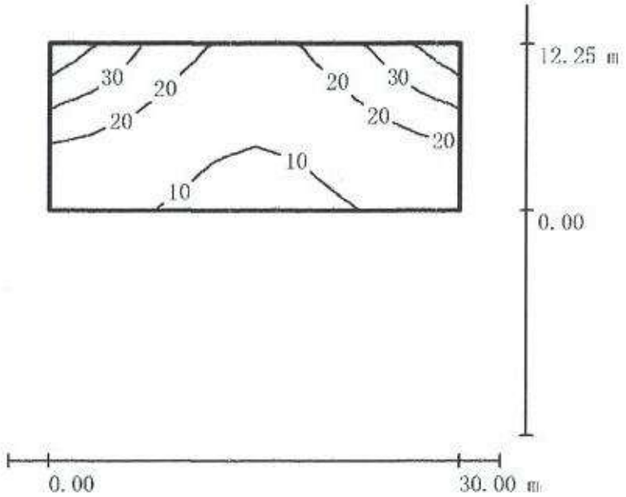
Lighting Calculation Parameter Table for Non-Motorized Vehicle Lanes and Pedestrian Walkways on 45m-Wide Roads

Roadway Design	Non-motorway+Sidewalk	Lamp distribution mode	Bilateral symmetrical arrangement	Type of a light source	LED light source		
Parameters & indexes	Lamp spacing (m)	Lamp pole height (m)	Lamp arm length (m)	Elevation angle (°)	Distance from a lamp pole to a curbstone (m)	Light source power (W)	Light flux/light source power (lm/W)
Design parameters	30	8	1.5	15	0.5	70	≥130
Specifications & standards (MNS 6846 : 2020)	Non-motorway	Maintenance value of average illuminance E h, av (lx)	Minimum value of uniformity (Uh)	人行道	Maintenance value of average illuminance E h, av (lx)	Minimum value of uniformity (Uh)	
		15	0.3		10	0.3	
Design indexes		19	0.496		11	0.508	

Lighting Calculation Parameter Table for Non-Motorized Lanes and Pedestrian Walkways on 45m-Wide Roads

Road grade	Main road (1B)	Lamp distribution mode	Symmetrically arranged on crash barriers	Type of a light source	LED light source		
Parameters & indexes	Lamp spacing (m)	Lamp pole height (m)	Lamp arm length (m)	Elevation angle (°)	Distance from a lamp pole to a curbstone (m)	Light source power (W)	Light flux/light source power (lm/W)
Design parameters	4	1.2	0	0	0	5	≥130
Specifications & standards (MNS 6846 : 2020)	Road Surface Luminance			Road Surface Illuminance		Maximum initial value of glare limit threshold increment Ti (%)	Minimum value of surround ratio SR
	Maintenance value of average brightness L (cd/m²)	Minimum value of overall uniformity (Uo)	Minimum value of longitudinal uniformity (UL)	Maintenance value of average illuminance Eh,av (lx)	Minimum value of uniformity (Uh)		
	1.00	0.4	0.7	15	0.35	15	0.50
Design indexes	1.18	0.56	0.72	24	0.576	9	0.6

Evaluation area Motorway/Iso-illuminance Curve (Illuminance)

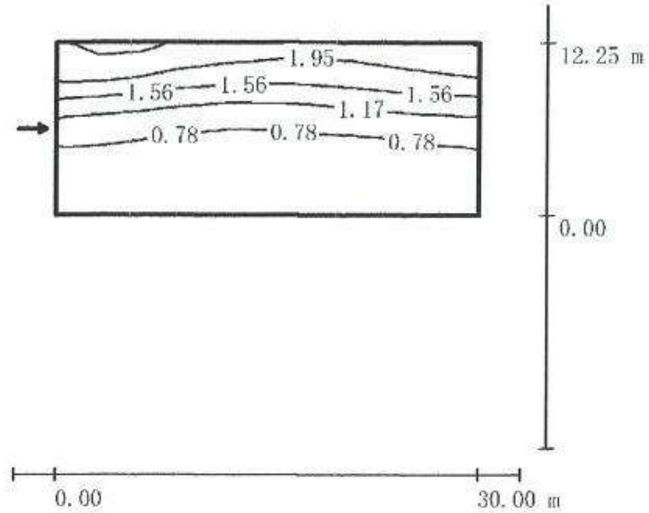


Grid: 10 x 9 points
Unit: Lux, proportion: 1:472

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
18	8.82	43	0.495	0.207

Iso-illuminance Curve for Motorway on a 60 Meter-wide Road

Evaluation area Motorway/Equal Brightness Curve (Brightness)



Grid: 10 x 9 points
Unit: Candela/м²,
proportion: 1:294

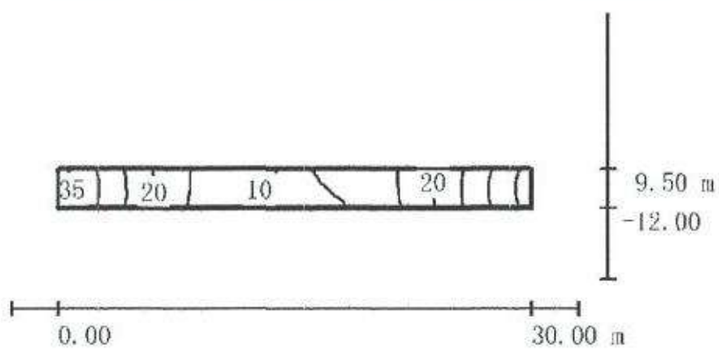
Observer position: (-60.000 м,6.125 м, 1.500 м)

Asphalt: R3, q0: 0.070

Average brightness [cd/m²]	U0	Ul	TI [%]
1.10	0.42	0.77	7

Equal Brightness Curve for Motorway on a 60 Meter-wide Road

Evaluation area Non-motorway/Iso-illuminance Curve (Illuminance)

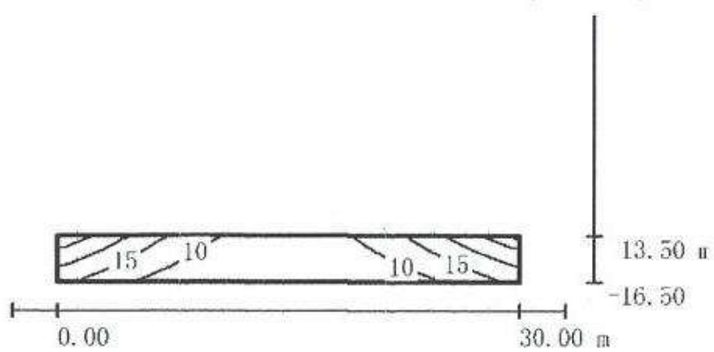


Grid: 10 x 3 points
Unit: Lux, proportion: 1:472

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
19	8.88	34	0.471	0.268

Iso-illuminance Curve for Non-motorway on a 60 Meter-wide Road

Evaluation area Sidewalk/Iso-illuminance Curve (Illuminance)

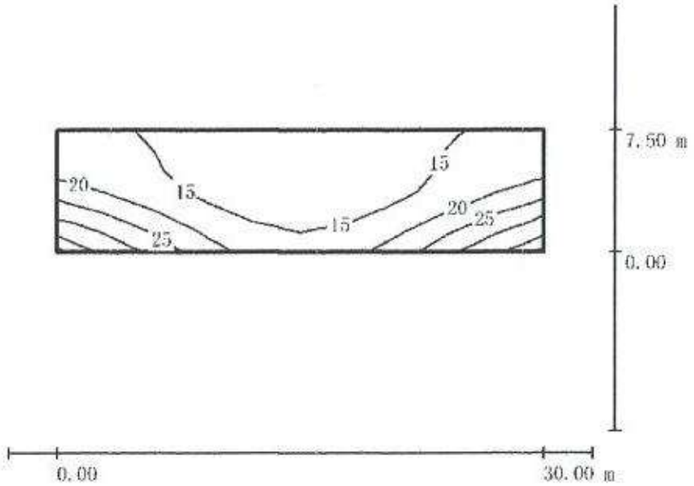


Grid: 10 x 3 points
Unit: Lux, proportion: 1:472

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
12	5.74	25	0.472	0.233

Iso-illuminance Curve for Sidewalk on a 60 Meter-wide Road

Evaluation area Auxiliary Road/Iso-illuminance Curve (Illuminance)

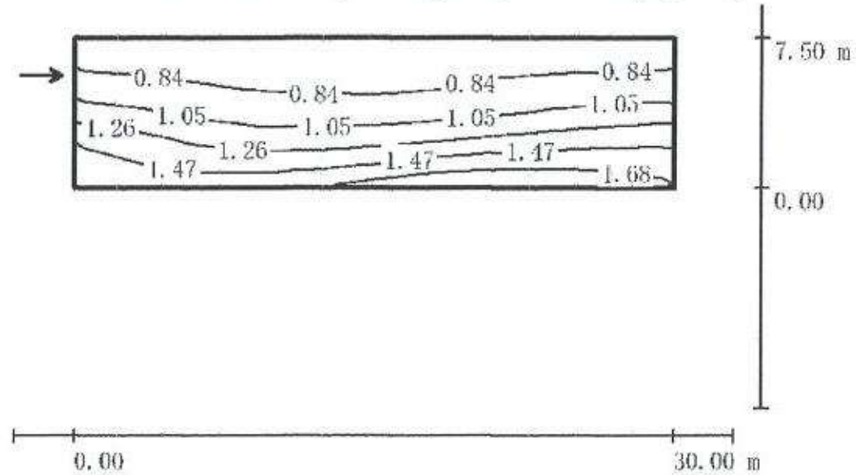


Grid: 10 x 6 points
Unit: Lux, proportion: 1:352

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
18	12	34	0.662	0.34

Iso-illuminance Curve for Auxiliary Road on a 45 Meter-wide Road

Evaluation area Auxiliary Road/Equal Brightness Curve (Brightness)



Grid: 10 x 6 points
Unit: Candela/м²,
proportion: 1:352

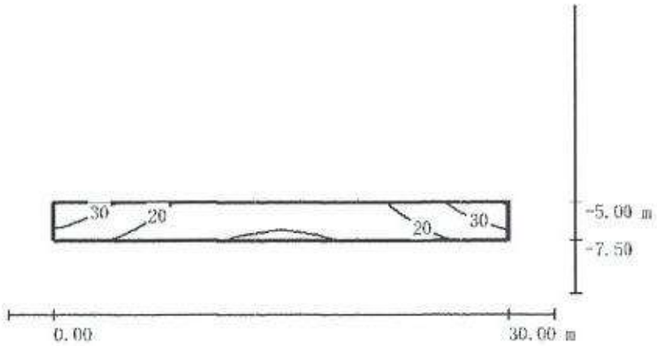
Observer position: (-60.000 м,5.625 м, 1.500 м)

Asphalt: R3, q0: 0.070

Average brightness [cd/m²]	U0	Ul	TI [%]
1.10	0.64	0.9	5

Equal Brightness Curve for Auxiliary Road on a 45 Meter-wide Road

Evaluation area Non-motorway/Iso-illuminance Curve (Illuminance)

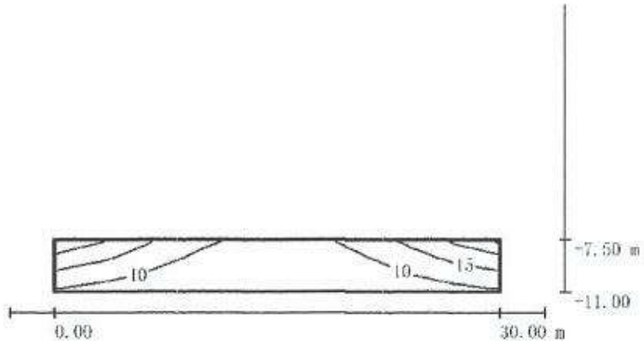


Grid: 10 x 3 points
Unit: Lux, proportion: 1:352

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
19	9.44	35	0.496	0.267

Iso-illuminance Curve for Non-motorway on a 45 Meter-wide Road

Evaluation area Sidewalk/Iso-illuminance Curve (Illuminance)



Grid: 10 x 3 points
Unit: Lux, proportion: 1:352

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
11	5.35	20	0.508	0.261

Iso-illuminance Curve for Sidewalk on a 45 Meter-wide Road

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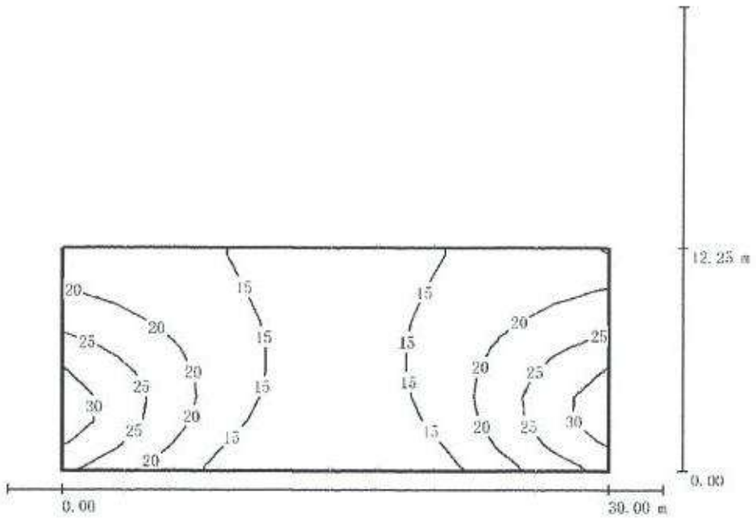
						MASTER DES.	CAO YONGLIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-03
		DIALux Simulation Results				MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIBEI		APPROVED	ZHANG JIHUI		DATE	2025.07

Evaluation area Overpass Motorway/Iso-illuminance Curve (Illuminance)

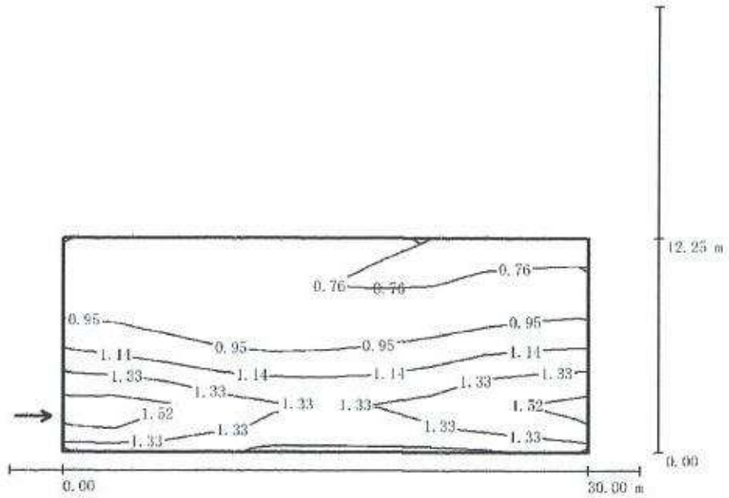


Grid: 10 x 9 points
Unit: Lux, proportion: 1:258

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
18	10	31	0.551	0.323

Iso-illuminance Curve for Overpass Motorway on a 45 Meter-wide Road

Evaluation area Overpass Motorway/Equal Brightness Curve (Brightness)



Grid: 10 x 9 points
Unit: Candela/м², proportion: 1:258

Observer position: (-60.000 м, 2.042 м, 1.500 м)

Asphalt: R3, q0: 0.070

Average brightness [cd/m²]	U0	UI	TI [%]
1.06	0.69	0.81	8

Equal Brightness Curve for Overpass Motorway on a 45 Meter-wide Road

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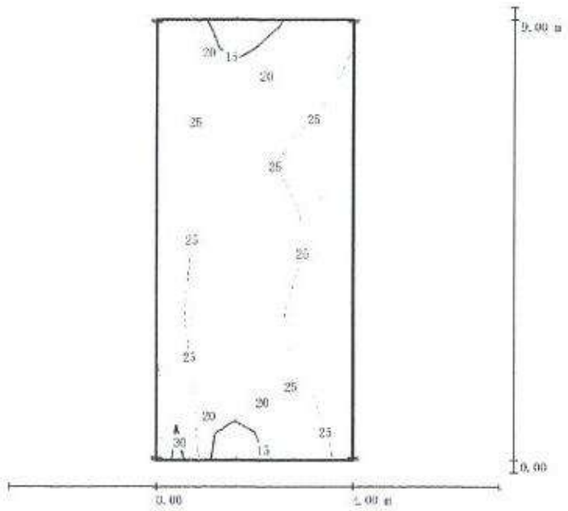
		DIALux Simulation Results				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-03
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07

Evaluation area Ramp Motorway/Iso-illuminance Curve (Illuminance)

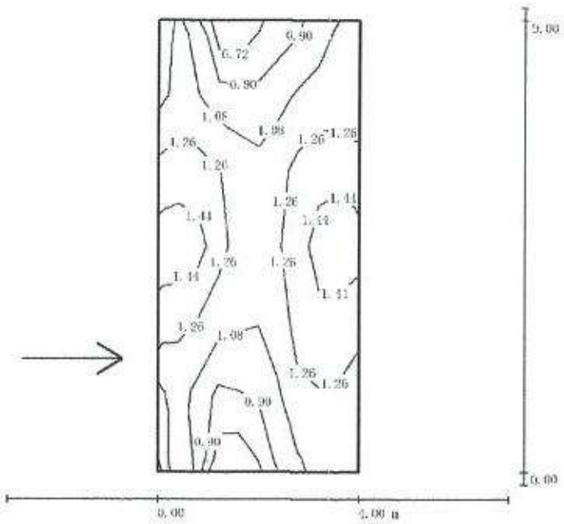


Grid: 10 x 6 points
Unit: Lux, proportion: 1:75

Average illuminance[lx]	Minimum illuminance [lx]	Maximum illuminance [lx]	Minimum illuminance/average illuminance	Minimum illuminance/maximum illuminance
24	14	34	0.576	0.401

Iso-illuminance Curve for Typical Ramp Motorway

Evaluation area Ramp Motorway/Equal Brightness Curve (Brightness)



Grid: 10 x 6points
Unit: Candela/M², proportion 1:75

Observer position: (-60.000 M,2.250 M, 1.500 M) Asphalt: R3, q0: 0.070

Average brightness [cd/m²]	U0	Ul	Tl [%]
1.18	0.59	0.72	9

Equal Brightness Curve for Typical Ramp Motorway

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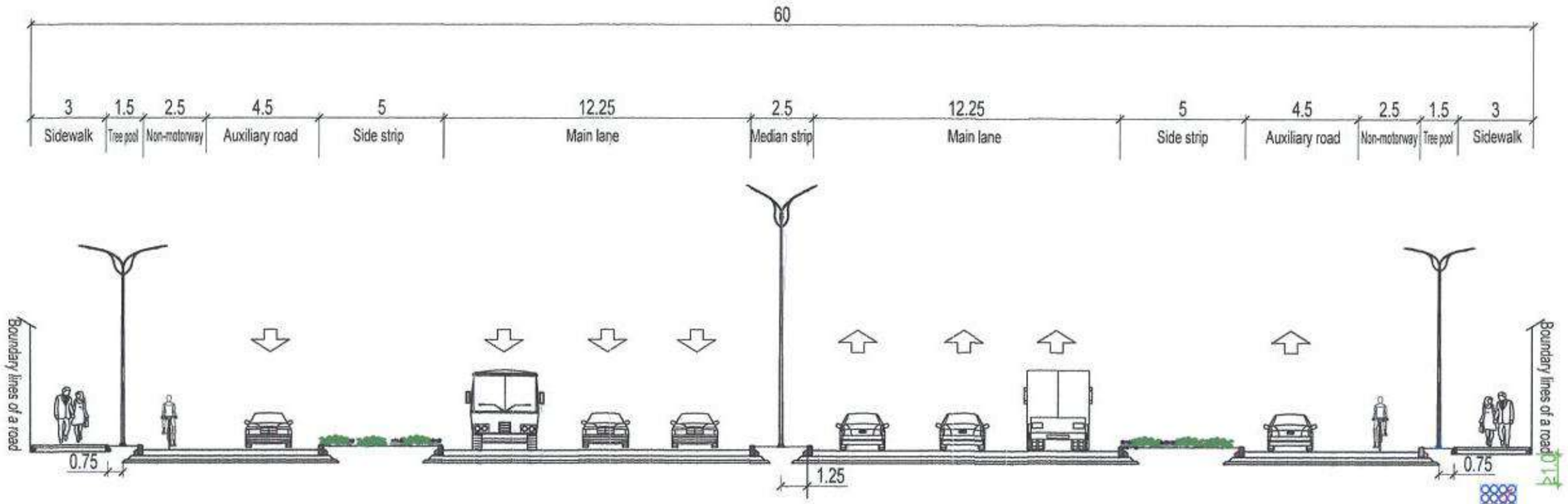
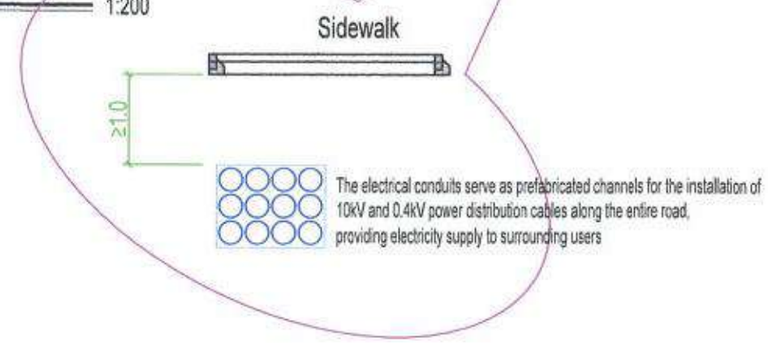
		DIALux Simulation Results				MASTER DES.	CAO YONGXIANG	SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN	DRAWING NO. V-03
						MASTER DES.	PAN HAOGUO	SPE. MANAGER			APPROVED	WANG AN MIN	
						SUB. MANAGER		DESIGNED	ZHANG WEIFEI		APPROVED	ZHANG JIHUI	DATE 2025.07

No.	Description	Specification / Model	Unit	Quantity				Note(s)
				Total	K0+000~K8+600	K8+600~K15+500	K15+500~K24+793.006	
1	Road lamp box transformer	80 kVA	Unit	18	7	3	8	
2	10 m single-pole double-cantilever road lamp	100 W+100 W LED lamp	Set	530	190	86	254	
3	10 m single-pole single-cantilever road lamp	100 W LED lamp	Set	760	270	188	302	
4	8 m single-pole double-cantilever road lamp	65 W+20 W LED lamp	Set	1060	380	172	508	
5	8 m single-pole single-cantilever road lamp	70 W LED lamp	Set	760	270	188	302	
6	15 m floodlight	3×200 W LED lamp	Set	50	24	12	14	
7	Ceiling lamp	80 W LED lamp	Set	760	270	188	302	
8	Low-level lighting lamp of a ramp	5 W LED lamp	Pcs	5210	2200	1100	1910	
9	Lighting controller		Pcs	18	7	3	8	Set in a box transformer
10	Single-lamp controller		Pcs	3260	100	1000	2160	
11	Main cable for road lamp power supply	YJV-0.6/1 kV-5×25 mm^2	m	16000	6000	3000	7000	Street light route
12	Main cable for road lamp power supply	YJV-0.6/1 kV-5×16 mm^2	m	70000	26000	15000	29000	Street light route
13	Insulated wire (lamp wire)	BVV-0.45/0.75 kV-3×2.5 mm^2	m	24000	9000	5000	10000	For lamp poles and Lamps
14	Protective casing of a cable	PVC φ100	m	86000	32000	18000	36000	Wall thickness 2.5 mm
15	Cable passing casing	Hot-dip galvanized steel pipe SC100	m	17000	6000	4000	7000	Wall thickness 5 mm
16	Hot-dip galvanized angle steel	∠50×50×5 L=2500	Pcs	12000	4000	3000	5000	For a grounding electrode
17	Hot-dip galvanized flat steel	-40X4	m	24000	8500	6000	9500	For a grounding wire
18	Fuse	CH2L-63C4/2 (30 mA)	Pcs	3870	#REF!	800	#REF!	
19	Fuse	CH2L-63C4/6 (30 mA)	Pcs	50	24	12	14	
21	Hand hole well	960×960×1100	Unit	2600	900	500	1200	
22	8 m and 10 m road lamp foundations	800×800×1,800 (length × width × height)	Unit	3110	1100	600	1410	
23	15 m road lamp foundation	1,000×1,000×2,200 (length × width × height)	Unit	50	24	12	14	
24	Road lamp box transformer foundation		Unit	16	6	3	7	



Cross Section of Power Conduit in a 60 Meter-wide Road Section

1:200



Note: The dimensions in the figure are in meters.

