

Be making a world
what YOU want...

“Infinite satisfaction!”

History

Aug, 1978	Obtained a special-construction-company license in the geological field (S.N. Earthworks, Seoul 01-103, S.N. Boring and Grouting Works, Seoul 14-30)
Oct, 1983	Introduced construction technology in a special underground structure between Pumyang and Soletanche Bachy, and established the joint-venture company Soletanche Pumyang
Aug, 1990	Its equipment and maintenance parts manufacture became independent, under Korean-French Machinery Manufacturing Co., Ltd
Jul, 1992	Purchased KFMM and moved to its site in Cheonan, Chungcheongnam-dod
Jul, 1994	Registered as a foreign construction business (S.N. Earthworks-5, S.N. Boring and Grouting Works-2)
Oct, 1994	The main office was moved to its present location
Jun, 1995	The Busan branch became independent (Pumyang Soletanche)
Dec, 1997	Obtained ISO9001 (No. QSC70819)
Dec, 1997	Obtained a license to undertake reinforced concrete works (S.N. Yongsan 97-10-3)
Apr, 2000	Obtained an engineering license (No. 10-938)
Feb, 2004	Pumyang Soletanche was merged into Soletanche-Pumyang
May, 2004	Obtained a license to undertake scaffolding works (S.N. Busan DongRae 2003-07-02)
Jul, 2006	Changed certificate authority ISO9001 (No. AJA06/10639)
Sep, 2007	Ended its partnership with Soletanche Bachy and changed its name to Pumyang E&C Co., Ltd.
Nov, 2007	Patent registration of underground wall earth retaining structure by prestressed steel pipe and excavation construction method of having used this (Registration No. 10-0776964)
Feb, 2008	Patent registration of The bottom structure of a storm storage tank (Registration No. 10-081691)
Aug, 2008	Opened Singapore Branch (No: F07251W)
Aug, 2009	Obtained a license to undertake Water Supply & Sewerage works (S.N. Yong San 09-11-01)
Aug, 2009	Obtained a license to undertake Paving works (S.N. Yong San 09-14-02)
Jan, 2010	Registered as a foreign construction business (S.N. Scaffolding Works-No.157, S.N. Water Supply & Sewerage Works-No.224, S.N. Reinforced Concrete Works-No.415, S.N. Paving Works-No.109)
Aug, 2011	Obtained a license to undertake Construction Business in Singapore Building and Construction Authority Unique Entity Number/ACRA Registration Number: T08FC7251B
Jan, 2012	PUMYANG MONGOL Co., Ltd. established in MONGOLIA National Registration Number: 9019064081 Corporation Registration Number:5559618
Jul, 2012	Obtained a license to undertake plastering work, masonry work, waterproof work (S.N. Yongsan 2012-03-01)
Apr, 2014	Patent registration of the direction controlling implement with the vibration cut off in the charge hole to obstruct propagation of blasting vibration, and the blasting method using that implement (Registration No. 10-1392158)
Jul, 2015	Pumyang Myanmar Co., Ltd. established in Myanmar

Within view or out of view, our efforts in order to achieve
the customer's dream is to go infinite

“customer satisfaction!”



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P.P.S Method Track Record

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1. EBS Digital Integration Company office Building new construction work
2. Woomyun Samsung R&D Center new construction work
3. Incheon International Airport Second passenger Terminal link railway
4. Gwangyang, E-Pyeonhan Sesang
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6. Jamsil I' PARK new construction work
7. Yeongdeungpo Officetel new construction work
8. Seokchon-dong, Bulgwangsa Jungchangbalsa new construction work
9. Sangam Doosan We've centium new construction work
10. Pusan Yonghoman complex facility new construction work
11. International Temple stay new construction work
12. Wiryu New city IS central tower new construction work
13. North Port Bridge private capital project (MP2, MP3)
14. Algeria Oman fertilizer plant project - INTAKE
15. Algeria Oman fertilizer plant project - OUTFALL
16. Pyeongtaek integrated combined cycle second level Sea water Lifting Pump (S,L,P)

P.P.S (Prestressed Pipe Strut) Method

► Summary of PPS(Prestressed Pipe Strut) Construction Method



Prestressed Pipe Strut (hereinafter PPS) method, different from general STRUT method that uses H-Beam, does use Circular Tube Columns with High-Strength Steel (more than $\phi 800$), and it's a construction method that increases the stiffness of cross section. This method can reduce considerable amount of POST PILE use owing to the increased performance of buckling resistance. Having secured wide vertical/horizontal placement spaces, this is the method which has a superior level of safety structurally, also it is economic method for making quality management easy, reducing the construction duration of inside earthwork and main structure.

► Main Resources of PPS, and Performance Comparison according to Identical Slenderness Ratio

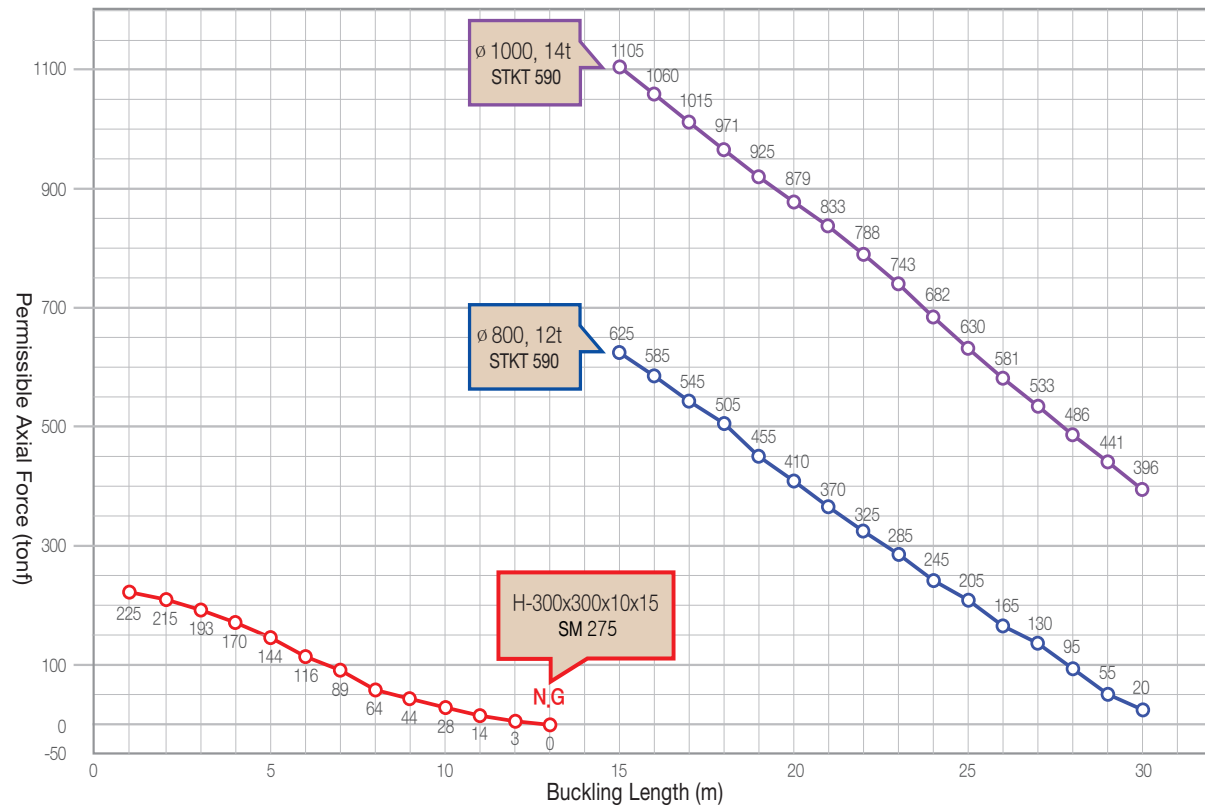
Classification	Steel Grade	Cross-section Area	Unit Weight	Geometrical moment of inertia	Modulus of Section	Slenderness Ratio	Installation Span	Allowable Bearing Capacity per Steel Pipe
		cm ²	kg/m	cm ⁴	cm ³	L/r	m	tonf
H-300x300x10x15	SM275	119.8	94	204x10 ²	136x10	60	4.5	176
$\phi 800$ mm, t=12mm	STKT590	297.1	233	231x10 ³	577x10	60	16.5	566.7
$\phi 800$ mm, t=16mm	STKT590	394.1	309	303x10 ³	757x10	60	16.5	781.9
$\phi 1000$ mm, t=14mm	STKT590	433.7	340	527x10 ³	105x10 ³	60	20.5	844.1

► Mechanical Property of Structural Steel according to Steel Grade (design criteria of Road bridge)