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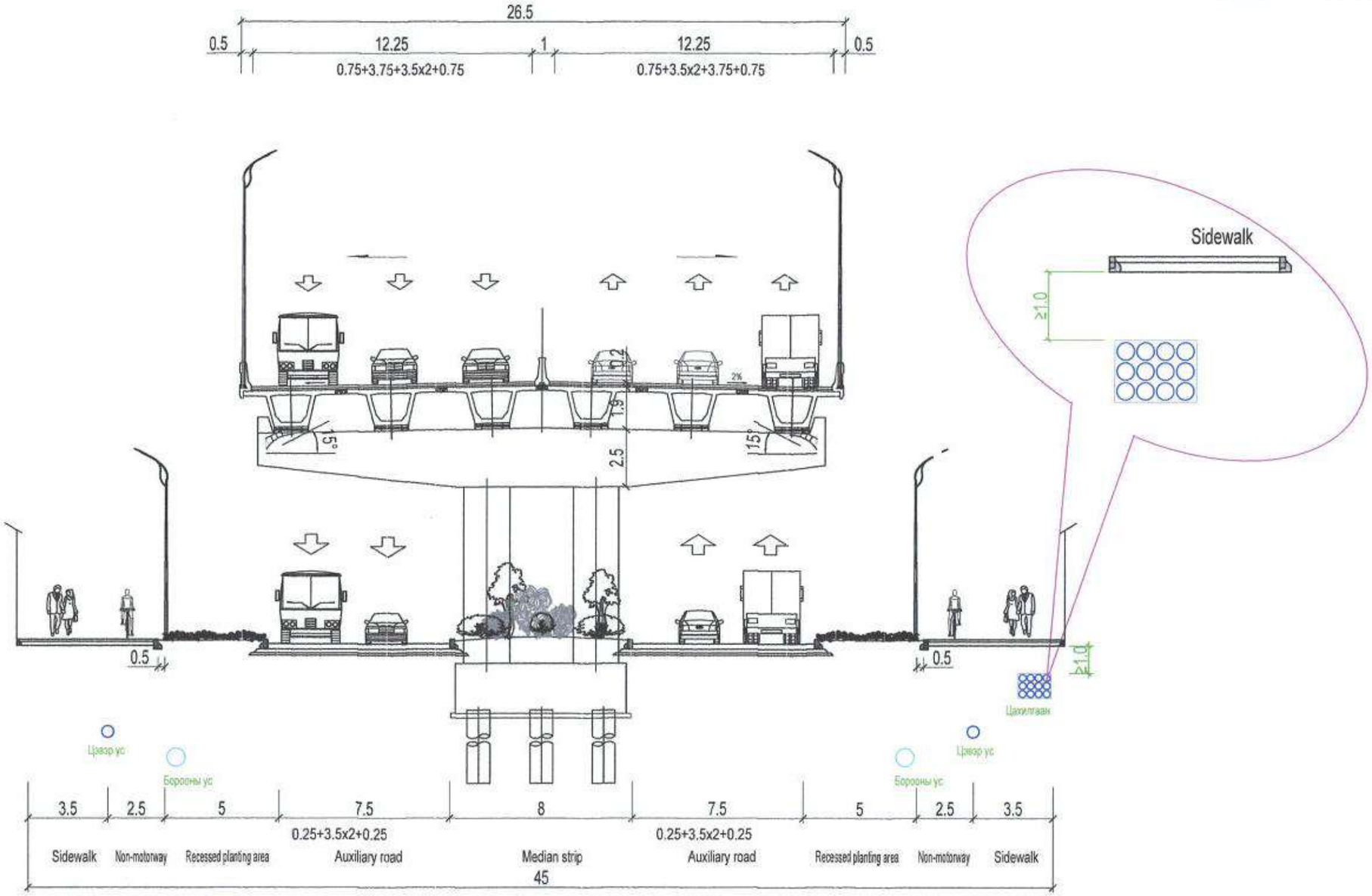
		Cross Section of Electrical Duct Bank in Road Section				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-05
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHAO JUNYI		DATE	2025.07



Cross Section of Power Conduit in a 45 Meter-wide Road Section

1:200

Note: The dimensions in the figure are in meters.

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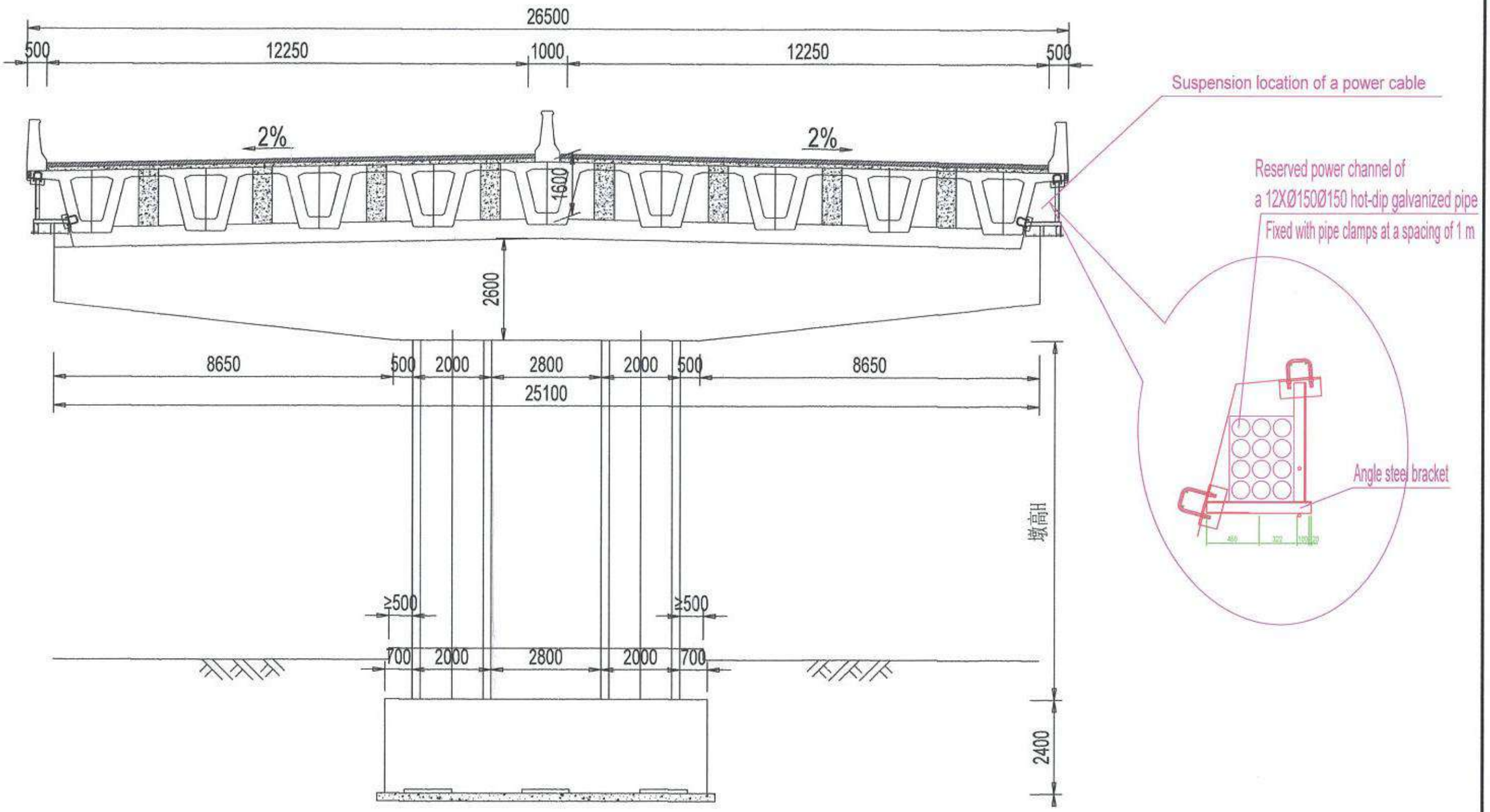
		Cross Section of Electrical Duct Bank in Road Section				MASTER DES.	CAO YONGJIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-05
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07



Cross Section of Power Conduit in a Bridge Section

1:200

Note: The dimensions in the figure are in Millimeters

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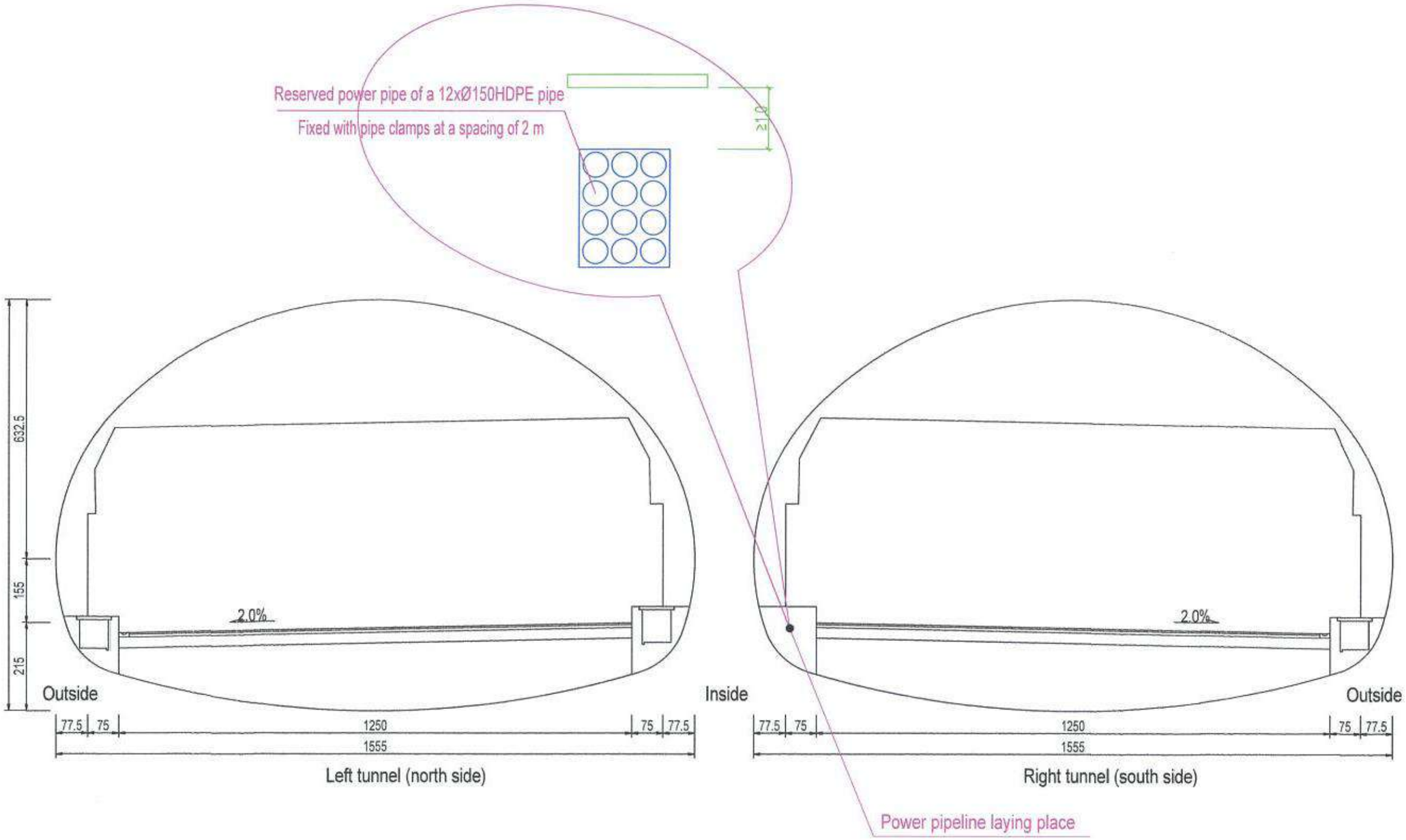
		Cross Section of Power Conduit in a Bridge Section				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-06
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JUKI		DATE	2025.07

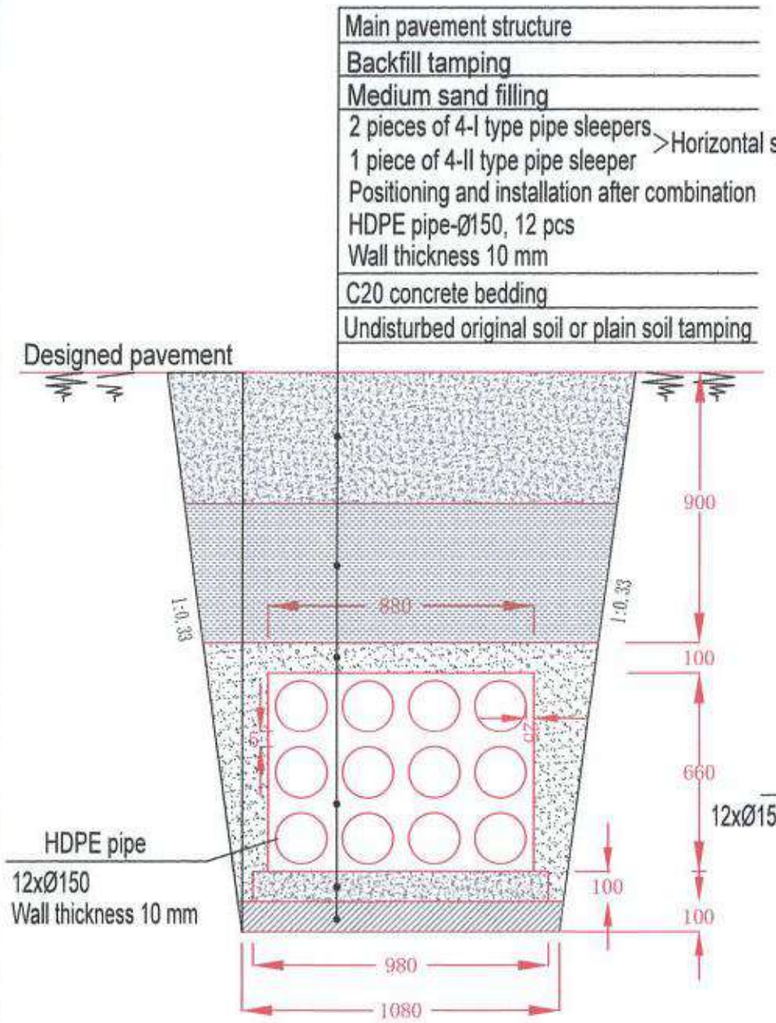


Cross Section of Power Conduit in a Tunnel Section

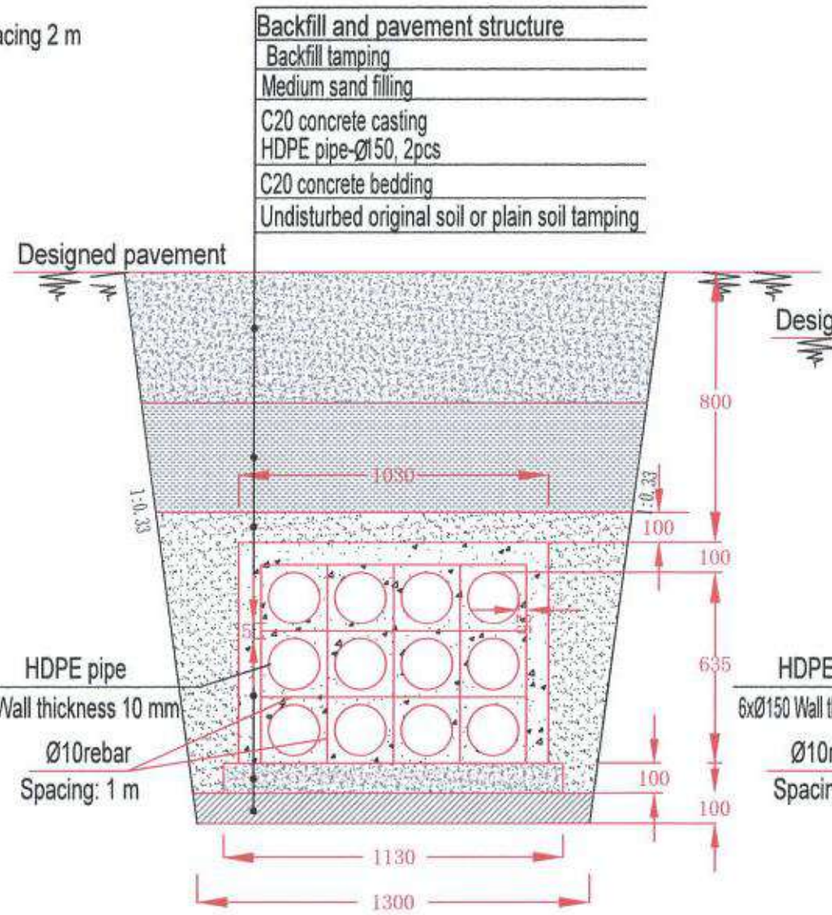
1:100

Note: The dimensions in the drawing are in cm.