Steel Grade	Yield Point or Resisting Force(kgf/mm ²)	Tensile Strength	Allowable Tension / Compressive Strength	Remarks
	Thk, 16mm Substandard	kgf/mm ²	kgf/mm ²	
SM275	27.5 ~	41 ~ 52	14	General Structural Steel
STKT570	47 ~	58 ~ 73	26	High Strength Steel

► Allowable Load according to Buckling Length of PPS

Classification	Buckling Length (m)	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
H-300x300x10x15 SM 275	Allowable Load (tonf)	Long Span Construction Incongruity															
ø 800 - 12t STKT 590		625	585	545	505	455	410	370	325	285	245	205	165	130	95	55	20
ø 1000 - 14t STKT 590		1105	1060	1115	971	925	879	833	788	743	682	630	581	533	486	441	396



- Minimum service function of POST PILE compared to H-strut Spread Beam Method
- Maximize function between vertical and horizontal level according to a large allowable Strength

► Test Report of Adjustable Jack of the End Part of PPS

시험성적서

1. 성적 서 번호 : CT14-047607

2. 의뢰자 :
☐ 업체명 : 성신기계
☐ 주소 : 서울특별시 구로구 신도림동 436-4
☐ 의뢰일자 : 2014. 04. 22
☐ 시험발급일 : 2014. 04. 28

3. 시험성적서의 용도 : 품질관리

4. 시험명 : PPS 일일조립 연습장치(330)

5. 시험방법
 (1) 의뢰자 제시방법

6. 시험결과

1) f

시험항목	단위	시험방법	시험결과
정확한 시험 (2.400 KN, 1 분)	-	(1)	대부분합

* 조립과 결사방법

1. 시험하중 = 2.400 KN
 2. 유지 시간 = 1 분
 3. 시험 속도 = 400 N/min
 4. 시험 후 외관 확인

확인	작성자 성명	서명	기술책임자 성명	검정인
표고 1 : 0 성적서 자료와 제시된 시험 및 시험항목에 대한 결과로서 전체 제품에 대한 총합을 제공하지 않는 것을 2 : 0 성적서는 안전, 강도, 중량 및 소음등으로 시험할 수 있지만, 필요 이상의 시험을 제공하지 않음				



한국건설생활환경시험연구원

대전충남지점 : 305-343 대전광역시 유성구 가동역로 26-94 (충동) 대표전화 042-300-3007
 서울지점 : 대전충남지점 ☎ (042)350-3000

► Patent Accreditation

	
CERTIFICATE OF PATENT	
REGISTRATION NUMBER	APPLICATION NUMBER 10-2006-000867
10-0810091	FILING DATE 2006.04.05.
	REGISTRATION DATE 2006.02.26.
TITLE OF THE INVENTION	
The bottom structure of a store storage tank	
PATENTE	It is reported in the registration page.
INVENTOR	
Kang Hyun Joon	
3-303, Dugwang-dong, Yongsan-gu, Seoul, Korea	
THIS IS TO CERTIFY THAT THE PATENT IS REGISTERED ON THE REGISTER OF THE KOREAN INTELLECTUAL PROPERTY OFFICE.	
2011.08.10.	
 COMMISSIONER, THE KOREAN INTELLECTUAL PROPERTY OFFICE	

P.P.S (Prestressed Pipe Strut) Method

▶ Manufacture of PPS



▲ Material inspection of steel coil



▲ Crude Steel Production of Steel Pipe and Cutting



▲ Installation of PLATE of the End Part of Steel Pipe



▲ Sanding and Painting

▶ Installation of PPS



▲ Earth Retaining Wall Construction



▲ Installation of Wale and Backfill



▲ PPS Installation (Placing of PPS and Connection)



▲ Prestress Loading

▶ PPS Dismantling



▲ Construction of Building SLAB in the Basement



▲ Removal of Pressure from Prestressed Load Jack



▲ PPS Dismantling



▲ PPS Dismantling (Transportation and Salvage)

► Prestress Load Control

▼ Minimum Prestress Load for Control of Bending Compressive Stress generated according to Self-Load of Steel Pipe

Classification	A cm ²	W kg/m	Z cm ³	Effective Length m	10	12	14	16	18	20	22	24	26	28	30
ø 800 12t	297.1	233	5770	Moment Occurred tonf	3	4	6	7	9	12	14	17	20	23	26
				Minimal Prestress Load ton	15	22	29	38	49	60	73	86	101	118	135
ø 1000 14t	433.7	340	10500	Moment Occurred tonf	4	6	8	11	14	17	21	24	29	33	38
				Minimal Prestress Load ton	18	25	34	45	57	70	85	101	119	138	158

*The above Prestress load should be applied to fit into the field situation with minimal applied pressure in order not to generate the bending tensile force according to self-load at the beginning of installation.