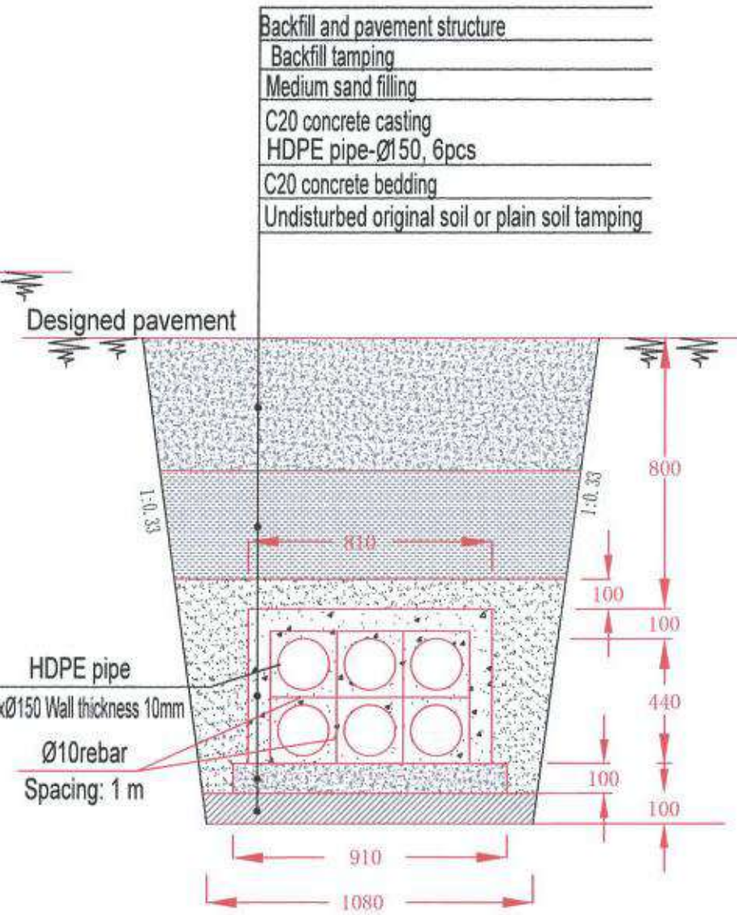
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Cross Section of Power Conduit in a Tunnel Section				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-07
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07



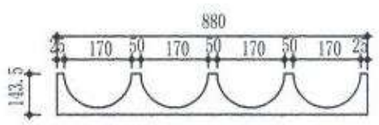
Burial method of a main power pipeline (A-type)



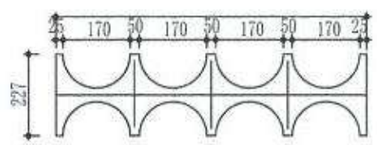
Concrete encapsulation and burial method of a main street crossing pipeline (B-type)



Burial method of a street crossing branch pipeline (C-type)



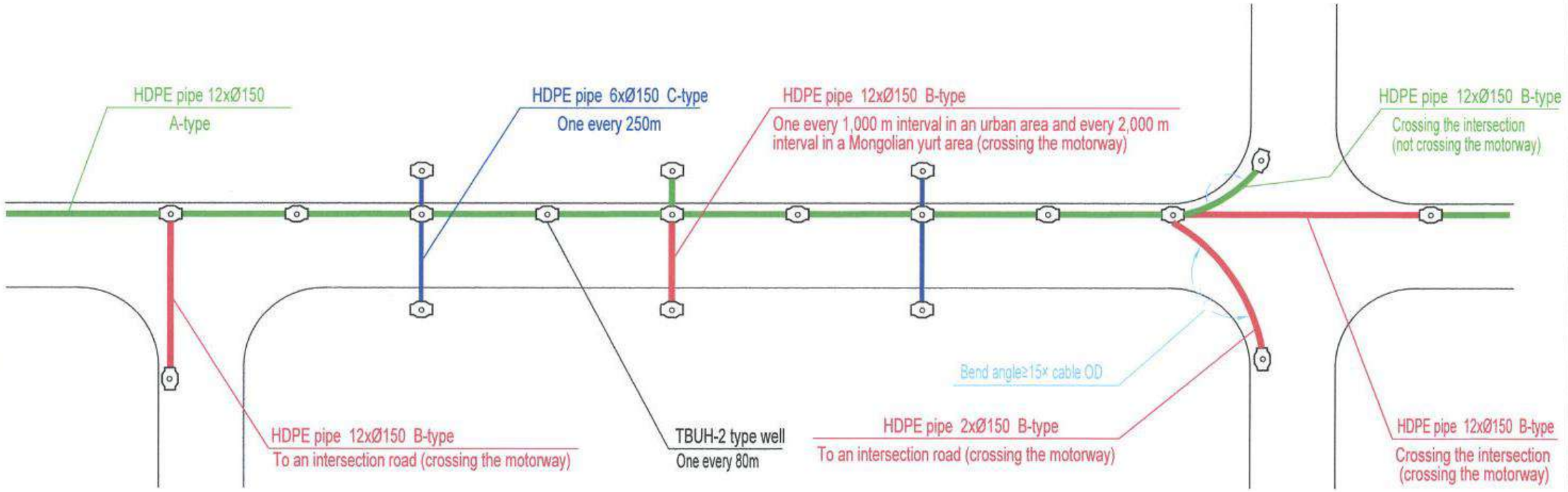
4-Ⅰ type pipe sleeper



4-Ⅱ type pipe sleeper

Note: The dimensions in the figure are in millimeter

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Detailed Cross Section for Laying of a Power Conduit				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-08
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07

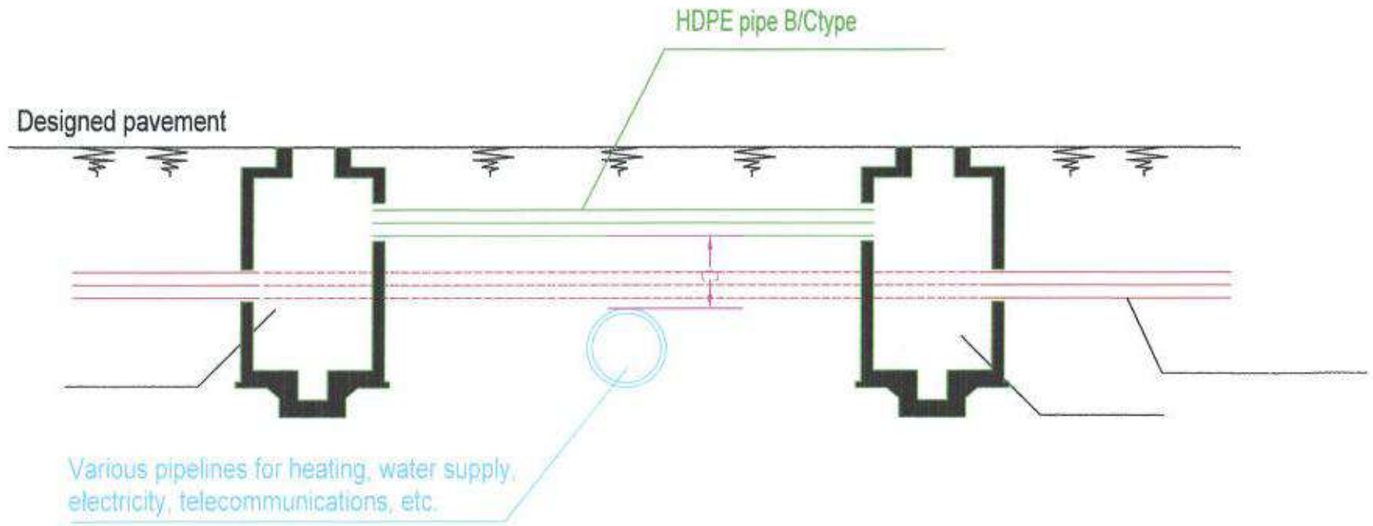


Typical Layout Plan of a Power Pipeline

Legend:

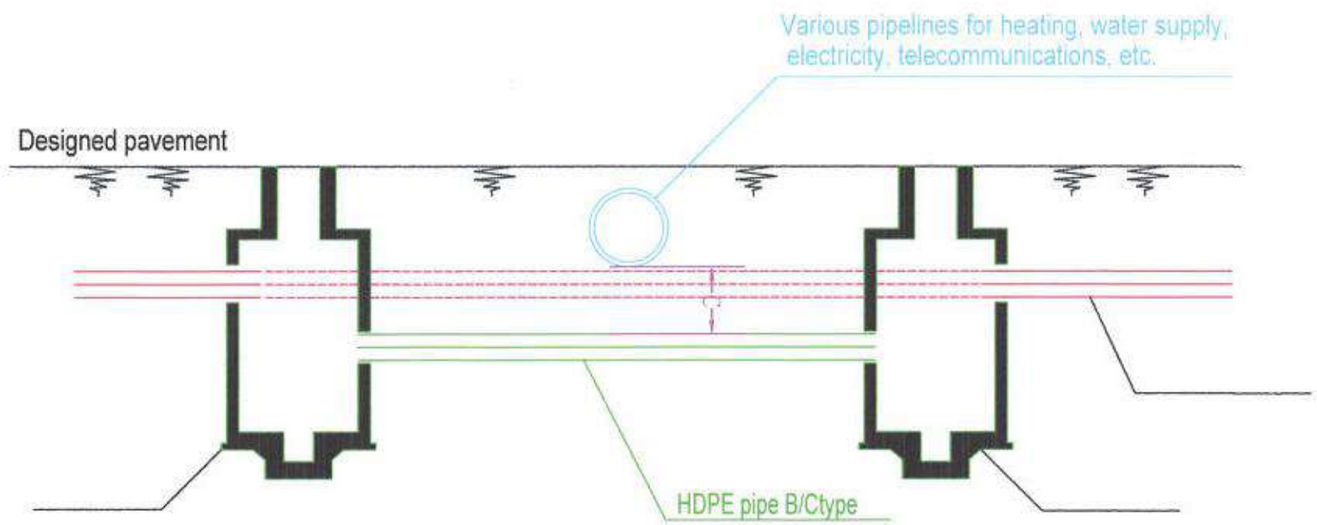
- TBUH-2 type well
- Burial method of a main power pipeline (A-type)
- Concrete encapsulation and burial method of a main street crossing pipeline (B-type)
- Burial method of a street crossing branch pipeline (C-type)

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Typical Layout Plan of a Power Pipeline				MASTER DES.	CAO YONGLIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-09
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	KANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIKI		DATE	2025.07



Scheme I for crossing power pipelines with other pipelines

Other pipelines are located below telecommunications pipelines



Scheme 2 for crossing power pipelines with other pipelines

Other pipelines are located above telecommunications pipelines

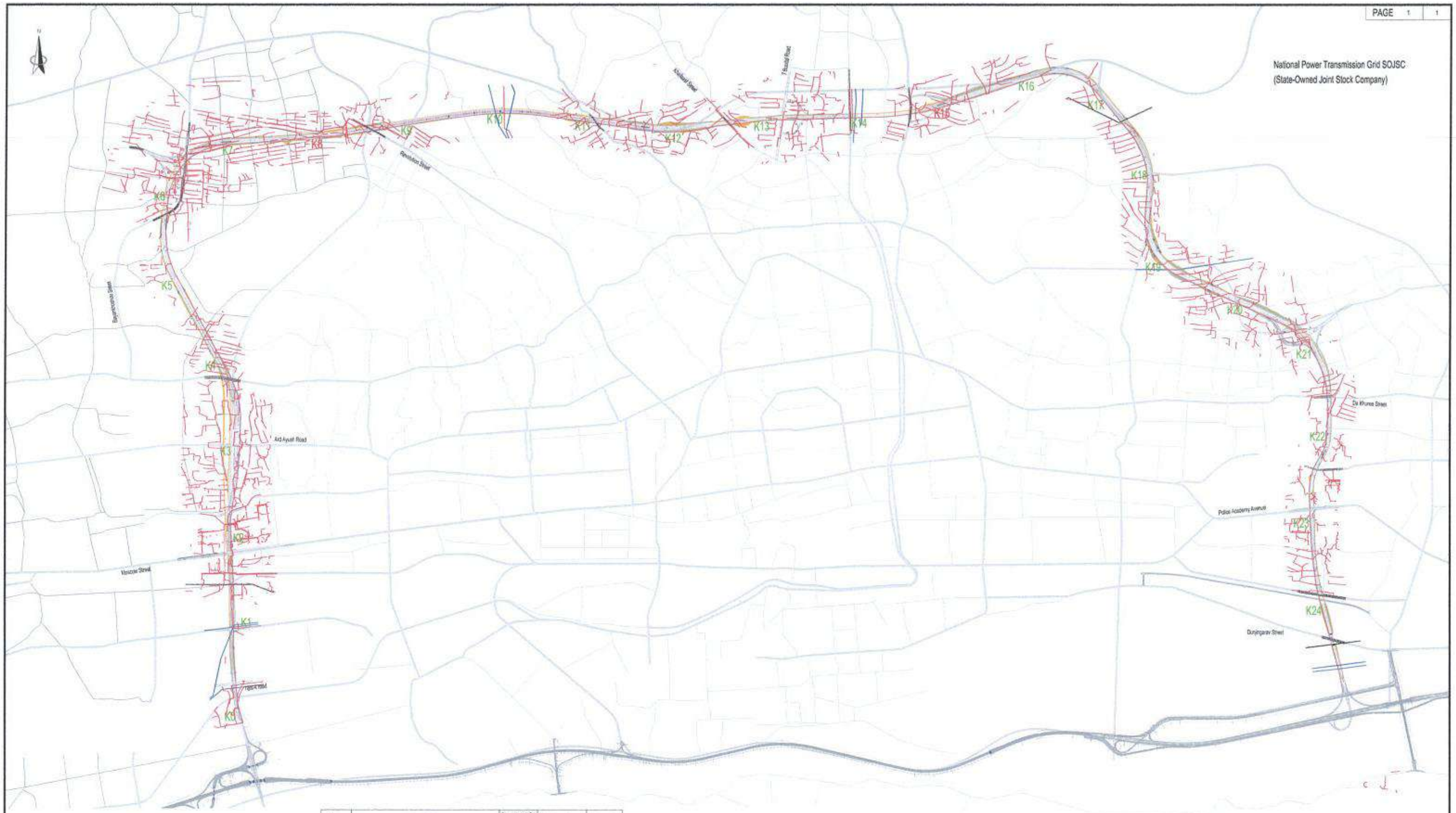
Note:

C-The minimum protection distance from other pipelines, determined according to relevant standards and specifications;

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Scheme for crossing power pipelines with other pipeline				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-10
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	KANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIHEI		APPROVED	ZHANG JUEI		DATE	2025.07

No.	Description	Specification / Model		Unit	Total	Quantity			Note(s)
						K0+000~ K8+600	K8+600~ K15+500	K15+500~ K24+793	
1	Protective pipe of a power cable	φ150		m	326000	113000	90800	122200	Main pipe (made of HDPE material, wall thickness 10 mm, equipped with a pipe sleeper, buried depth 1 m)
2	Protective pipe of a power cable	φ150	3x4	m	19949	12204	7003	743	Road crossing pipe (made of HDPE material, wall thickness 10 mm, equipped with a pipe sleeper, buried depth 1 m)
			2x3		35819	12499	9928	13392	
3	Manhole well			Pcs	300	104	83	112	Prefabricated
4	Manhole well cover	Φ710 nodular		Pcs	300	104	83	112	Cast iron
5	Grounding wire of galvanized flat steel	-40x4		m	54500	18905	15168	20428	
6	Grounding electrode of a galvanized steel pipe	ϕ50、L=2,500mm		Pcs	4950	1717	1378	1855	

National Power Transmission Grid SOJSC
(State-Owned Joint Stock Company)



No.	Description	Unit	Total
1	2 35 KV overhead power lines/3 anchor points are to be relocated. Two new anchor points and two gaps/	KM	0.68
2	Relocation of a 10 KV overhead power line	KM	2.8
3	Relocation of a 0.4 KV overhead power line	KM	4.2
4	10 KV landing overhead power line	KM	3.49
8	Relocation of a 10 KV cable transmission line	m	6950
9	Relocation of a 10 KV cable transmission line	m	1510
10	Relocation of a 0.4KV cable transmission line	m	5260

No.	Description	Intersection Pole No	Voltage Level	Total
1	Dund gol	11--12	110 kV	1
2	133,134	91--92	110 kV	1
3	135,136	34--35, 1--2	110 kV	2
4	137,138	56--57	110 kV	1
5	149,150-Duri Ekh branch overhead lines of the overhead line	4--3	110 kV	1
6	109,110	14--17	110 kV	1
7	107,108	34--36	110 kV	1
8	103,104	16--17	110 kV	1
9	125,126	13--11	110 kV	1
10	Communications A, B	16--17	35 kV	1

1	Lot-1 (K0+000~K8+800)	Tugrik. 4,412,863,489
2	Lot-2 (K8+600~K15+500)	Tugrik. 6,598,965,357
3	Lot-3 (K15+500~K24+790)	Tugrik. 5,217,514,677

Explanation:
1. The planning solution was developed for the relocation and adjustment of the transmission line at the Feasibility Study (FS) stage.
2. At the Detailed Design stage, it is necessary to define the detailed calculations and planning.
3. The location is between KP~K24 on the alignment.

0.4kV Overhead electrical line
10kV Overhead electrical line
35kV Overhead electrical line
110kV Overhead electrical line
New 12-way Φ150 power cable duct bank

中国市政工程西北设计研究院有限公司
CSCEC AECOM CONSULTANTS CO., LTD

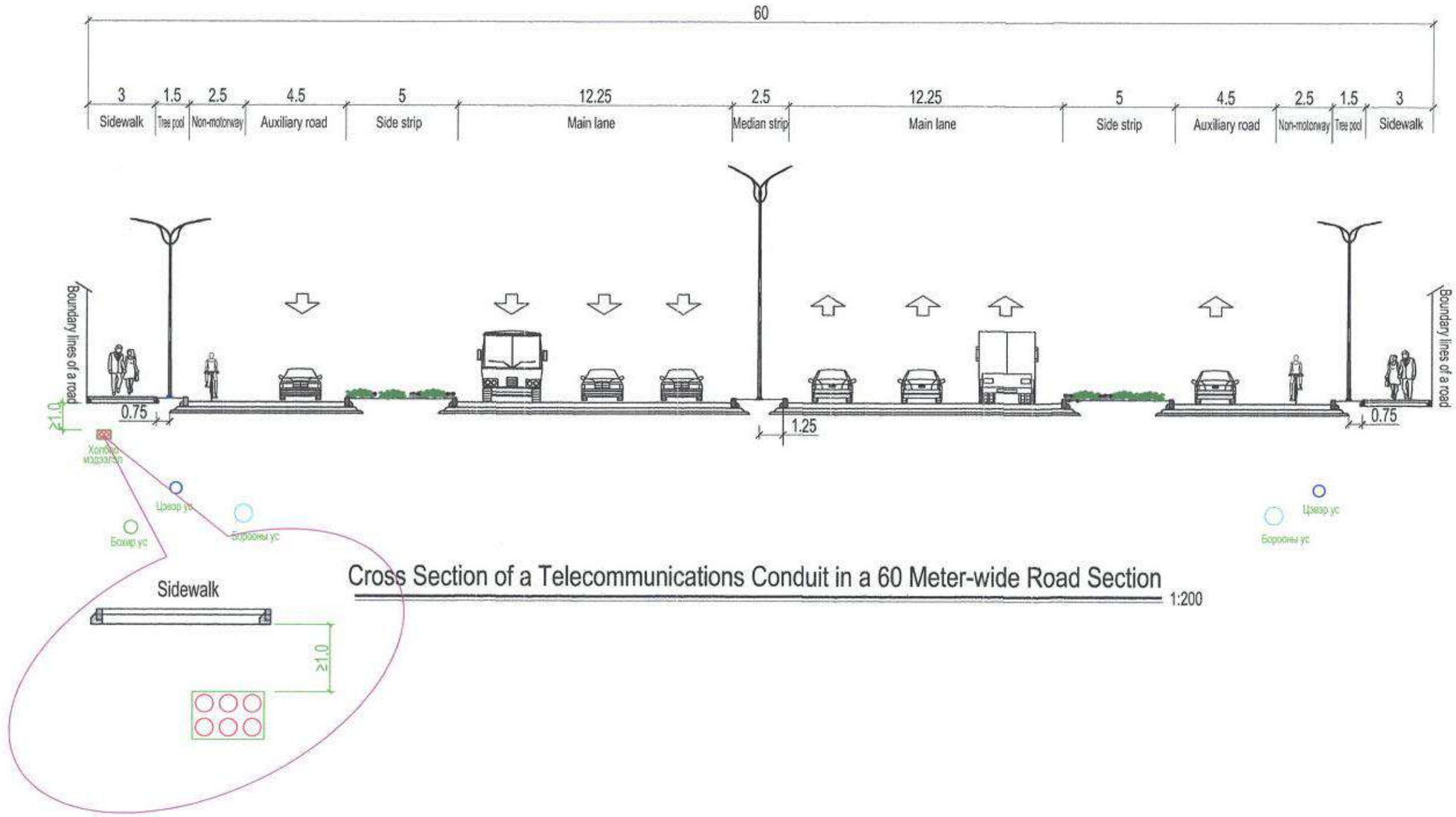
The Feasibility Study and Concept Design of the First Ring Road Project of Ulaanbaatar City

Electric Power Relocation and Modification Design Drawing

DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	SCALE	-
DRAWING NO.	V-12	DATE	2025.07		

No.	Description	Unit	Total	Quantity			Design Cost	Budgeted Cost
				K0+000~K8+600	K8+600~K15+500	K15+500~K24+793.006		
1	2 35 KV overhead power lines/3 anchor points are to be relocated. Two new anchor points and two gaps/	KM	0.68			0.68	7,680,000.00	519,416,145.00
2	Relocation of a 10 KV overhead power line	KM	2.8			2.8	3,796,254.00	108,720,104.00
3	Relocation of a 0.4 KV overhead power line	KM	4.2			4.2	10,519,741.00	157,382,433.00
4	10 KV landing overhead power line	KM	3.49		3.49		4,731,759.00	29,381,298.00
5	Relocation of a box transformer	Set	14		14		11,027,016.00	304,837,097.00
6	Relocation of a pole transformer	Set	3		3		1,603,800.00	68,873,971.00
7	Relocation of a high-voltage cabinet/400-630 KVA/new building	Set	2		2		27,255,400.00	636,755,016.00
8	Relocation of a 10 KV cable transmission line	m	6950	6950			24,765,977.00	1,503,307,970.00
9	Relocation of a 10 KV cable transmission line	m	1510	1510			6,035,760.00	193,185,741.00
10	Relocation of a 0.4KV cable transmission line	m	5260	5260			16,968,024.00	463,599,997.00
Total Price							**114,383,731.00**	**3,985,459,772.00**

No.	Description	Intersection Pole No	Voltage Level	Total	Quantity		
					K0+000~K8+600	K8+600~K15+500	K15+500~K24+793.006
1	Dund gol	11--12	110 kV	1	1		
2	133,134	91--92	110 kV	1		1	
3	135,136	34--35, 1--2	110 kV	2		2	
4	137,138	56--57	110 kV	1		1	
5	149,150-Dari Ekh branch overhead lines of the overhead line	4--3	110 kV	1		1	
6	109,110	14--17	110 kV	1			1
7	107,108	34--36	110 kV	1			1
8	103,104	16--17	110 kV	1			1
9	125,126	13--11	110 kV	1			1
10	Communications A, B	16--17	35 kV	1	1		

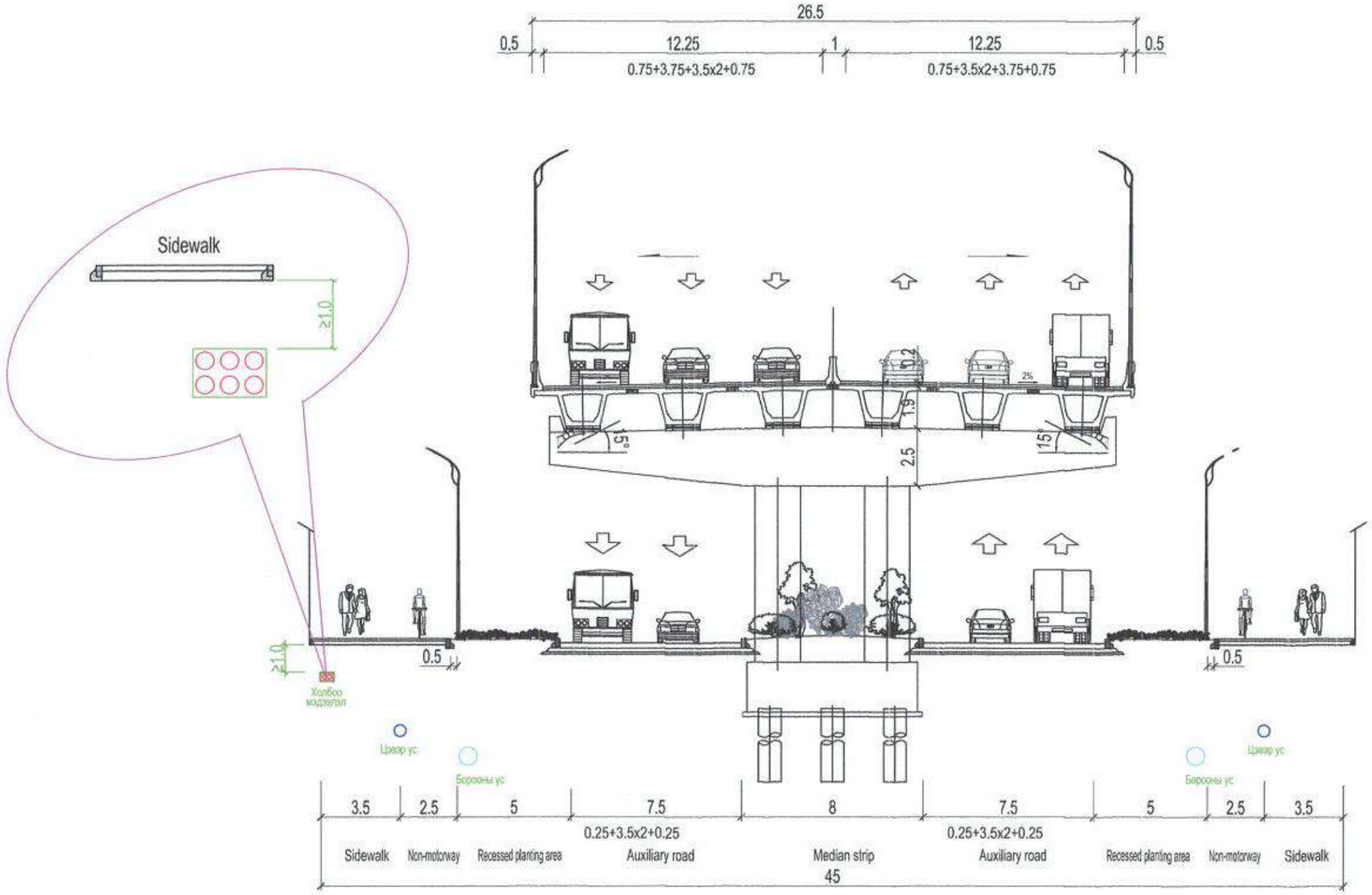


Cross Section of a Telecommunications Conduit in a 60 Meter-wide Road Section

1:200

Note: The dimensions in the figure are in meters.

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the "First Ring Road" Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Cross Section of Telecommunication Duct Bank in Road Section				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-14
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07

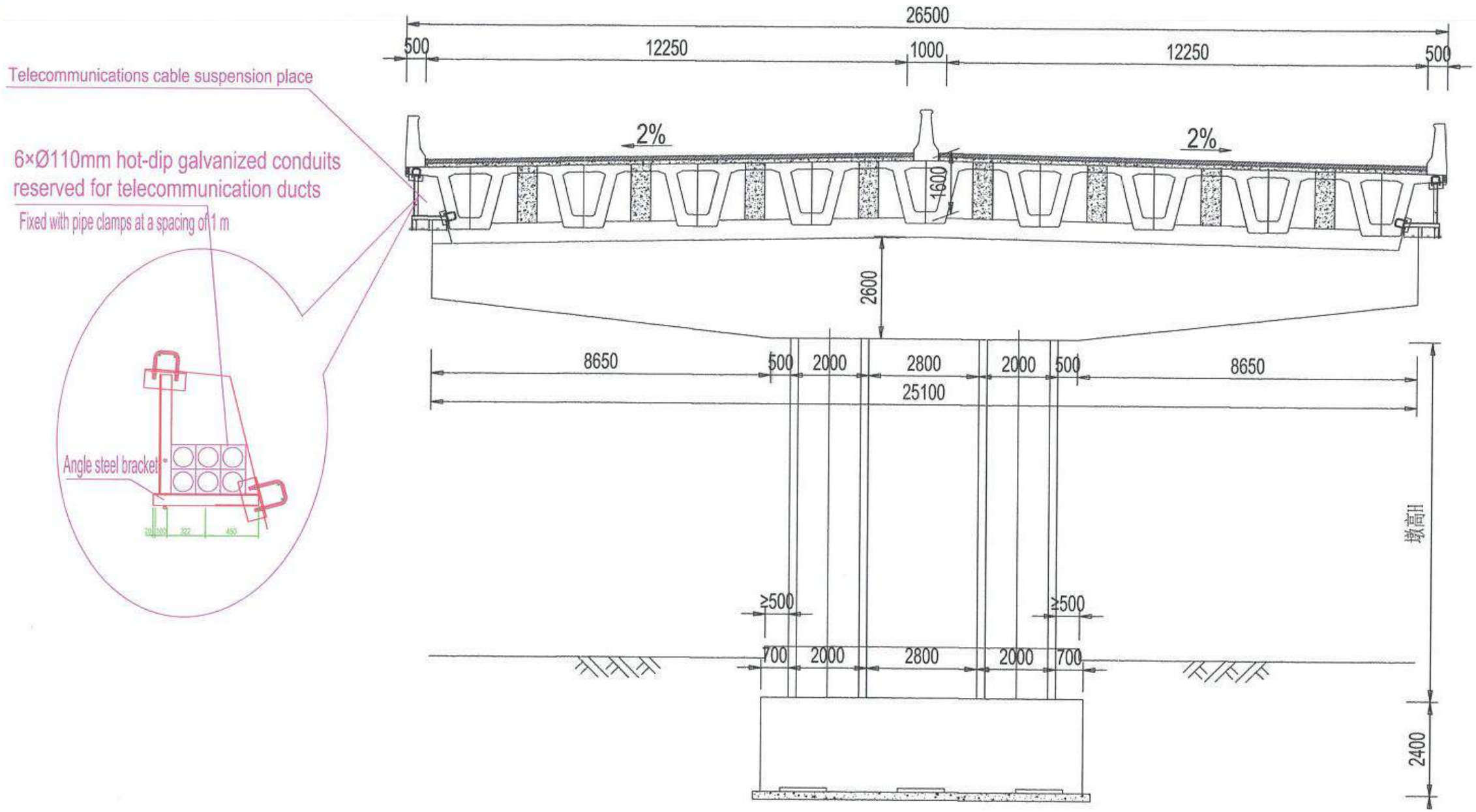


Cross Section of a Telecommunications Conduit in a 45 Meter-wide Road Section

1:200

Note: The dimensions in the figure are in meters.

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Cross Section of Telecommunication Duct Bank in Road Section				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-14
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIBIN		DATE	2025.07

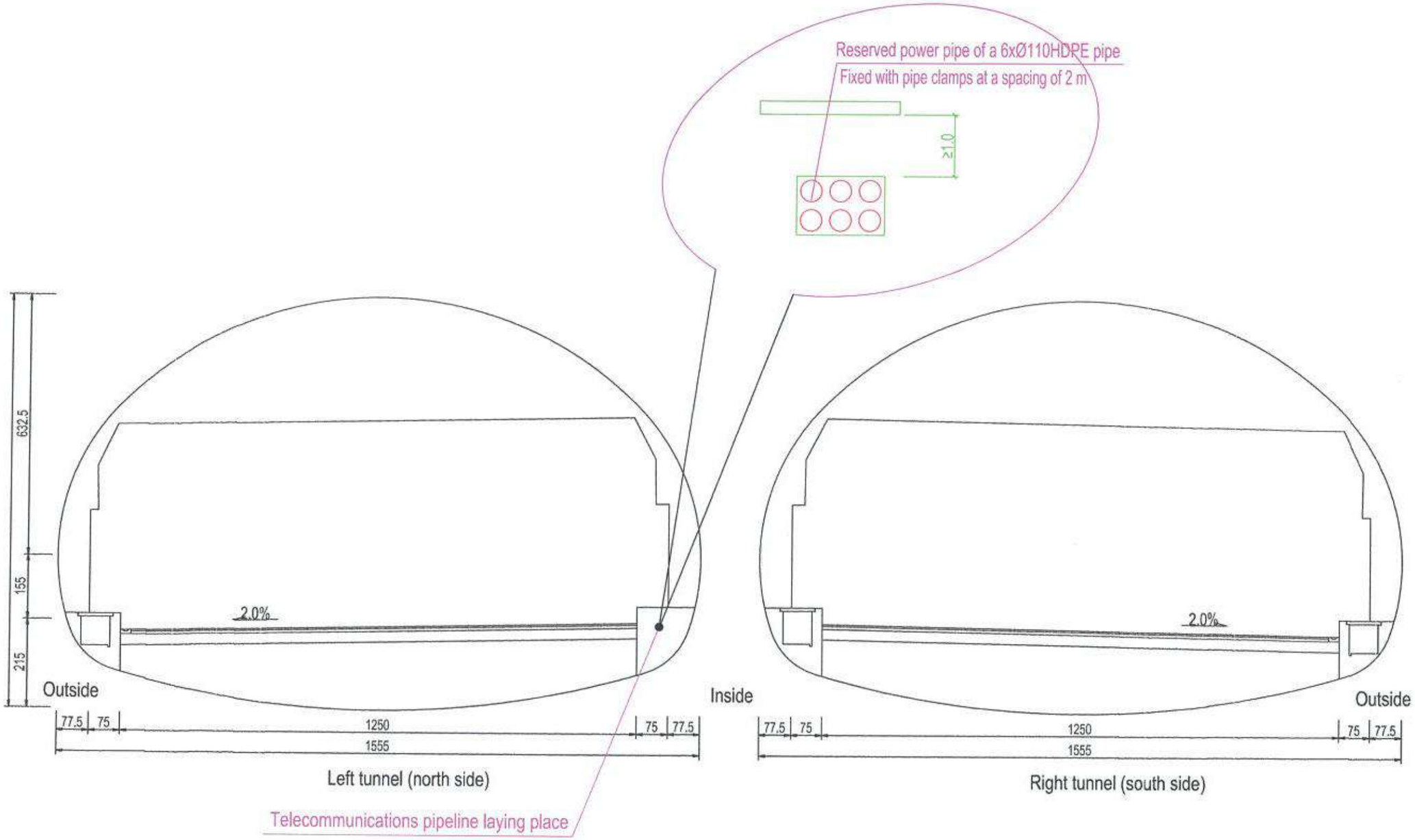


Cross Section of a Telecommunications Conduit in a Bridge Section

1:200

Note: The dimensions in the figure are in Millimeters

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Cross Section of a Telecommunications Conduit in a Bridge Section				MASTER DES.	ZHO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-15
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHU		DATE	2025.07

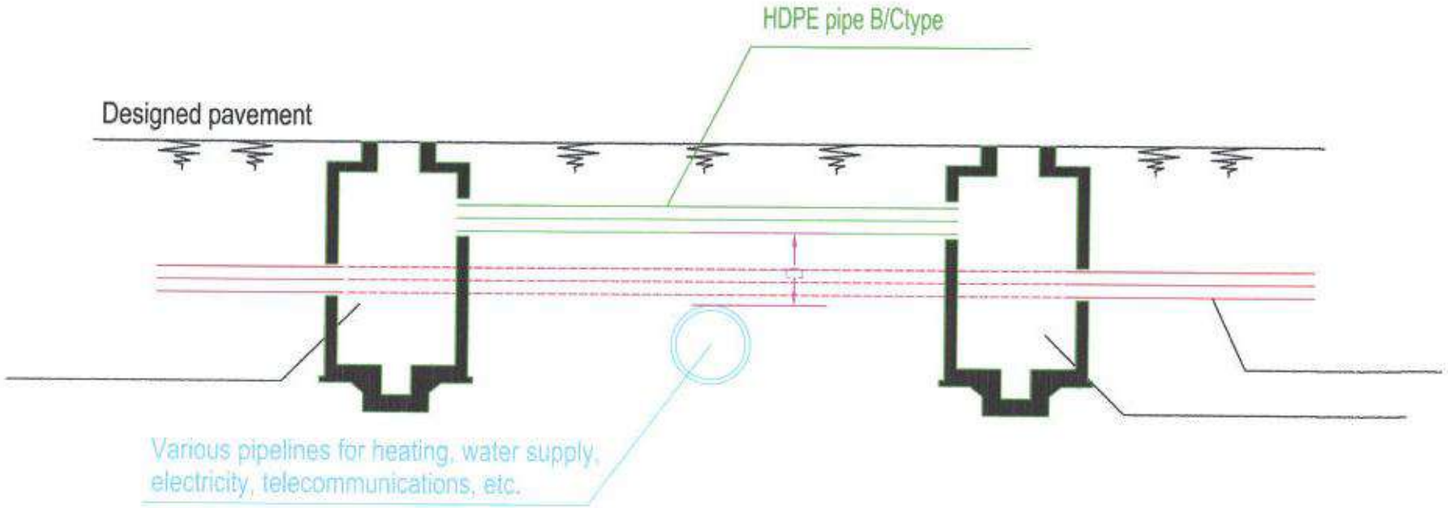


Cross Section of Telecommunication Duct Bank in Tunnel Section

1:100

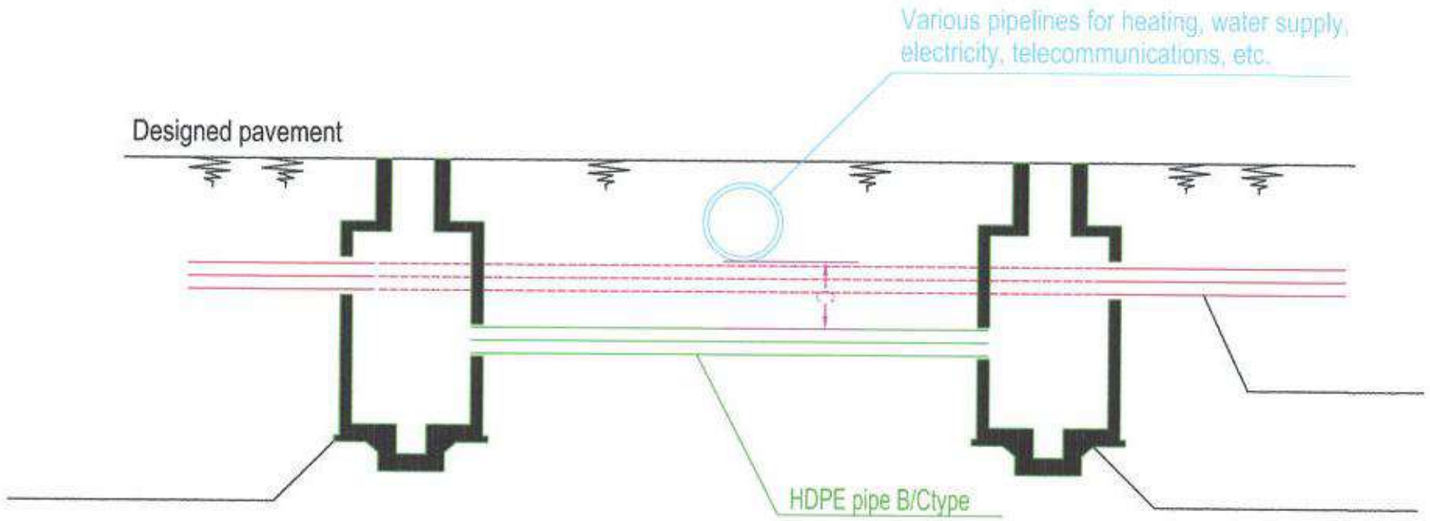
Note: The dimensions in the drawing are in cm.

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	
		Cross Section of Telecommunication Duct Bank in Tunnel Section				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-16
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG JIN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07



Scheme I for crossing telecommunications pipelines with other pipelines

Other pipelines are located below telecommunications pipelines



Scheme 2for crossing telecommunications pipelines with other pipelines

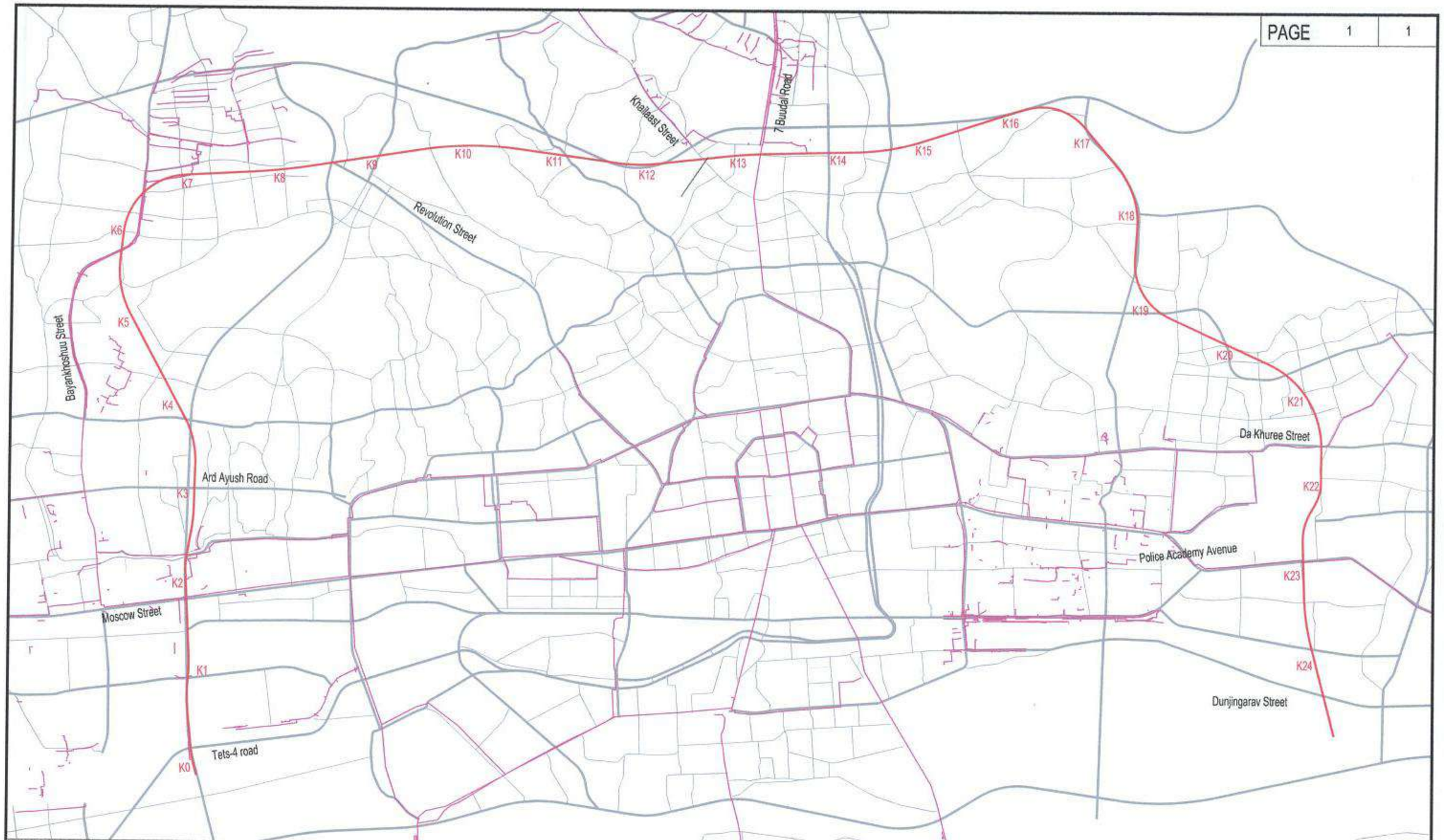
Other pipelines are located above telecommunications pipelines

Note:

C-The minimum protection distance from other pipelines, determined according to relevant standards and specifications;

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XIUPING		SCALE	
		Scheme for crossing telecommunications pipelines with other pipelines				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-19
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
						SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHEI		DATE	2025.07

No.	Description	Specification / Model	Unit	Total	Quantity			Note(s)
					K0+000 ~K8+600	K8+600~ K15+500	K15+500~ K24+793	
1	Protective pipe of a telecommunications cable	φ110	m	163400	56679	45475	61246	Main pipe (made of HDPE material, wall thickness 10.5 mm, equipped with a pipe sleeper, buried depth 1 m)
2	Protective pipe of a telecommunications cable	φ110	m	32000	11100	8906	11994	Road crossing pipeline (made of HDPE material, wall thickness 10.5 mm, equipped with a pipe sleeper, buried depth 1 m)
3	Manhole well		Pcs	300	104	83	112	Prefabricated
4	Manhole well cover	Φ710 nodular	Pcs	300	104	83	112	Cast iron



Location	Channelization (m)	Communication Cable (m)	
		Underground	Overhead
lot-1	420	33600	2300
lot-2	60	4800	200
lot-3	120	9600	400
Total	600	48000	2900

AVANTGARDE URAN
DESIGN & ENGINEERING

Engineer
Myagmarsuren

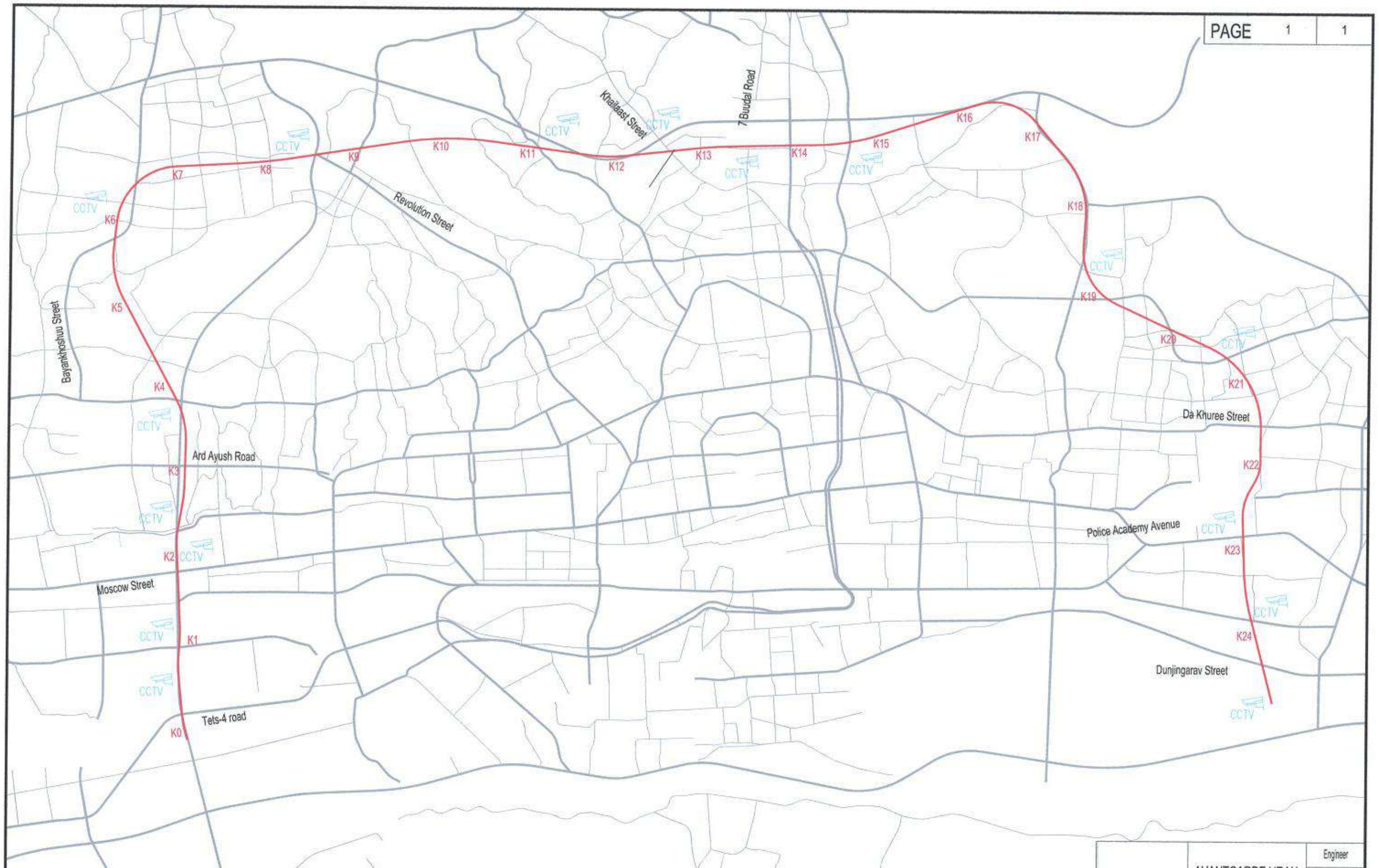
中国市政工程西北设计研究院有限公司
CSCEC AECOM CONSULTANTS CO., LTD