▲ Prestress Load Control Pump

PW-75 Hydraulic Pump				
Maximum Pump Pressure (kgf/cm ²)	Weight (kg)	Number of Cylinder (ea)	Cross-section Area (cm ²)	Tensile Load (tonf)
1000	300	4	415.4	290
		8	581.7	580
		12	1246.2	870



▲ Multi-rod Type Prestressed Load Jack

Multi-rod Type Prestressed Load Jack					
Classification	Dimension of Outward Form (mm)			Hydraulic Jack (ea)	Allowable Bearing Capacity (tonf)
	Width (Horizontal Length)	Vertical Length	Length		
PPS - PRJ	1000	1000	340~490	4	600
				6	900

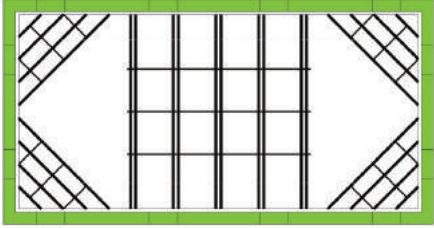
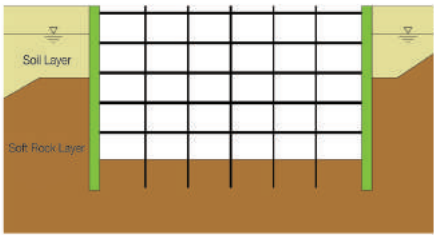
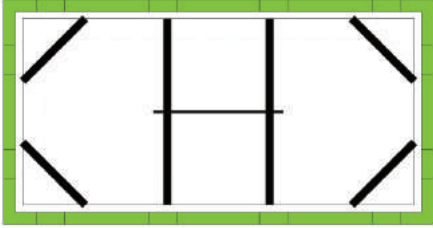
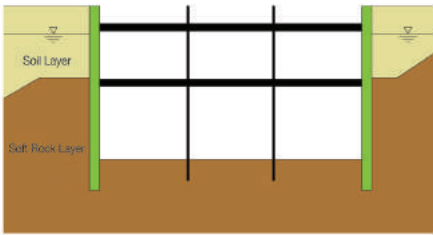


▲ Adjustable Jack of Length of the End Part

Adjustable Jack of Length of the End Part				
H (mm)	Under Loading Test		Number of Installation (ea)	Allowable Bearing Capacity (tonf)
	Loading (tonf)	Test Results		
30	245	All serene	4	980
180			6	1470
330				

P.P.S (Prestressed Pipe Strut) Method

► Comparison of PPS with H-Strut Method (typical)

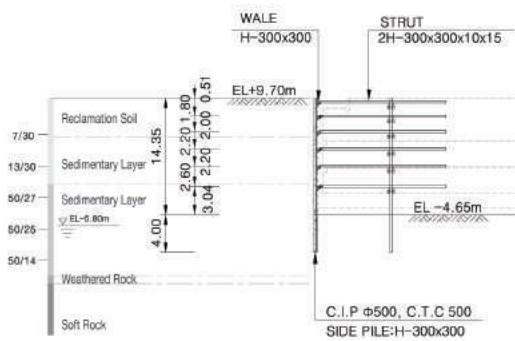
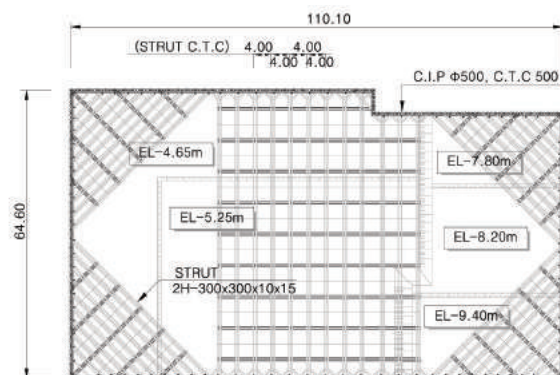
Classification	General STRUR method	PPS Method
Plane · Cross Section	 	 
Characteristic	• Classification of Strong Axis / Weak Axis • Direction of weak axis is disadvantageous for buckling • Disadvantageous for torsion • Limited spacing of spread beam • Required horizontal / vertical Stiffener (Post Pile spacing within about 5.0m, Brace)	• No classification for strong axis / weak axis • Advantageous for buckling and torsion • Able to maximize vertical spacing of spread beam • The weight of required structural steel is small quantity comparing to STRUT method • Minimize horizontal / vertical stiffener (Post Pile spacing within about 20m)
Constructability	• Detailed technologies of constructability, including connecting and dismantling, etc, are generalized • Generation of additional construction process for installation / dismantling of stiffener • Risk factors are available on the spread beam according to generation of working process • Many obstacles have arisen when constructing this structure. (Close placement of supports in up down left right side, and post pile) • Construction Period is disadvantageous relatively	• Flange type joint has become generalized • No additional process in relation to stiffener • It's safe in construction because PPS steel pipe installation process is simple • Relatively possible to reduce the construction period • Quality control and constructability are satisfactory because there is no construction interference with PPS structure steel when constructing this structure
Construction Period	• General	• Construction period saving effect is 15days per one basement floor
Economy	• Relatively High Construction cost • Advantageous for Small construction site	• Save less than a 10% of construction cost comparing to H-shape steel type • Applied to regardless the size of construction site (holds a record of construction, excavation width more than 100m)
Safety	• Inappropriate to apply it to a large size construction site for long term period	• Increase resistance of changes in earth pressure during construction according to apply to high-strength-large-section spread beam method • Diminishing displacement of abnormality of retaining wall through prestress load • Minimize subsidence of neighboring ground through prestress load (Increase safety of adjacent building and the buried utility assets)