The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City

Relocation and Transfer Line Network

DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER		CHECKED	YIN XUPING
				MASTER DES.	CAO YONGXIANG	SPE. MANAGER	KANG QIAN	EXAMINED	KANG QIAN
				MASTER DES.	PAN HAOGUO	SPE. MANAGER		APPROVED	WANG AN MIN
				SUB. MANAGER		DESIGNED	ZHANG WEIWEI	APPROVED	ZHANG JIHU

SCALE	–
DRAWING NO.	V-21
DATE	2025.07



Location	Unit	lot-1	lot-2	lot-3	Total
Road Surveillance Camera	Piece	6	5	5	16

CCTV Planned Road Surveillance Camera

AVANTGARDE URAN
DESIGN & ENGINEERING

Engineer: Myagmarsuren

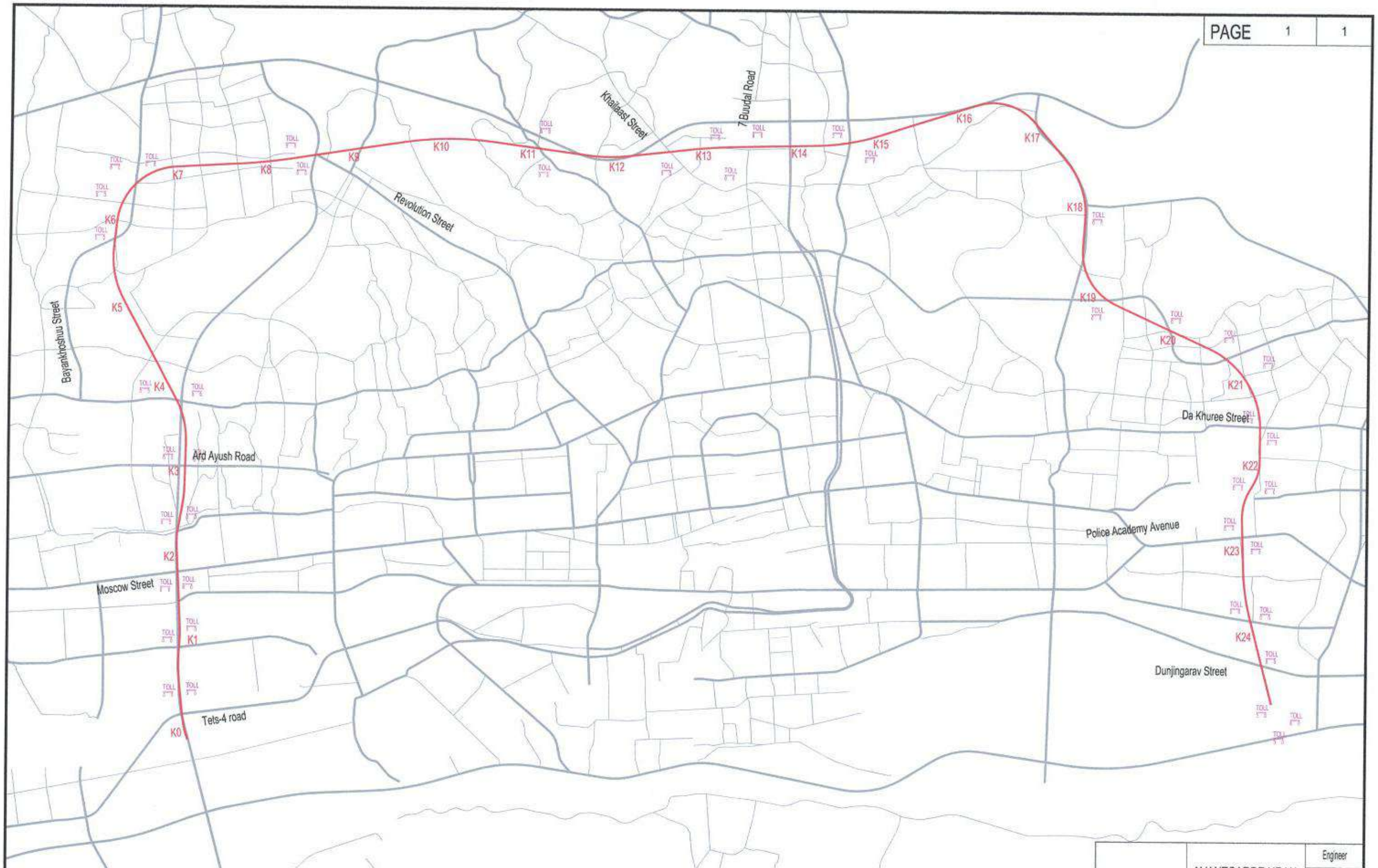
中国市政工程西北设计研究院有限公司
CSCEC AECOM CONSULTANTS CO., LTD

The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City

DRAWING STAGE: Technical Drawings | PROJECT NO.: 10-2024-2509

Road Surveillance Camera Location

DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE	–
MASTER DES.	CAO YONGLIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.	V-23
MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN			
SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JIHUI		DATE	2025.07



No.	Device	Unit	lot-1	lot-2	lot-3	Total
1	Toll Collection Point	Piece	54	36	38	128

TOLL Planned Toll Collection Point

AVANTGARDE URAN
DESIGN & ENGINEERING

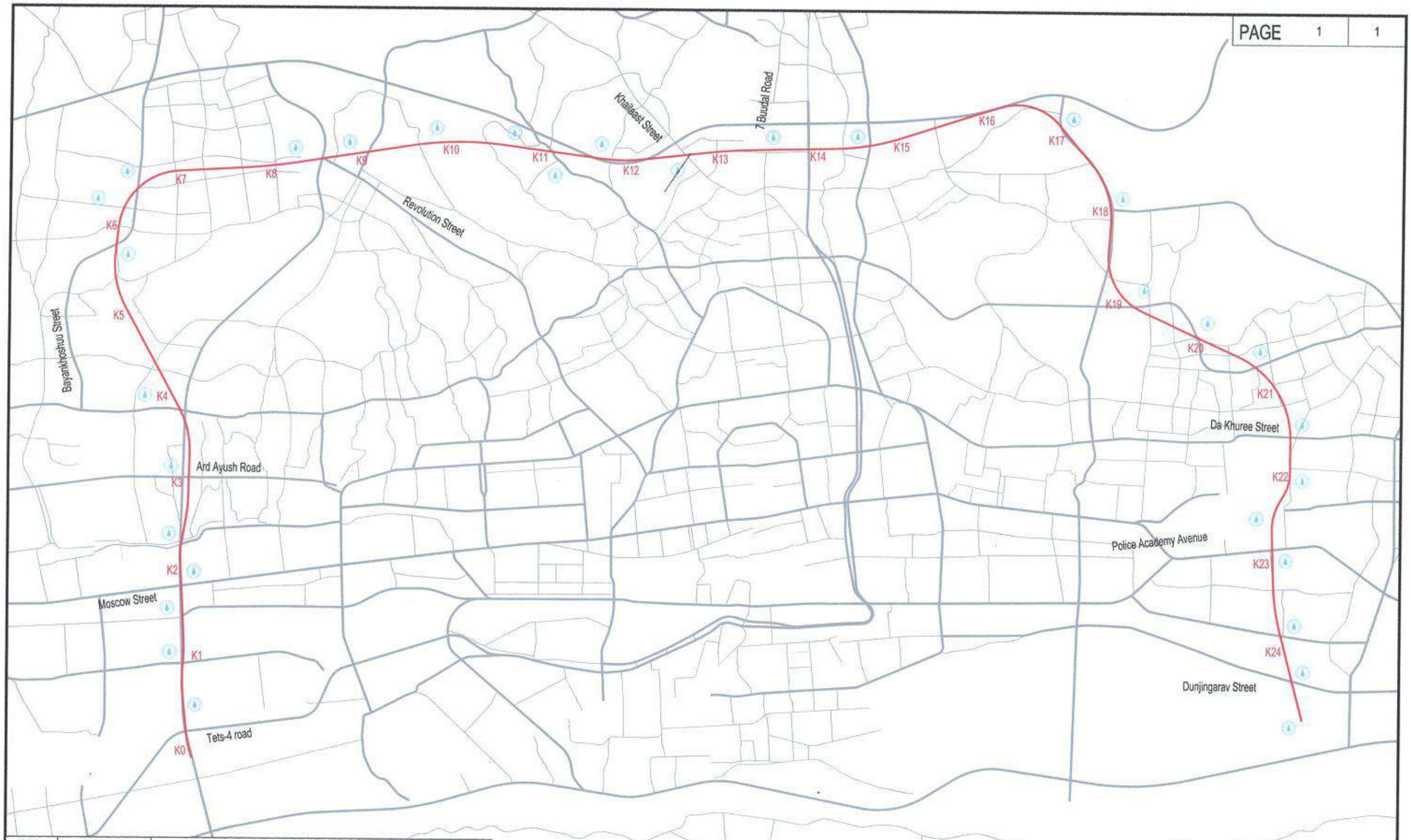
Engineer: Myagmarsuren

中国市政工程西北设计研究院有限公司
CSCEC AECOM CONSULTANTS CO., LTD

The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City

Toll Collection Point Location

DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509						
DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE: –
MASTER DES.	CAO TONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.: V-24
MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN		
SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHOU JIBIN		DATE: 2025.07



No.	Name	Location	Quantity
1	Bridge	Center of the Bridge	6
2	Road	Cross traffic and intersection	22
3	Tunnel	At entrances, exits, and drainage sections	3
Total			31

Planned Flood Water Level Sensor

AVANTGARDE URAN
DESIGN & ENGINEERING

Engineer: Myagmarsuren

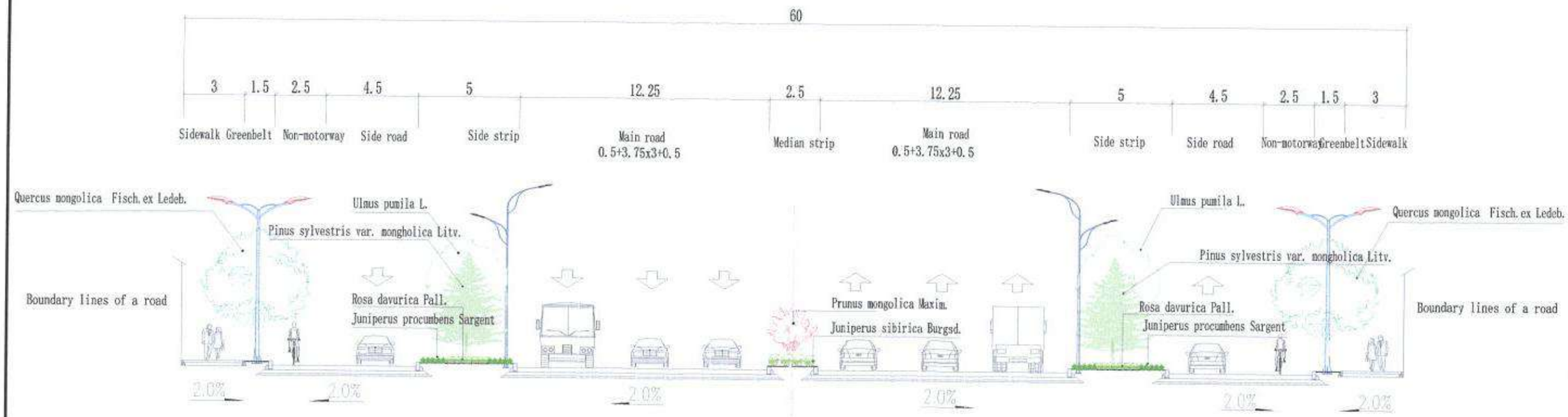
中国市政工程西北设计研究院有限公司
CSCEC AECOM CONSULTANTS CO., LTD

The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City

DRAWING STAGE: Technical Drawings
PROJECT NO.: 10-2024-2509

Flood Level Monitoring Point Location

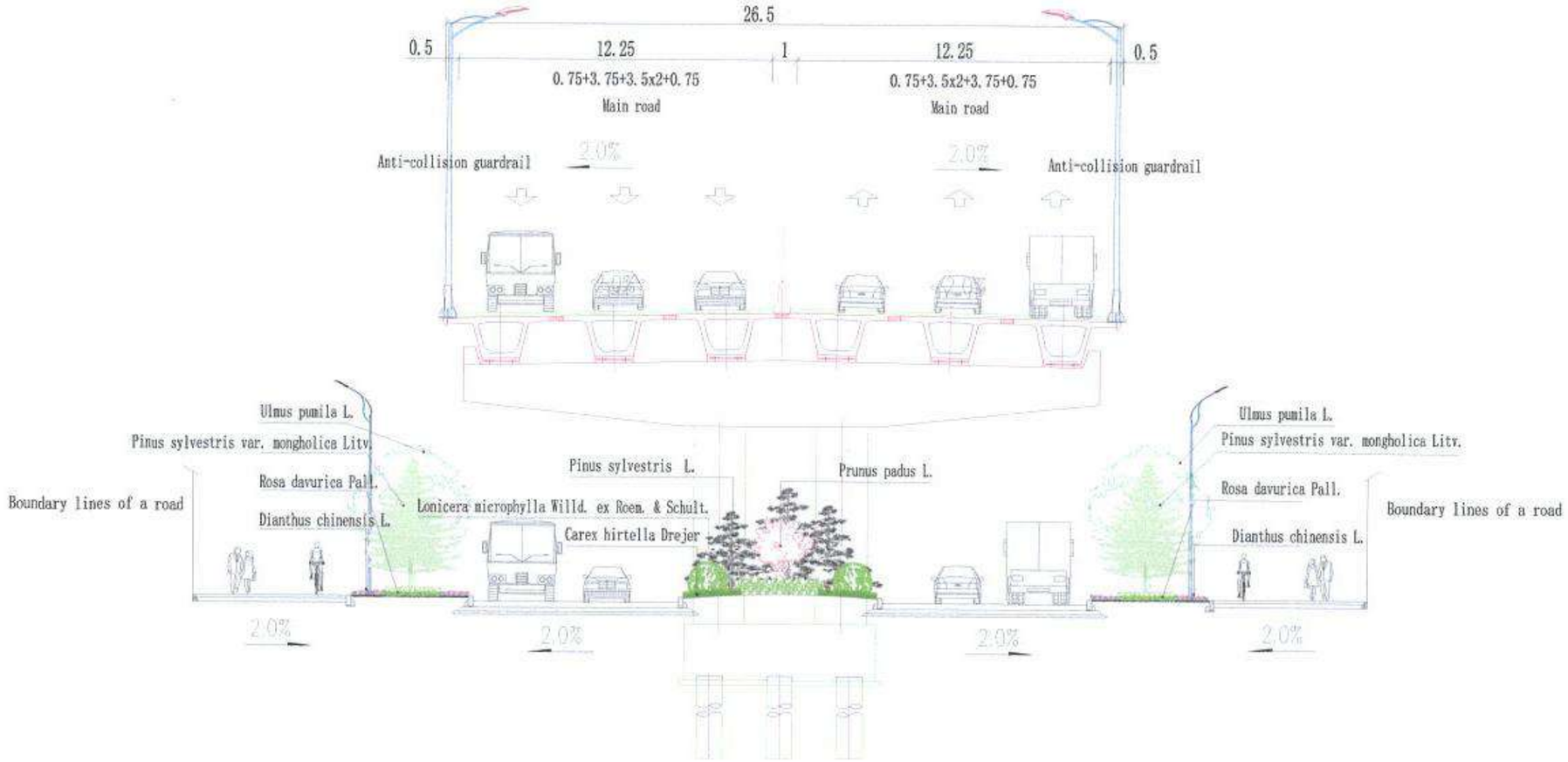
DES. MANAGER	PANG WEI		SUB. MANAGER			CHECKED	YIN XUPING		SCALE: –
MASTER DES.	CAO YONGXIANG		SPE. MANAGER	KANG QIAN		EXAMINED	KANG QIAN		DRAWING NO.: V-25
MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	WANG AN MIN		
SUB. MANAGER			DESIGNED	ZHANG WEIWEI		APPROVED	ZHANG JUHUI		DATE: 2025.07



Standard Section of 60M Wide Road Landscaping 1:200

Note
1.Drawing scale: 1:200

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 200
		Standard Section of 60M Wide Road Landscaping				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 01
						MASTER DES.	PAN HAOCUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07

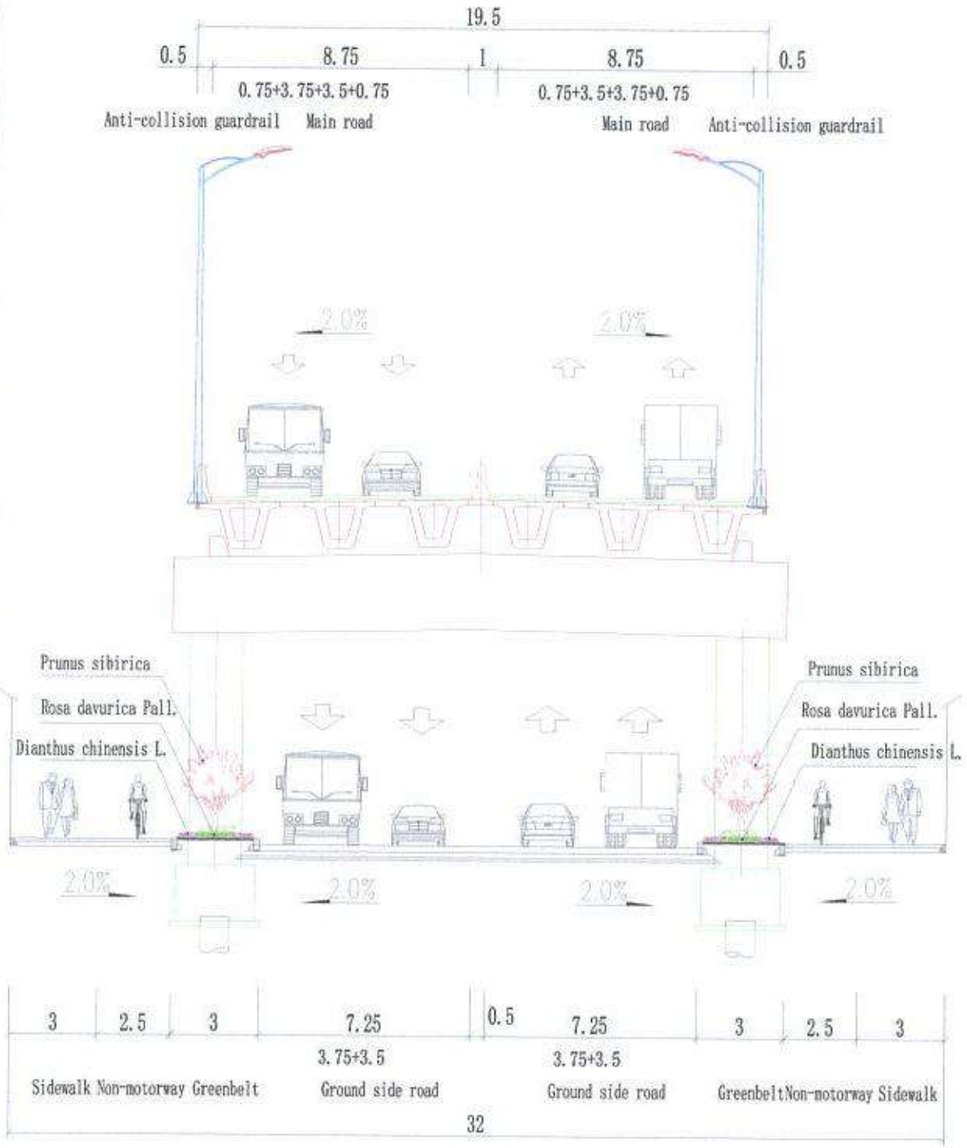


3.5	2.5	5	7.5	8	7.5	5	2.5	3.5
Sidewalk	Non-motorway	Greenbelt	0.25+3.5x2+0.25 地面Side road	Median strip 45	0.25+3.5x2+0.25 地面Side road	Greenbelt	Non-motorwa	Sidewalk