► **Comparison of PPS with H-Strut Method** (The result from the review of alternative design)

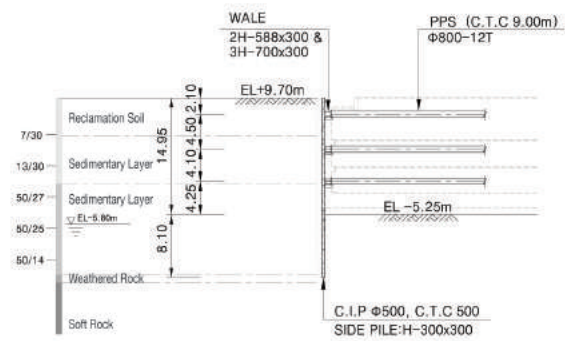
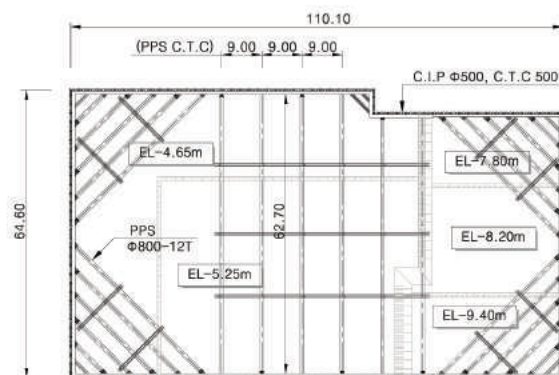
▼ **New Construction of officetel, Yeongdeungpo**

(Construction size, area (A)–110m x 65m, Excavation Height (H)–14.5m)

▼ **Constructability**



- STRUT: 6 layers, install it at space of 4.0 m
- Post Pile: install it at space of 7.0 m



- PPS : 3 layers, install it at space of 9.0
- POST PILE, install it at space of 16.0m

- Earth work and frame construction work are easy on account of large vertical and horizontal spacing.
- Earth work and frame construction work are easy on account of minimal placement of POST PILE.

➡ **Shorten the construction period about 2 months**

1. EBS Digital Integration Company office Building new construction work

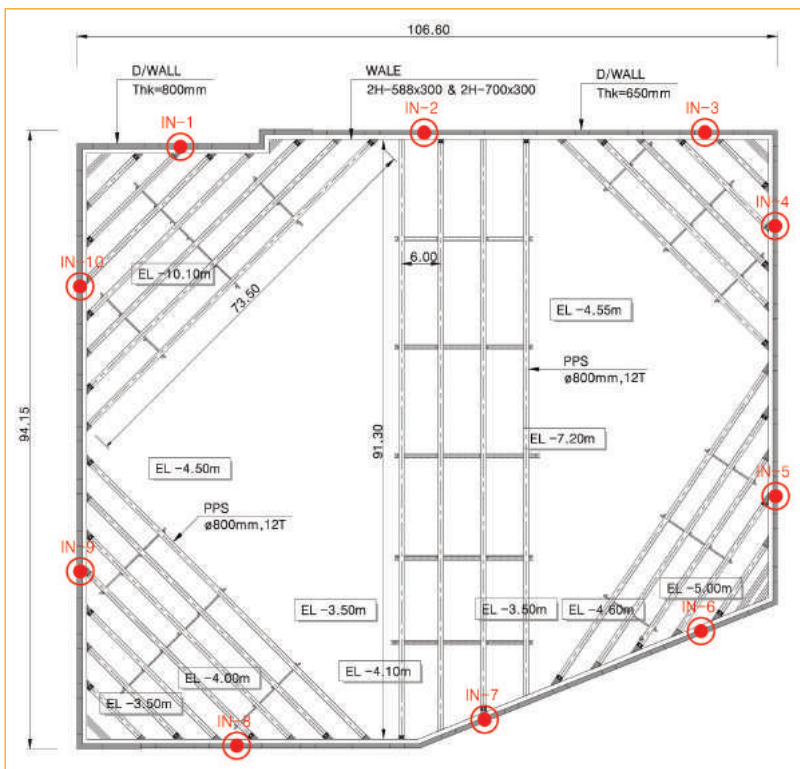
Summary of Construction Site

- Name of Construction Site: EBS Digital Integration Company office Building new construction work
- Order Organization: Public Procurement Service
- Original Contractor: Kyeryong Construction Consortium
- Construction Period: 2014.09 ~ 2015.02 (Completion of Earth Work)
- Applied Construction Method: D/ Wall + PPS 2layers
- Maximum Extension of PPS and Total Executed Quantity: 94.0m (2,350m Construction)