Standard Section of 45M Wide Road Landscaping 1:200

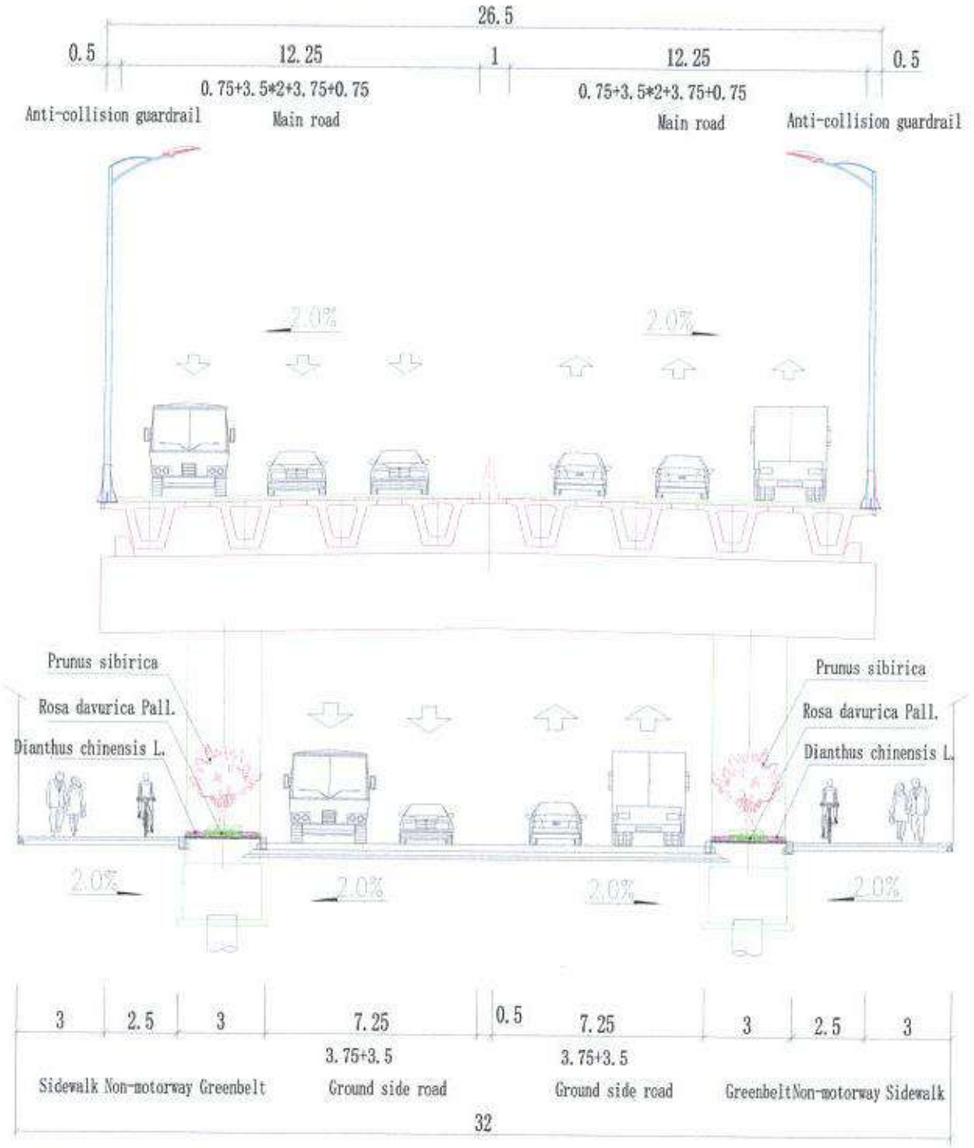
Note
1.Drawing scale: 1:200

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER	CHANG KAI	CHECKED	CHANG KAI	SCALE	1: 200
		Standard Section of 45M Wide Road Landscaping				MASTER DES.	CAO YONGXIANG	SPE. MANAGER	CHANG KAI	EXAMINED	TANG ZHENTAO	DRAWING NO.	VII- 02
						MASTER DES.	PAN HAOGUO	SPE. MANAGER		APPROVED	TANG ZHENTAO		
						SUB. MANAGER	CHANG KAI	DESIGNED	CHENG CHEN	APPROVED	TANG ZHENTAO	DATE	2025.07



Standard Section of 32M Wide Road Landscaping (4-lane dual carriageway) 1:200

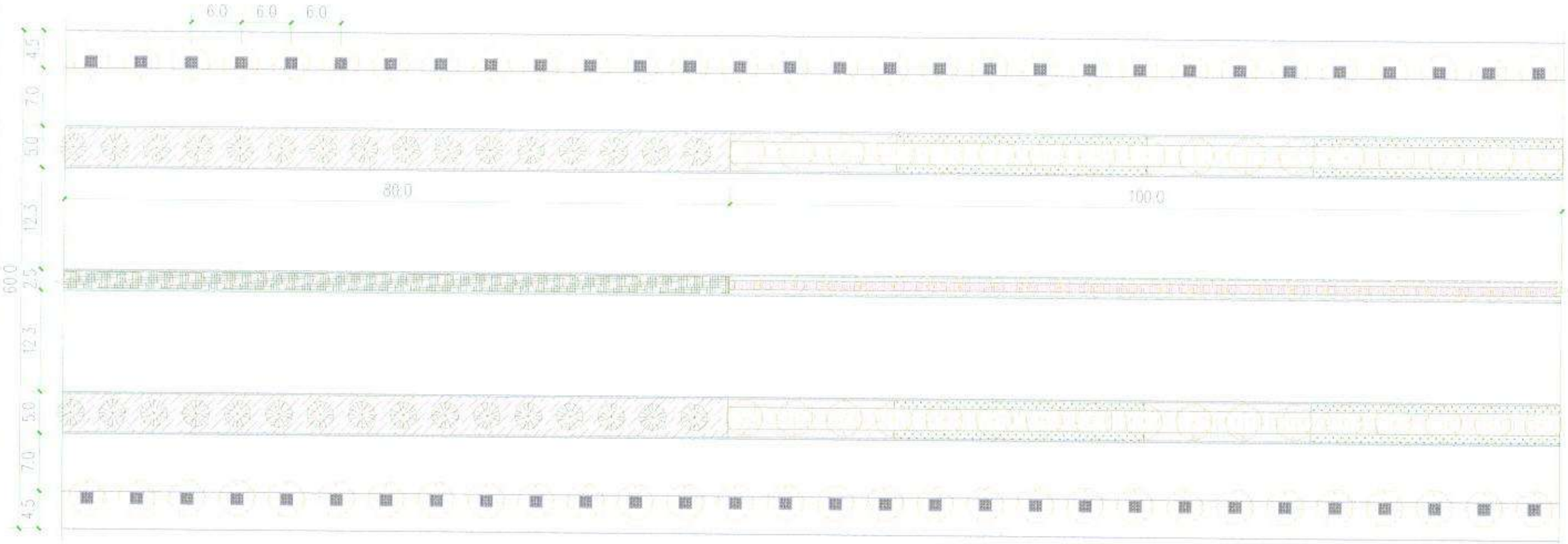
K0+380~K1+080



Standard Section of 32M Wide Road Landscaping (6-lane dual carriageway) 1:200

K1+080~K3+240

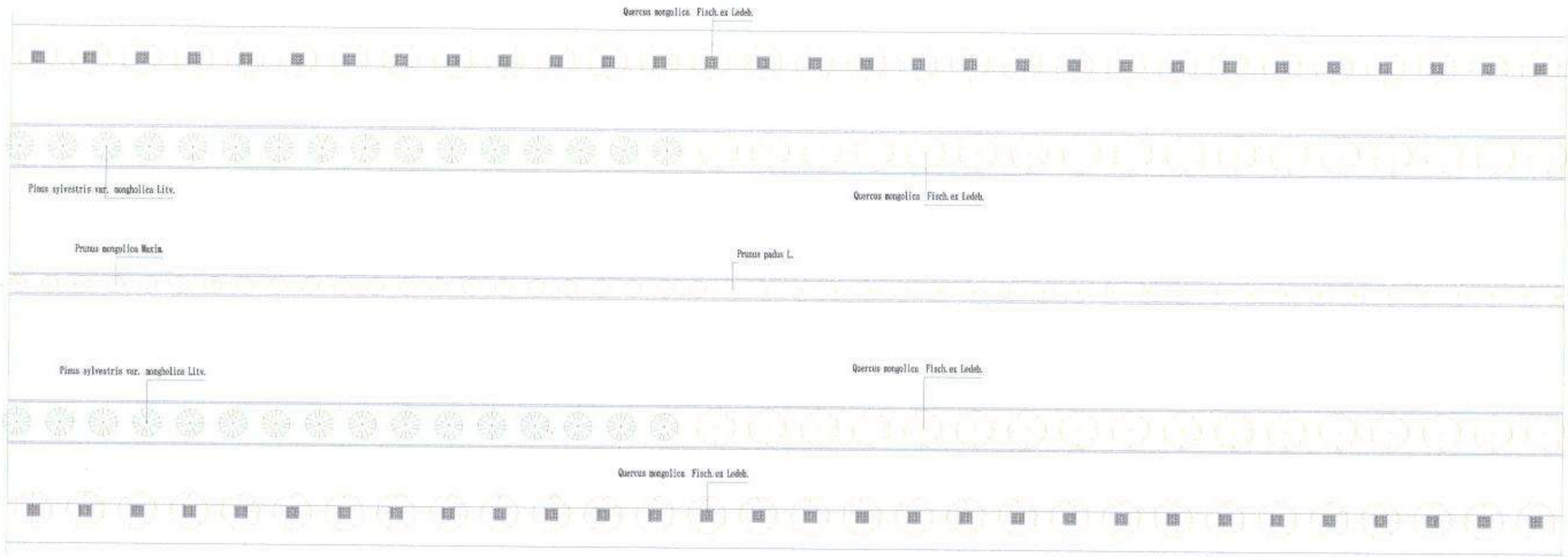
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER	CHANG KAI	CHECKED	CHANG KAI	SCALE	1: 200
		Standard Section of 32M Wide Road Landscaping				MASTER DES.	CAO YONGXIANG	SPE. MANAGER	CHANG KAI	EXAMINED	TANG ZHENTAO	DRAWING NO.	VII- 03
						MASTER DES.	PAN HAOGUO	SPE. MANAGER		APPROVED	TANG ZHENTAO		
						SUB. MANAGER	CHANG KAI	DESIGNED	CHENG CHEN	APPROVED	TANG ZHENTAO	DATE	2025.07



Layout Plan for Landscaping of 60m Wide Typical Road Section-1 1:500

Note: K0+000~K8+600-K15+500~K24+793.006

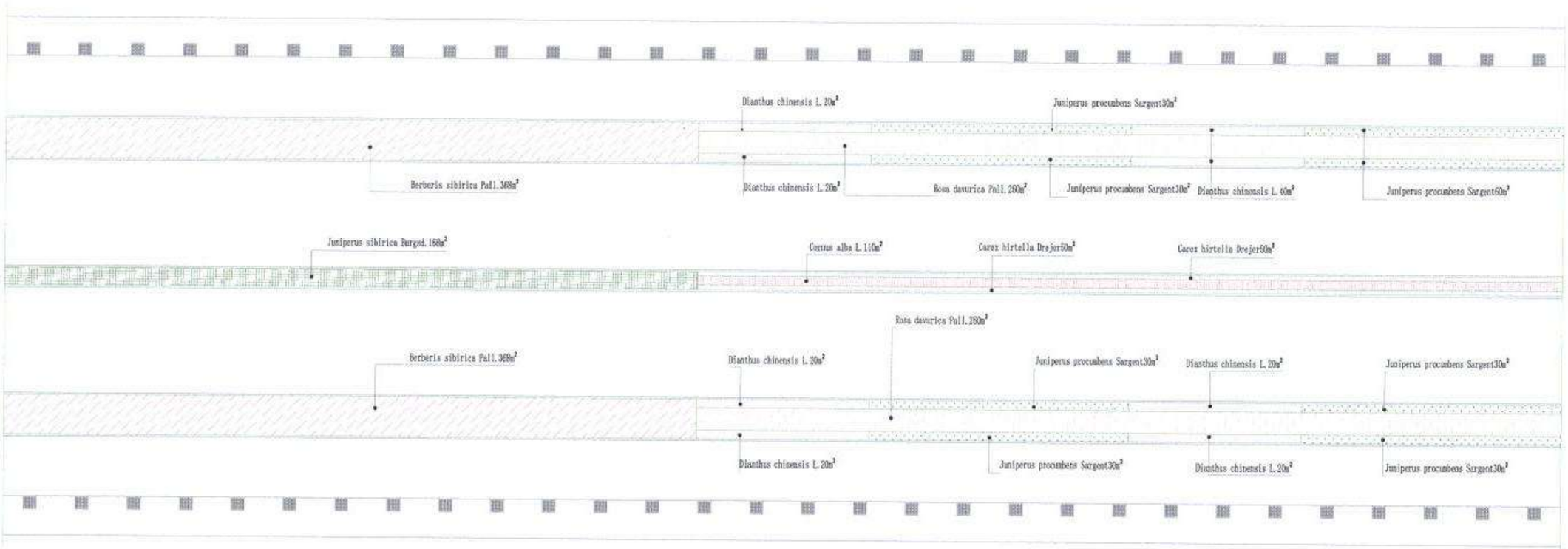
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI	SUB. MANAGER	CHANG KAI	CHECKED	CHANG KAI	SCALE	1: 500
		Layout Plan for Landscaping of 60m Wide Typical Road Section-1				MASTER DES.	CAO YONGXIANG	SPE. MANAGER	CHANG KAI	EXAMINED	TANG ZHENTAO	DRAWING NO.	VII- 04
						MASTER DES.	PAN HAOGUO	SPE. MANAGER		APPROVED	TANG ZHENTAO		
						SUB. MANAGER	CHANG KAI	DESIGNED	CHENG CHEN	APPROVED	TANG ZHENTAO	DATE	2025.07



Overstory in Layout Plan for Landscaping of 60m Wide Typical Road Section-1 1:500

Note: K0+000~K8+600-K15+500~K24+793.006

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 500
		Overstory in Layout Plan for Landscaping of 60m Wide Typical Road Section-1				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 05
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Understory in Layout Plan for Landscaping of 60m Wide Typical Road Section-1 1:500

Note: K0+000~K8+600-K15+500~K24+793.006

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 500
		Understory in Layout Plan for Landscaping of 60m Wide Typical Road Section-1				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 06
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07

List of nursery stocks in the typical road section

Serial No.	Legend	Name	Specification			Quantity	Quantity	Note
			Basal diameter (diameter at breast height) (cm)	Height (cm)	Crown diameter (cm)			
1		Quercus mongolica Fisch. ex Ledeb.	12	550-650	300-350	94	Nr.	lush leaves in half canopy
2		Pinus sylvestris var. mongholica Litv.	——	500-600	300-350	32	Nr.	Cone
3		Prunus padus L.	D10	250-300	200-250	25	Nr.	lush leaves in half canopy
4		Prunus mongolica Maxim.	D8	200	150-200	22	Nr.	lush leaves in half canopy

List of nursery stocks in the typical road section

Serial No.	Legend	Name	Specification		Area	Quantity	Note
			Height (cm)	Crown diameter (cm)			
1		Cornus alba L.	60-70	30-40	110	m^2	Each has 8 or more branches, 16Nr./m^2
2		Rosa davurica Pall.	50-60	35-40	520	m^2	16Nr./m^2
3		Berberis sibirica Pall.	40-50	30-35	736	m^2	25Nr./m^2
4		Juniperus sibirica Burgsd.	40-50	30-35	168	m^2	25Nr./m^2
5		Juniperus procumbens Sargent	20-30	20-30	240	m^2	25Nr./m^2
6		Dianthus chinensis L.	15-20	15-20	160	m^2	64Nr./m^2
7		Carex hirtella Drejer	10-15	10-15	100	m^2	64Nr./m^2
8		Gobi gravel			97.5	m^2	

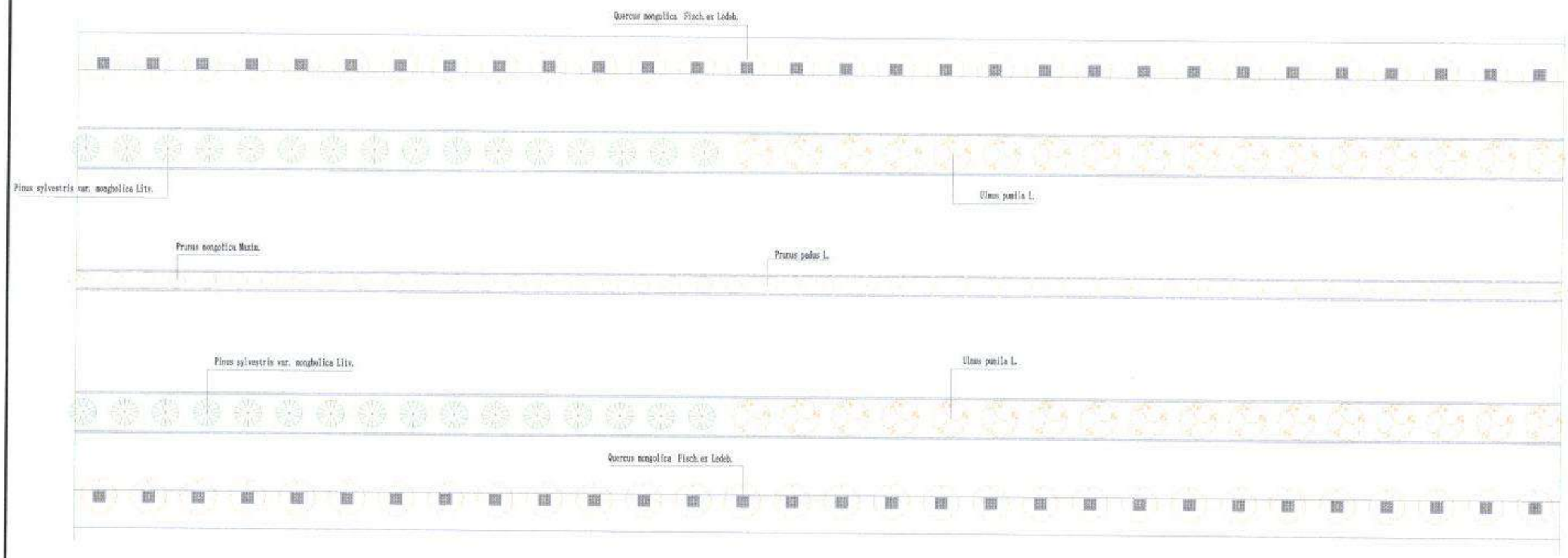
List of nursery stocks in the 60m wide typical road section-1

Note: K0+000~K8+600-K15+500~K24+793.006

Layout Plan for Landscaping of 60m Wide Typical Road Section-2 1:500

Note: K8+600~K15+500

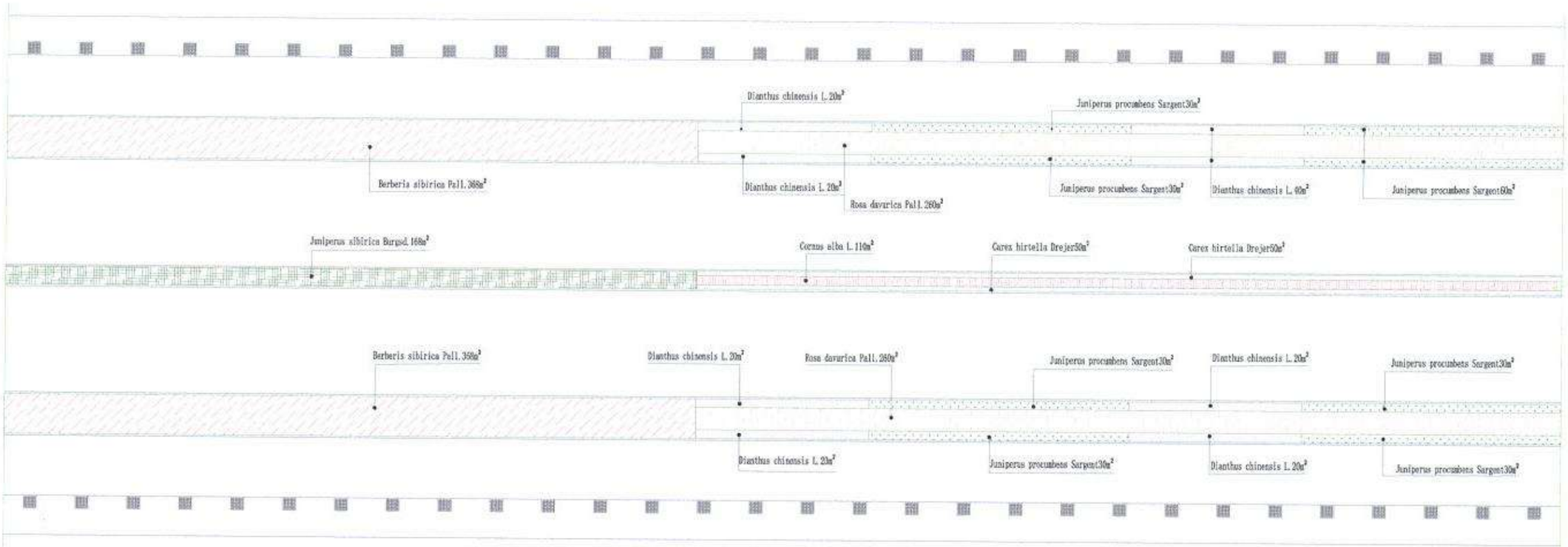
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 500
		Layout Plan for Landscaping of 60m Wide Typical Road Section-2				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 08
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Overstory in Layout Plan for Landscaping of 60m Wide Typical Road Section-2 1:500

Note: K8+600~K15+500

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 500
		Overstory in Layout Plan for Landscaping of 60m Wide Typical Road Section-2				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 09
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Understory in Layout Plan for Landscaping of 60m Wide Typical Road Section-2 1:500

Note: K8+600~K15+500

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 500
		Understory in Layout Plan for Landscaping of 60m Wide Typical Road Section-2				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 10
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07