► View of Construction Site

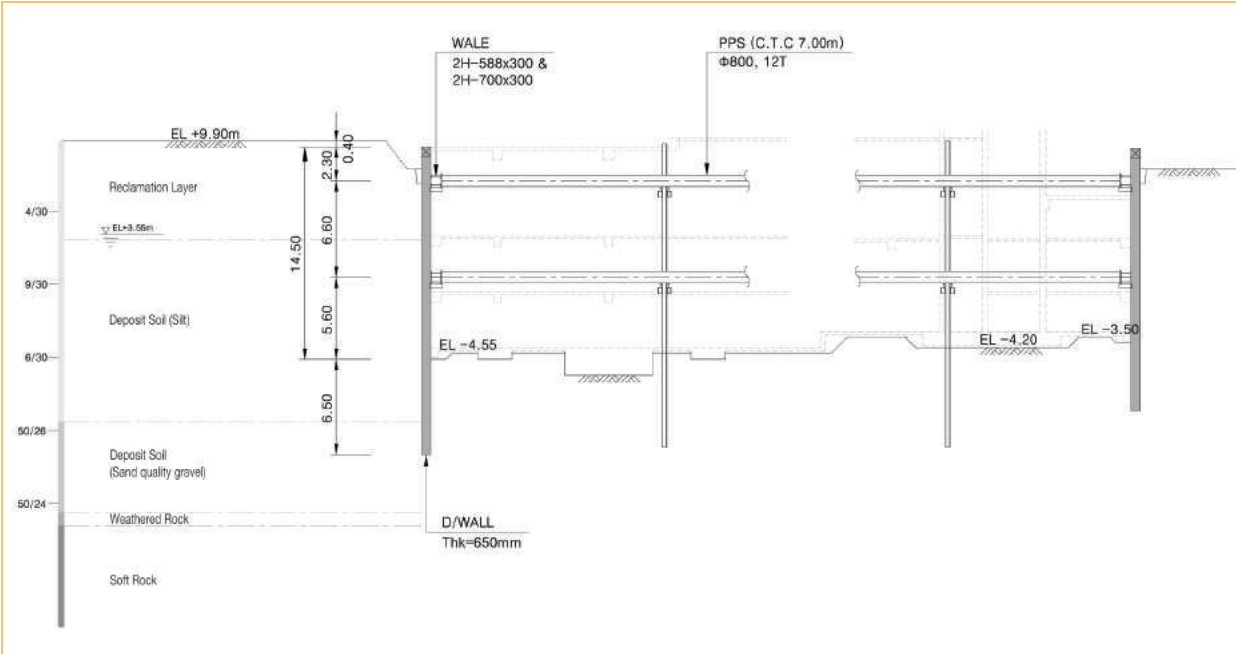


Plan

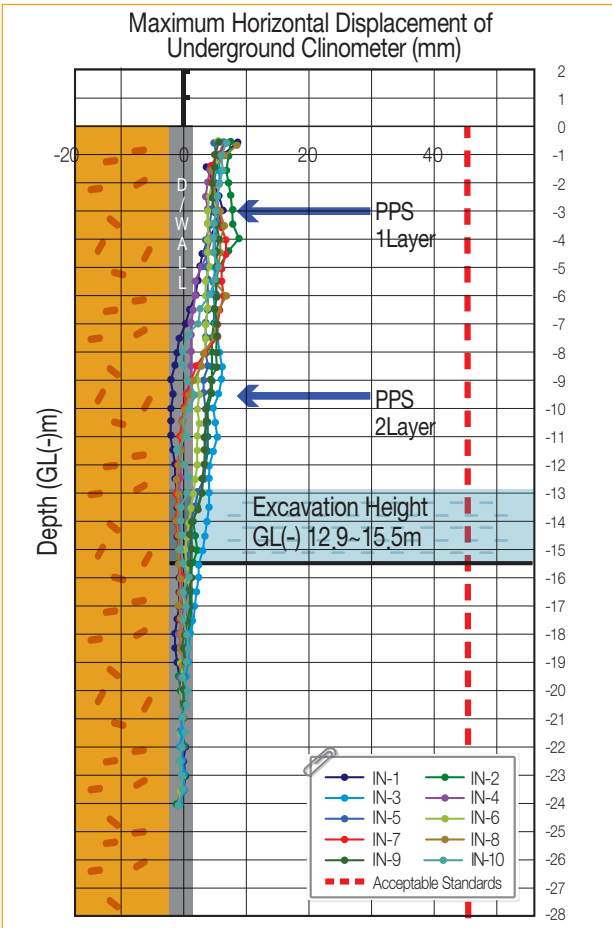


- **Soil Property**
 - Deposit Soil(Silt and Sand-gravel): 19.0~25.0m
 - Weather Soil 1.2~15.0m
- **Size of Construction Site**
 - 106.6m(W) X 94.3m(L)
 - Earthwork Depth 13~16m
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m): 3,062m²
 - D/ Wall(T=0.65m): 4,515m²
 - Earth Work: about 124,000m³
 - PPS(D=0.8m): 2,356m(2 layers)

Sectional View



Measured DATA



Number	Excavation Height (m)	Occurrence Depth (m)	Maximum Horizontal Displacement (mm)	
			Occurrence Displacement	Acceptable Standards
IN-1	15.5	0.5	8,790	54.25
IN-2	14.5	4	9,070	50.75
IN-3	14.5	0.5	5,800	50.75
IN-4	14.5	0.5	5,570	50.75
IN-5	14.5	1.5	5,430	50.75
IN-6	14.5	0.5	5,560	50.75
IN-7	12.9	4.5	6,990	45.15
IN-8	12.9	0.5	8,150	45.15
IN-9	15.5	4	6,620	54.25
IN-10	15.5	0.5	7,330	54.25

2. Woomyun Samsung R&D Center new construction work

Summary of Construction Site

- Name of Construction Site: Woomyun Samsung R&D Center new construction work
- Original Contractor: Samsung CNT
- Applied Construction Method: CIP+ PPS 3~5 layers
- Order Organization: Samsung Electronics
- Construction Period: 2012.11 ~ 2013.12
- Maximum Extension of PPS and Total Executed Quantity: 60.0m (5,656m Construction)

▶ View of Construction Site



● Soil Property

- Reclamation and Sedimentary Layer 9.0~18.0m
- Weathered Rock 1.0~7.0m
- Under Soft Rock Layer

● Size of Construction Site

- 61.0m(W) X 123.0m(L)
- Earthwork Depth 15.5~20.9m

● Quantity per Contracted Process

- PPS(D=0.8m): 5,656m(3~4 layers)