List of nursery stocks in the typical road section

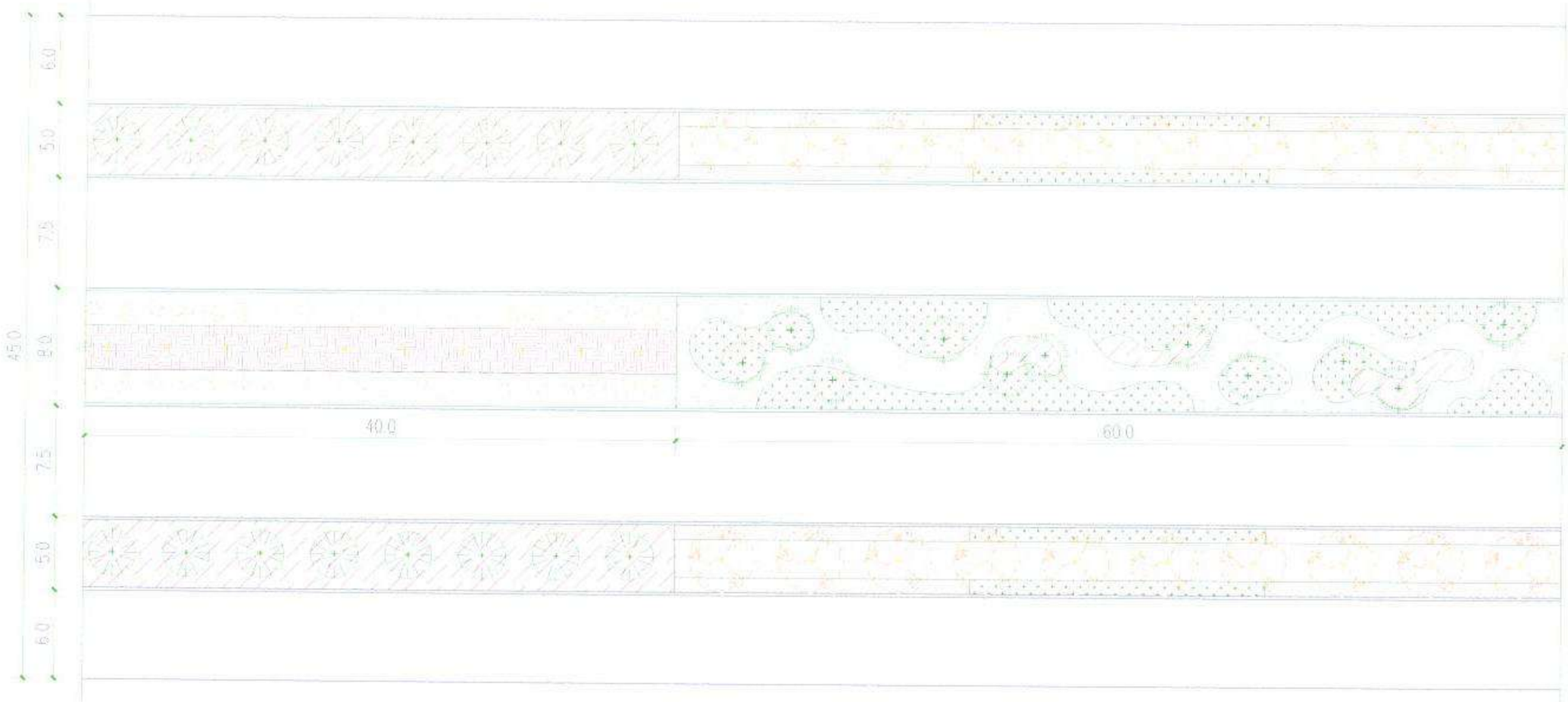
Serial No.	Legend	Name	Specification			Quantity	Quantity	Note
			Basal diameter (diameter at breast height) (cm)	Height (cm)	Crown diameter (cm)			
1		Quercus mongolica Fisch. ex Ledeb.	12	550-650	300-350	60	Nr.	lush leaves in half canopy
2		Ulmus pumila L.	12	500-600	300-350	34	Nr.	lush leaves in half canopy
3		Pinus sylvestris var. mongholica Litv.	——	500-600	300-350	32	Nr.	Cone
4		Prunus padus L.	D10	250-300	200-250	25	Nr.	lush leaves in half canopy
5		Prunus mongolica Maxim.	D8	200	150-200	22	Nr.	lush leaves in half canopy

List of nursery stocks in the typical road section

Serial No.	Legend	Name	Specification		Area	Quantity	Note
			Height (cm)	Crown diameter (cm)			
1		Cornus alba L.	60-70	30-40	110	m^2	Each has 6 or more branches, 16Nr./m^2
2		Rosa davurica Pall.	50-60	35-40	520	m^2	16Nr./m^2
3		Berberis sibirica Pall.	40-50	30-35	736	m^2	25Nr./m^2
4		Juniperus sibirica Burgsd.	40-50	30-35	168	m^2	25Nr./m^2
5		Juniperus procumbens Sargent	20-30	20-30	240	m^2	25Nr./m^2
6		Dianthus chinensis L.	15-20	15-20	160	m^2	64Nr./m^2
7		Carex hirtella Drejer	10-15	10-15	100	m^2	64Nr./m^2
8		Gobi gravel			97.5	m^2	

List of nursery stocks in the 60m wide typical road section-2

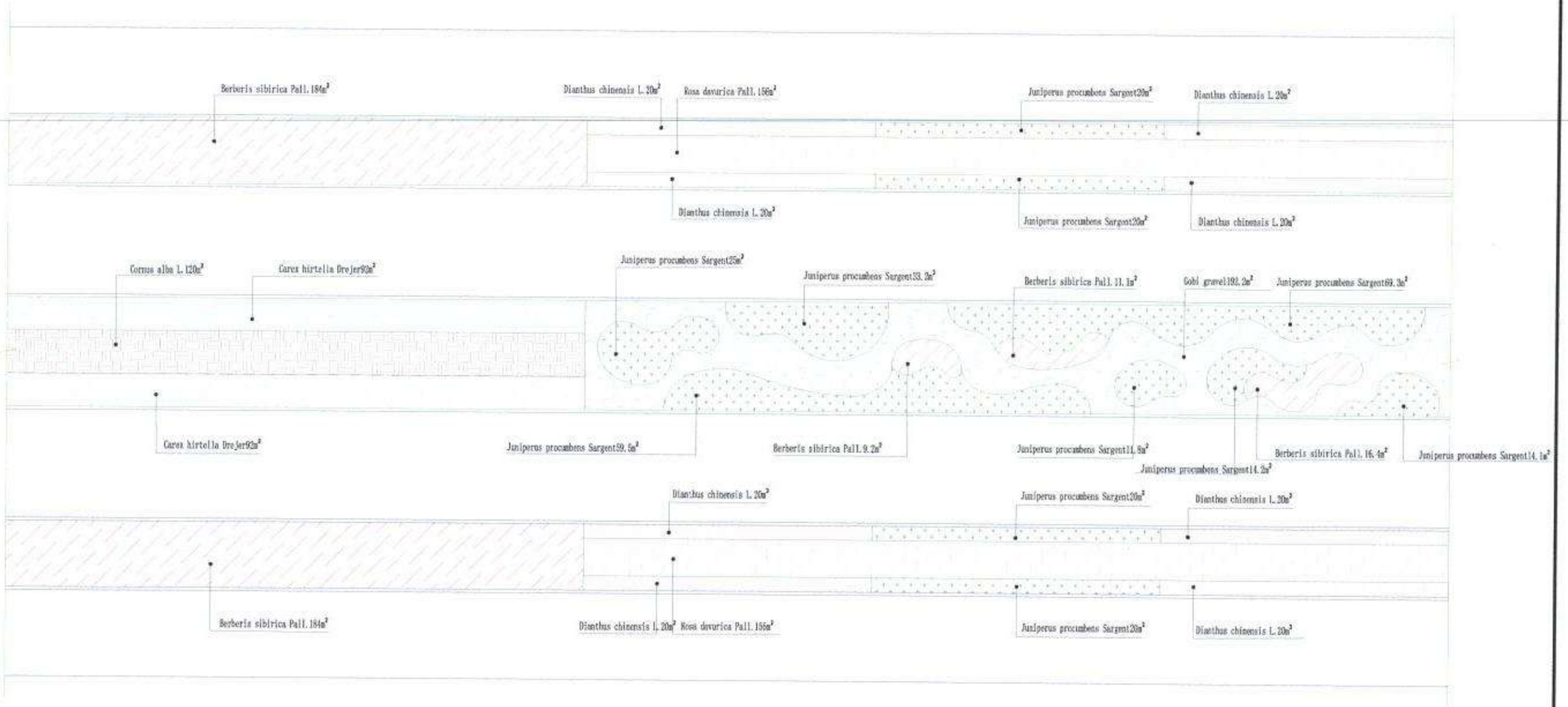
Note: K8+600~K15+500



Layout Plan for Landscaping of 45m Wide Typical Road 1:300

Note: K12+620~K14+000-K21+350~K23+800

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 300
		Layout Plan for Landscaping of 45m Wide Typical Road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 12
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Understory in Layout Plan for Landscaping of 45m Wide Typical Road 1:300

Note: K12+620~K14+000-K21+350~K23+800

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 300
		Understory in Layout Plan for Landscaping of 45m Wide Typical Road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 14
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07

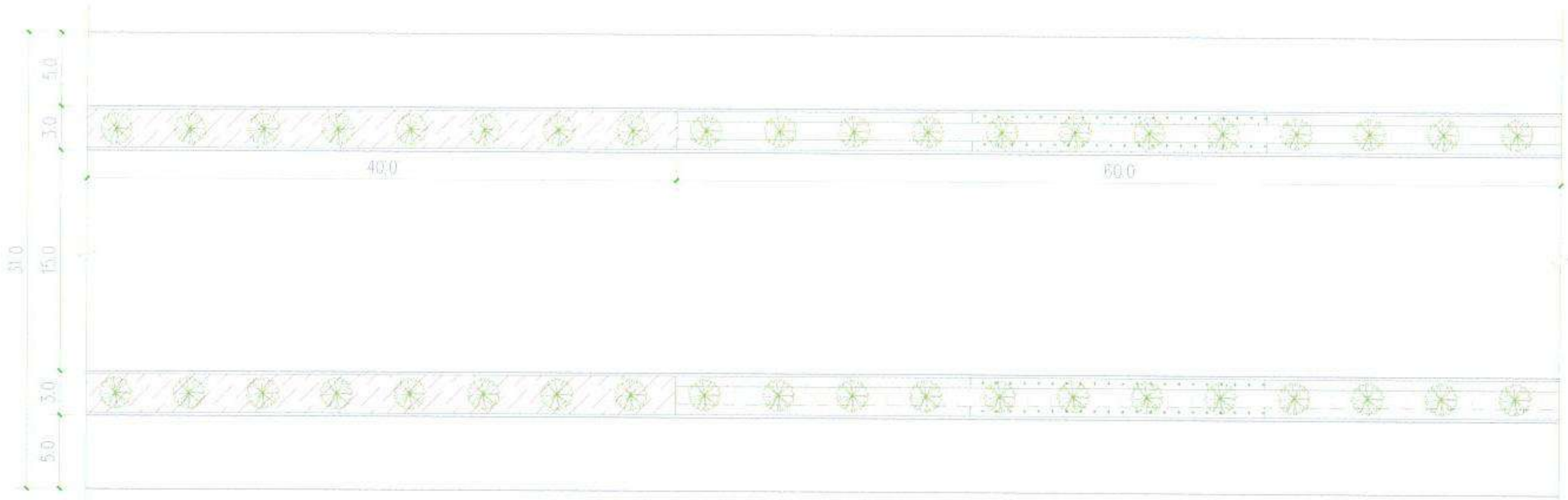
List of nursery stocks in the typical road section

Serial No.	Legend	Name	Specification: Basal diameter (diameter at breast height) (cm)	Specification: Height (cm)	Specification: Crown diameter (cm)	Quantity	Quantity	Note
1		Ulmus pumila L.	12	500-600	300-350	20	Nr.	lush leaves in half canopy
2		Pinus sylvestris var. mongholica Litv.	——	500-600	300-350	16	Nr.	Cone
3		Prunus padus L.	D10	250-300	200-250	10	Nr.	lush leaves in half canopy
4		Pinus sylvestris L.	——	300-500	250-350	11	Nr.	Cone
5		Lonicera microphylla Willd. ex Roem & Schult.	——	120-150	80-100	24	Nr.	The tree is a leafy tree that has multiple branches, and the height is the one after trimming
6		Syringa oblata Lindl.	——	150	120	22	Nr.	The tree is a leafy tree that has multiple branches, and the height is the one after trimming

List of nursery stocks in the typical road section

Serial No.	Legend	Name	Specification: Height (cm)	Specification: Crown diameter (cm)	Area	Quantity	Note
1		Cornus alba L.	60-70	30-40	120	m^2	Each has 6 or more branches, 16Nr./m^2
2		Rosa davurica Pall.	50-60	35-40	312	m^2	16Nr./m^2
3		Berberis sibirica Pall.	40-50	30-35	404.7	m^2	25Nr./m^2
4		Juniperus procumbens Sargent	20-30	20-30	307.1	m^2	25Nr./m^2
5		Dianthus chinensis L.	15-20	15-20	160	m^2	64Nr./m^2
6		Carex hirtella Drejer	10-15	10-15	184	m^2	64Nr./m^2
7		Gobi gravel			192.2	m^2	

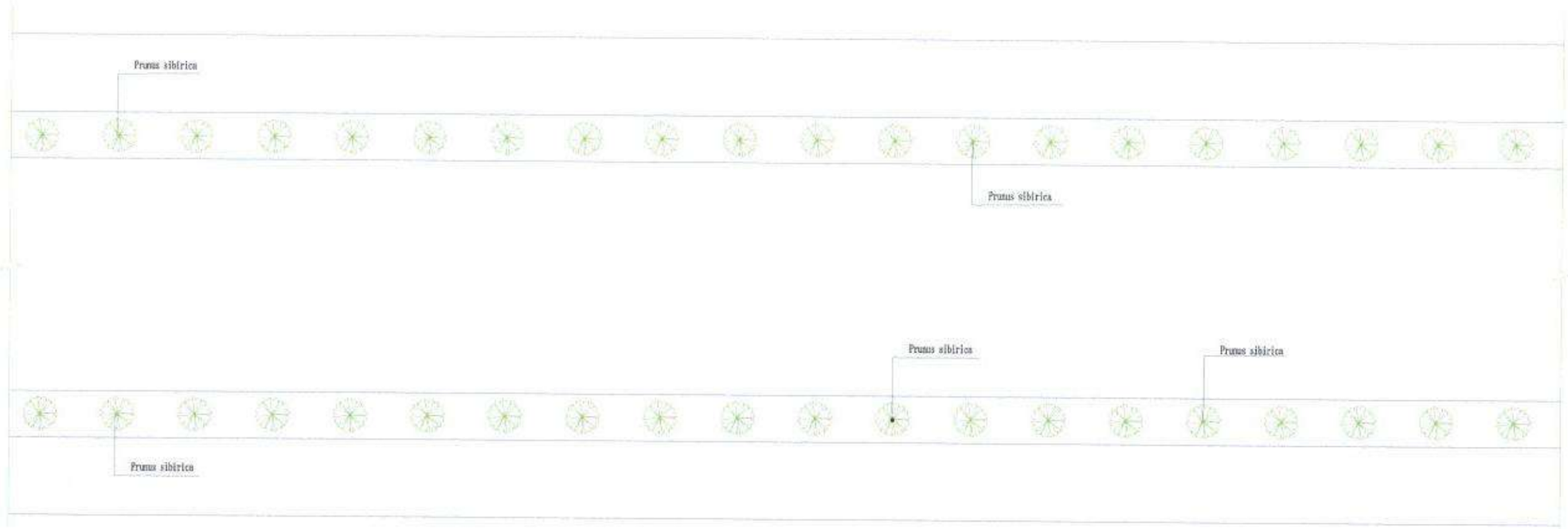
List of nursery stocks in the 45m wide typical road



Layout Plan for Landscaping of 32m Wide Typical Road 1:300

Note: K0+380~K3+240

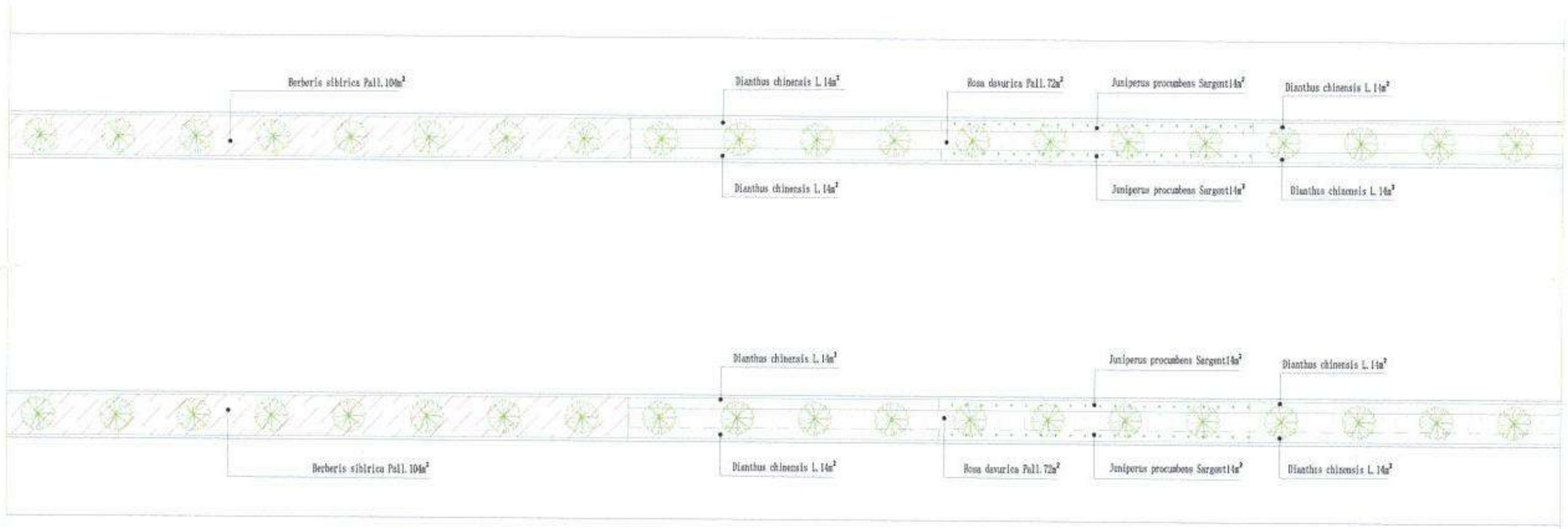
中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 300
		Layout Plan for Landscaping of 32m Wide Typical Road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 16
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Understory in Layout Plan for Landscaping of 32m Wide Typical Road 1:300

Note: K0+380~K3+240

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 300
		Understory in Layout Plan for Landscaping of 32m Wide Typical Road				MASTER DES.	CAO YONGJIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 17
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Understory in Layout Plan for Landscaping of 32m Wide Typical Road 1:300

Note: K0+380~K3+240

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 300
		Understory in Layout Plan for Landscaping of 32m Wide Typical Road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 18
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07

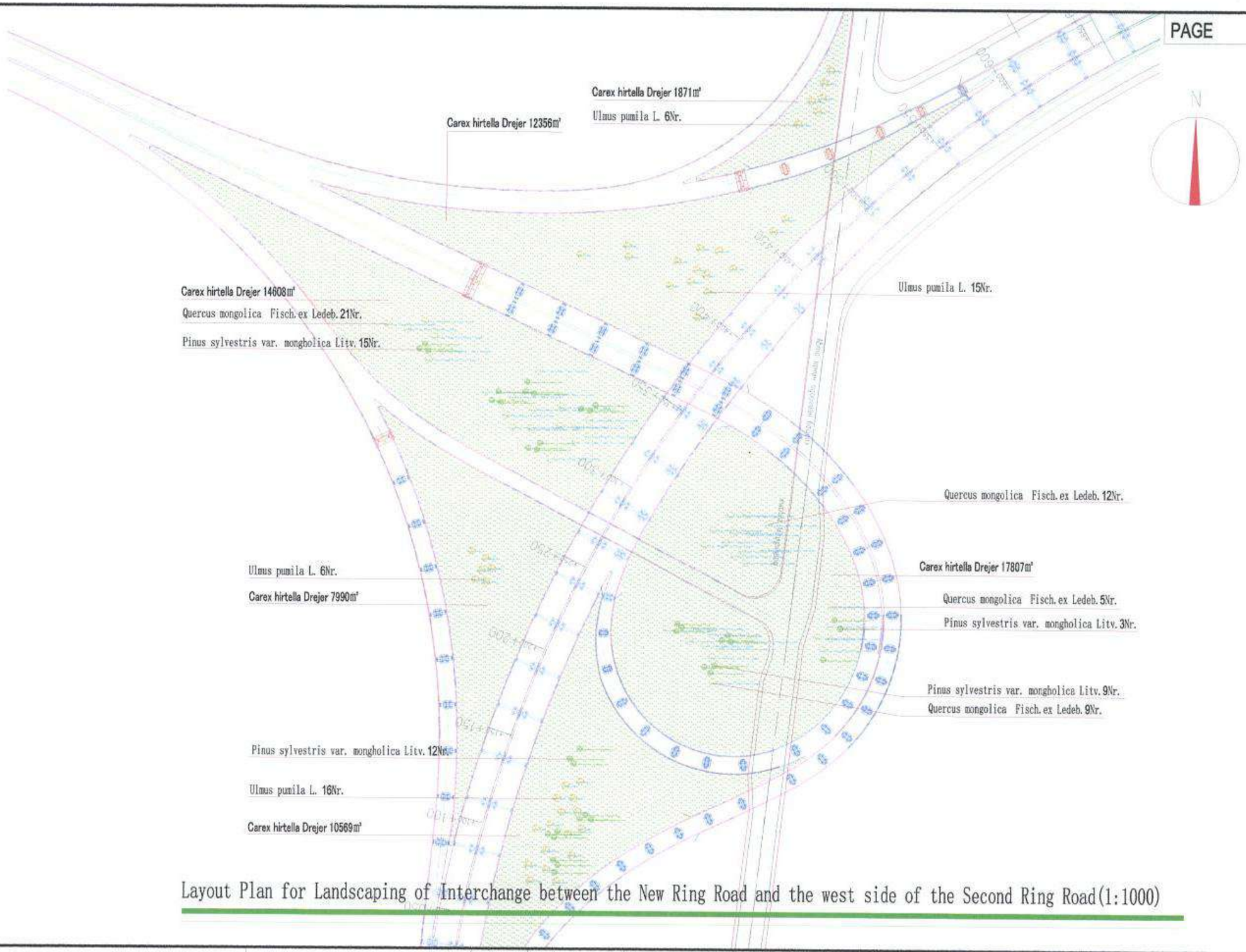
List of nursery stocks in the typical road section								
Serial No.	Legend	Name	Specification			Quantity	Quantity	Note
			Basal diameter (diameter at breast height) (cm)	Height (cm)	Crown diameter (cm)			
1		Prunus sibirica	D10	200-250	200-250	40	Nr.	lush leaves in half canopy

List of nursery stocks in the typical road section							
Serial No.	Legend	Name	Specification		Area	Quantity	Note
			Height (cm)	Crown diameter (cm)			
1		Rosa davurica Pall.	50-60	35-40	144	m^2	16Nr./m^2
2		Berberis sibirica Pall.	40-50	30-35	208	m^2	25Nr./m^2
3		Juniperus procumbens Sargent	20-30	20-30	56	m^2	25Nr./m^2
4		Dianthus chinensis L.	15-20	15-20	112	m^2	64Nr./m^2

List of nursery stocks in the 32m wide typical road

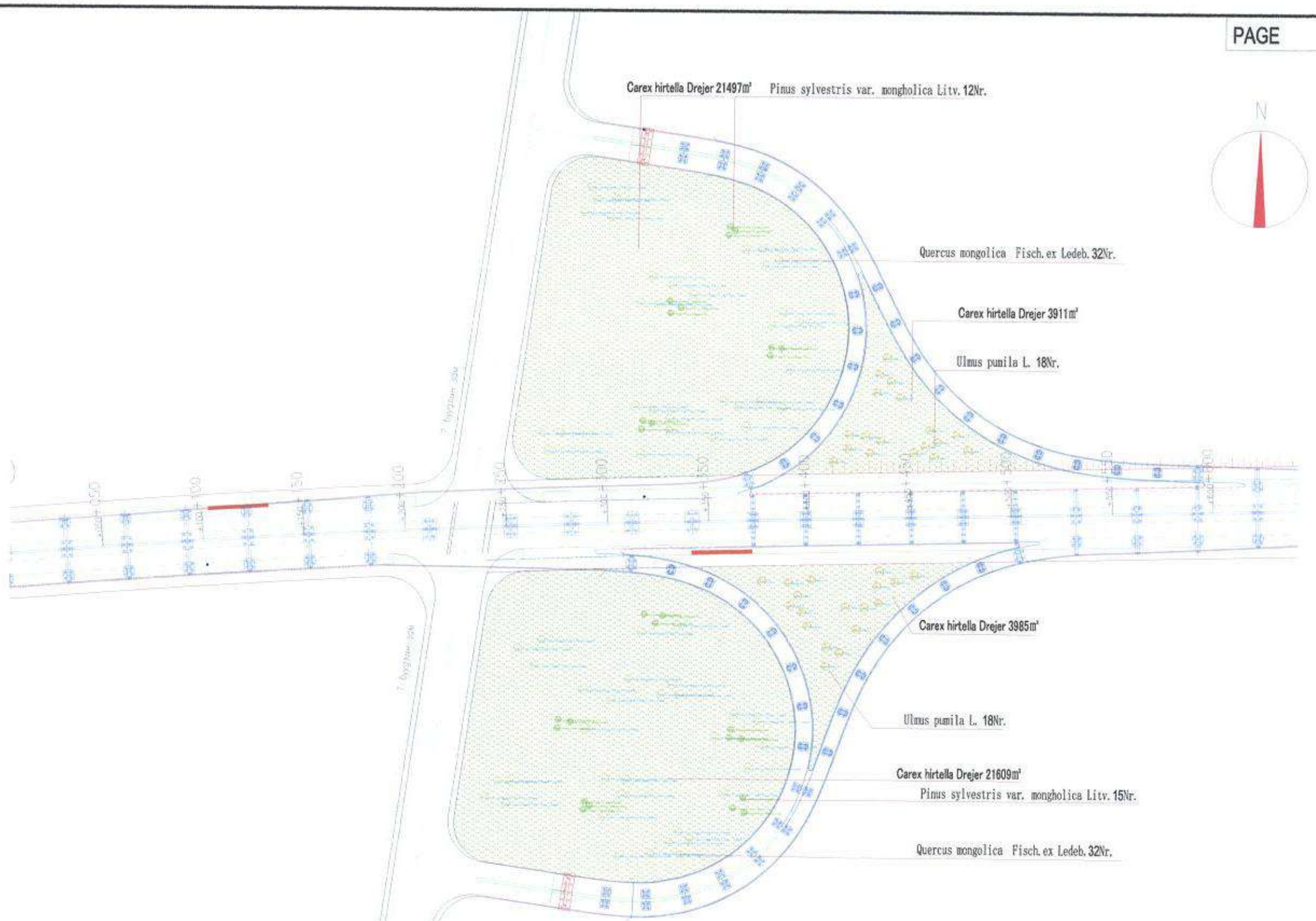
Note: K0+380~K3+240

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	
		List of nursery stocks in the 32m wide typical road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 19
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



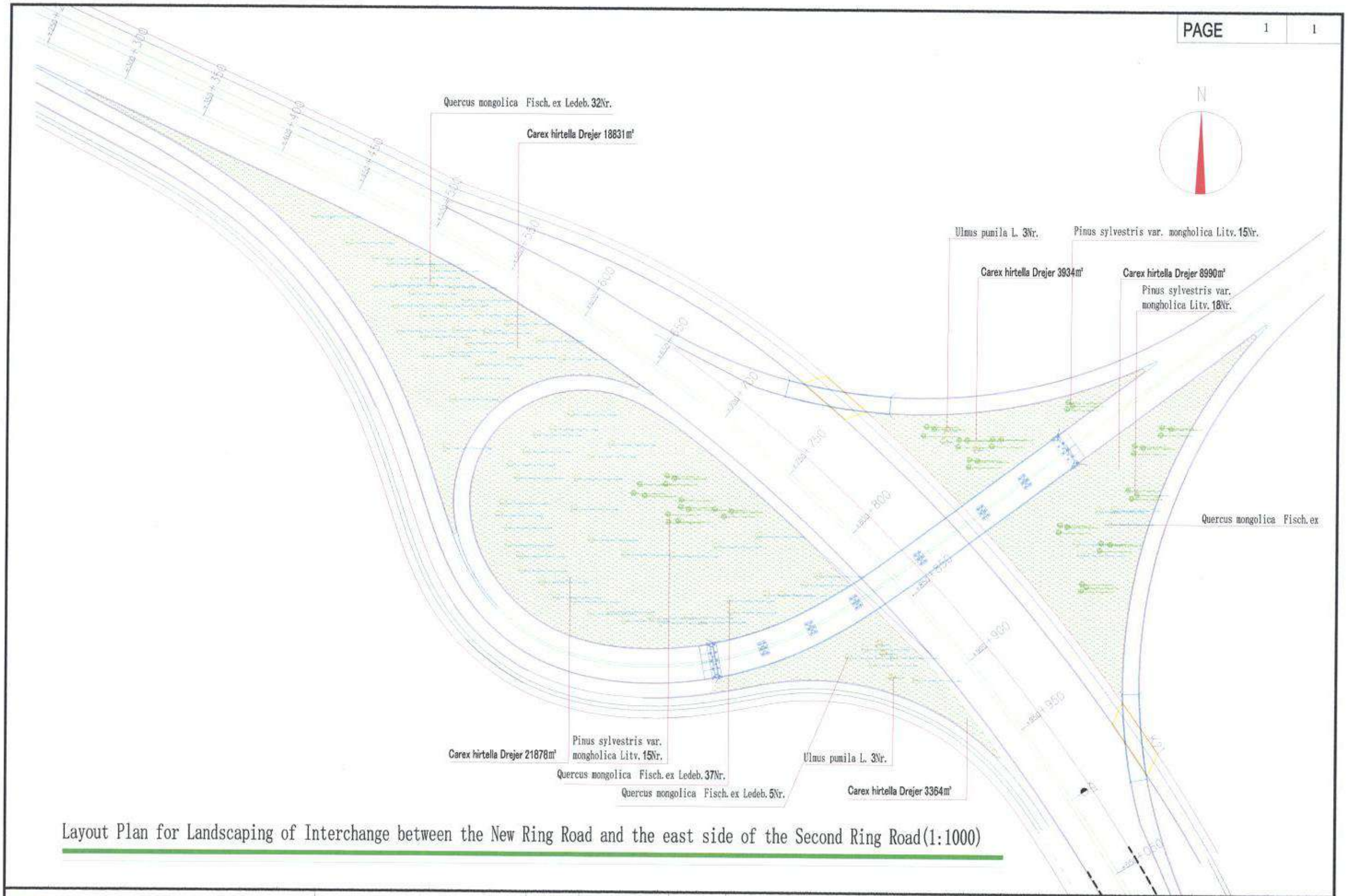
Layout Plan for Landscaping of Interchange between the New Ring Road and the west side of the Second Ring Road(1:1000)

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 1000
		Layout Plan for Landscaping of Interchange between the New Ring Road and the west side of the Second Ring Road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 20
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



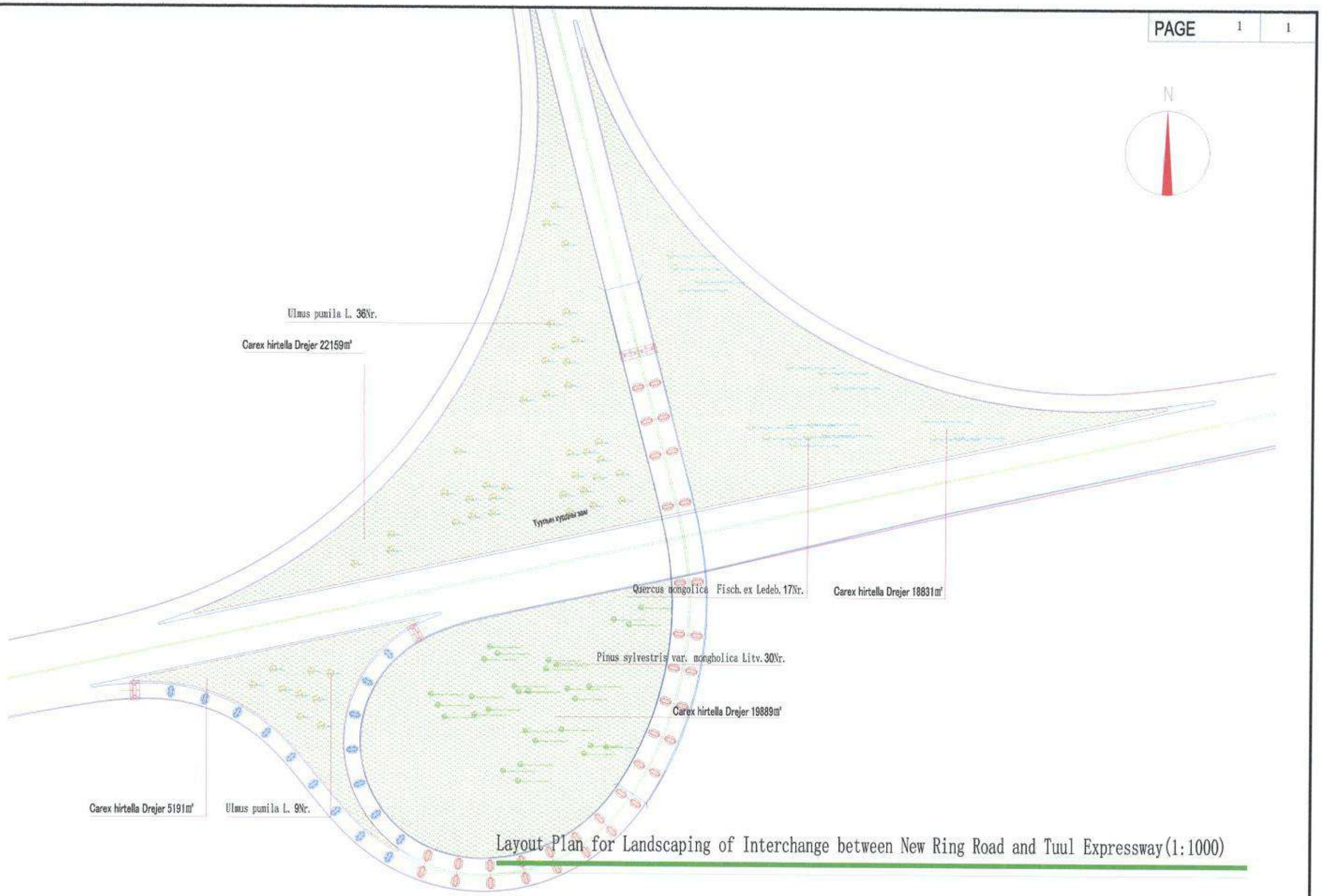
Layout Plan for Landscaping of Interchange between the New Ring Road and the No. VII Road(1:1000)

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 1000
		Layout Plan for Landscaping of Interchange between the New Ring Road and the No. VII Road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 21
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Layout Plan for Landscaping of Interchange between the New Ring Road and the east side of the Second Ring Road(1:1000)

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 1000
		Layout Plan for Landscaping of Interchange between the New Ring Road and the east side of the Second Ring Road				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 22
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07



Layout Plan for Landscaping of Interchange between New Ring Road and Tuul Expressway(1:1000)

中国市政工程西北设计研究院有限公司 CSCEC AECOM CONSULTANTS CO., LTD	The Feasibility Study and Concept Design of the 'First Ring Road' Project of Ulaanbaatar City	DRAWING STAGE	Technical Drawings	PROJECT NO.	10-2024-2509	DES. MANAGER	PANG WEI		SUB. MANAGER	CHANG KAI		CHECKED	CHANG KAI		SCALE	1: 1000
		Layout Plan for Landscaping of Interchange between New Ring Road and Tuul Expressway				MASTER DES.	CAO YONGXIANG		SPE. MANAGER	CHANG KAI		EXAMINED	TANG ZHENTAO		DRAWING NO.	VII- 23
						MASTER DES.	PAN HAOGUO		SPE. MANAGER			APPROVED	TANG ZHENTAO			
						SUB. MANAGER	CHANG KAI		DESIGNED	CHENG CHEN		APPROVED	TANG ZHENTAO		DATE	2025.07

List of nursery stocks (project1 K0+000-K8+600)

Serial No.	Name	Specification (cm)					Unit	Quantity	Root ball/transplanting density	Note
		height	Branch point	Crown diameter (cm)	diameter at breast height	Basal diameter				
1	Ulmus pumila L.	500-600	250-300	300-350	12		Nr.	43	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush
2	Quercus mongolica Fisch.ex Ledeb.	550-650	250-300	300-350	12		Nr.	2360	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush
3	Pinus sylvestris var. mongholica Litv.	500-600	250-300	300-350			Nr.	827	Root ball100cm	Cone
4	Prunus padus L.	300-350		200-250		10	Nr.	615	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush
5	Pinus sylvestris L.	300-500		250-350			Nr.	0	Root ball100cm	Cone
6	Prunus sibirica L	200-250		200-250		10	Nr.	1124	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush
7	Prunus mongolica Maxim.	200		150-200		8	Nr.	541	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush
8	Cornus alba L.	60-70		30-40			m2	2707	16/m²	Each has 6 or more branches
9	Rosa davurica Pall.	50-60		35-40			m2	14821	16/m²	Each has 6 or more branches
10	Berberis sibirica Pall.	40-50		30-35			m2	21036	25/m²	Each has 6 or more branches
11	Juniperus sibirica Burgsd.	40-50		30-35			m2	4135	25/m²	Each has 6 or more branches
12	Juniperus procumbens Sargent	20-30		20-30			m2	33109	25/m²	Each has 6 or more branches
13	Dianthus chinensis L.	15-20		15-20			m2	5511	64/m²	Each has 6 or more branches
14	Lonicera microphylla Willd. ex Roem. & Schult.	120-150		80-100			Nr.	0		The tree is a leafy tree that has multiple branches, and the height is the one after
15	Syringa oblata Lindl.	150		120			Nr.	0		The tree is a leafy tree that has multiple branches, and the height is the one after
16	Carex hirtella Drejer	10-15		10-15			m2	67662	64/m²	Purity ≥ 95%
17	Triangular staking support for trees						Nr.	2281		Wood
18	Rectangular staking support for trees						Nr.	3230		Galvanized steel pipe
19	Gobi gravel						m2	2400		
20	Planting soil						m3	100690		Ground cover plant and bush have a depth of 0.5 m underground.

Part of landscaping requirements: 1. The seedling has strong trunks and branches, and its surface is free of damages or wormholes. The trunk is straight without holes, and has balanced distribution of branches with well-formed canopy. 2. The seedling is vigorous but not over mature, there are no dry branches, withered leaves or plant diseases and insect pests. 3. The saw bite of the tree is clean and smooth without tearing or splitting. The cut area is treated with anti-corrosion and pest control measures and the like. 4. The root of the seedling grows evenly and well, and the root ball is not loose. 5. All seedlings are accepted by the Supervisor for review before entering the construction site, and used only after passing the acceptance. 6. Specifications, technical parameters, technical requirements, quality requirements, and the like of all seedlings and project materials conform to the requirements specified in the design drawing.

List of nursery stocks (project2 K8+600-K15+500)

Serial No.	Name	Specification(cm)					Unit	Quantity	Root ball/transplanting density	Note
		height	Branch point	Crown diameter (cm)	diameter at breast height	Basal diameter				
1	Ulmus pumila L.	500-600	250-300	300-350	12		Nr.	675	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half canopy
2	Quercus mongolica Fisch.ex Ledeb.	550-650	250-300	300-350	12		Nr.	715	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half canopy
3	Pinus sylvestris var. mongholica Litv.	500-600	250-300	300-350			Nr.	590	Root ball100cm	Cone
4	Prunus padus L.	300-350		200-250		10	Nr.	406	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half canopy
5	Pinus sylvestris L.	300-500		250-350			Nr.	149	Root ball100cm	Cone
6	Prunus mongolica Maxim.	200		150-200		8	Nr.	239	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half canopy
7	Cornus alba L.	60-70		30-40			m2	2814	16/m²	Each has 6 or more branches
8	Rosa davurica Pall.	50-60		35-40			m2	9857	16/m²	Each has 6 or more branches
9	Berberis sibirica Pall.	40-50		30-35			m2	13453	25/m²	Each has 6 or more branches
10	Juniperus sibirica Burgsd.	40-50		30-35			m2	1824	25/m²	Each has 6 or more branches
12	Juniperus procumbens Sargent	20-30		20-30			m2	6751	25/m²	Each has 6 or more branches
14	Dianthus chinensis L.	15-20		15-20			m2	3897	64/m²	Each has 6 or more branches
15	Lonicera microphylla Willd. ex Roem. & Schult.	120-150		80-100			Nr.	324		The tree is a leafy tree that has multiple branches, and the height is the one after trimming
16	Syringa oblata Lindl.	150		120			Nr.	297		The tree is a leafy tree that has multiple branches, and the height is the one after trimming
17	Carex hirtella Drejer	10-15		10-15			m2	54572	64/m²	Purity ≥ 95%
18	Triangular staking support for trees						Nr.	794		Wood
19	Rectangular staking support for trees						Nr.	1981		Galvanized steel pipe
20	Gobi gravel						m2	3653		
21	Planting soil						m3	59437		Ground cover plant and bush have a depth of 0.5 m underground.

Part of landscaping requirements: 1. The seedling has strong trunks and branches, and its surface is free of damages or wormholes. The trunk is straight without holes, and has balanced distribution of branches with well-formed canopy. 2. The seedling is vigorous but not over mature, there are no dry branches, withered leaves or plant diseases and insect pests. 3. The saw bite of the tree is clean and smooth without tearing or splitting. The cut area is treated with anti-corrosion and pest control measures and the like. 4. The root of the seedling grows evenly and well, and the root ball is not loose. 5. All seedlings are accepted by the Supervisor for review before entering the construction site, and used only after passing the acceptance. 6. Specifications, technical parameters, technical requirements, quality requirements, and the like of all seedlings and project materials conform to the requirements specified in the design drawing.

List of nursery stocks (project3 K15+500-K24+793.006)

Serial No.	Name	Specification(cm) height	Branch point	Crown diameter (cm)	diameter at breast height	Basal diameter	Unit	Quantity	Root ball/transplanting density	Note
1	Ulmus pumila L.	500-600	250-300	300-350	12		Nr.	537	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half
2	Quercus mongolica Fisch.ex Ledeb.	550-650	250-300	300-350	12		Nr.	2707	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half
3	Pinus sylvestris var. mongholica Litv.	500-600	250-300	300-350			Nr.	1356	Root ball100cm	Cone
4	Prunus padus L.	300-350		200-250		10	Nr.	1025	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half
5	Pinus sylvestris L.	300-500		250-350			Nr.	268	Root ball100cm	Cone
6	Prunus mongolica Maxim.	200		150-200		8	Nr.	688	Root ball100cm	The tree has a beautiful shape, rich branching, with plenty main branches, lush leaves in half
7	Cornus alba L.	60-70		30-40			m2	6357	16/m²	Each has 6 or more branches
8	Rosa davurica Pall.	50-60		35-40			m2	22032	16/m²	Each has 6 or more branches
9	Berberis sibirica Pall.	40-50		30-35			m2	30287	25/m²	Each has 6 or more branches
10	Juniperus sibirica Burgsd.	40-50		30-35			m2	5252	25/m²	Each has 6 or more branches
12	Juniperus procumbens Sargent	20-30		20-30			m2	14135	25/m²	Each has 6 or more branches
14	Dianthus chinensis L.	15-20		15-20			m2	8336	64/m²	Each has 6 or more branches
15	Lonicera microphylla Willd. ex Roem. & Schult.	120-150		80-100			Nr.	584		The tree is a leafy tree that has multiple branches, and the height is the one after trimming
16	Syringa oblata Lindl.	150		120			Nr.	535		The tree is a leafy tree that has multiple branches, and the height is the one after trimming
17	Carex hirtella Drejer	10-15		10-15			m2	124120	64/m²	Purity ⩾ 95%
18	Triangular staking support for trees						Nr.	1979		Wood
19	Rectangular staking support for trees						Nr.	4600		Galvanized steel pipe
20	Gobi gravel						m2	7383		
21	Planting soil						m3	137166		Ground cover plant and bush have a depth of 0.5 m underground.

Part of landscaping requirements: 1. The seedling has strong trunks and branches, and its surface is free of damages or wormholes. The trunk is straight without holes, and has balanced distribution of branches with well-formed canopy. 2. The seedling is vigorous but not over mature, there are no dry branches, withered leaves or plant diseases and insect pests. 3. The saw bite of the tree is clean and smooth without tearing or splitting. The cut area is treated with anti-corrosion and pest control measures and the like. 4. The root of the seedling grows evenly and well, and the root ball is not loose. 5. All seedlings are accepted by the Supervisor for review before entering the construction site, and used only after passing the acceptance. 6. Specifications, technical parameters, technical requirements, quality requirements, and the like of all seedlings and project materials conform to the requirements specified in the design drawing.