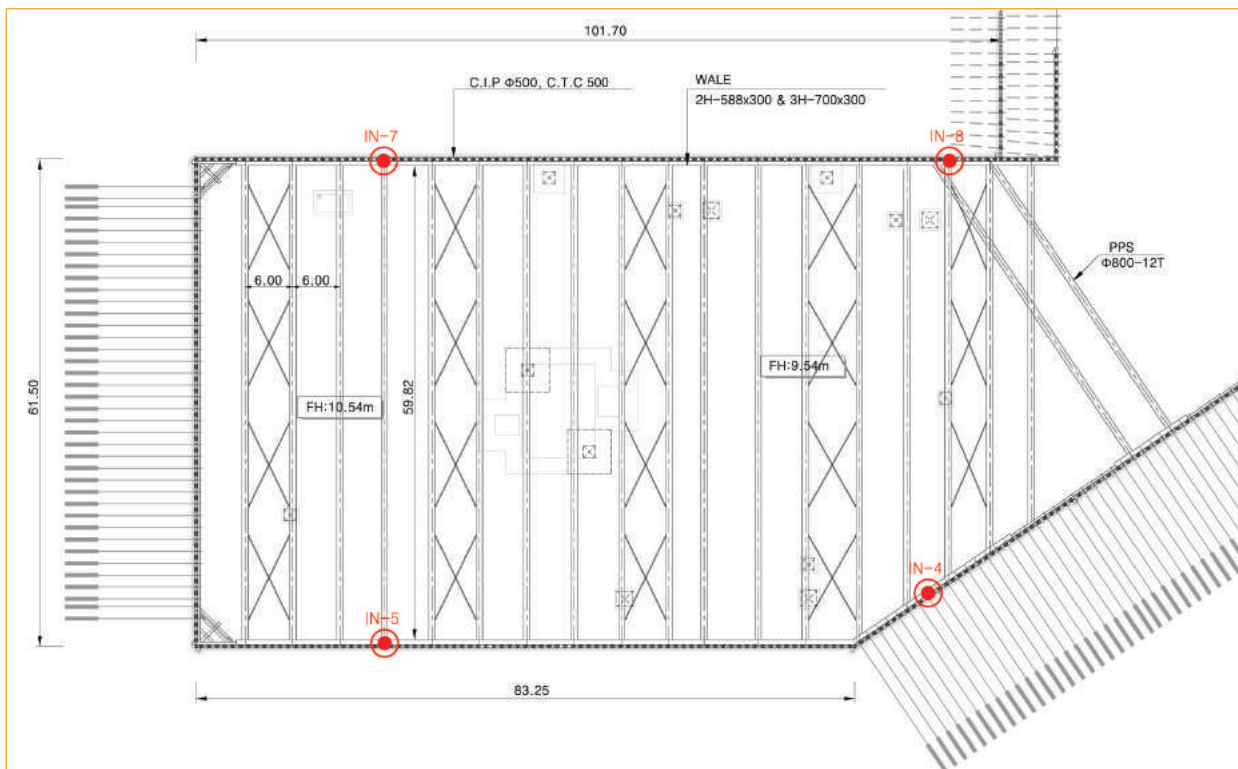


▶ PPS Dismantling

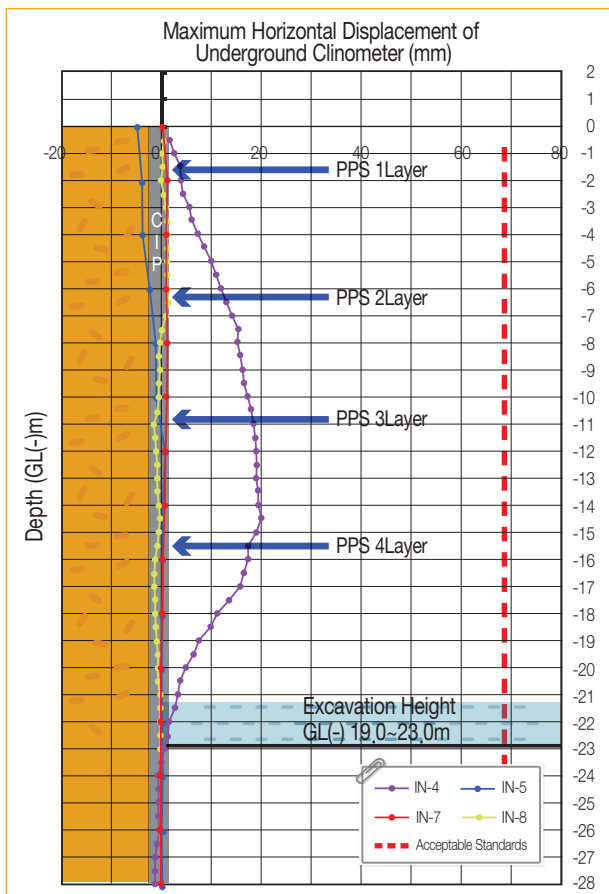


▶ Lower View

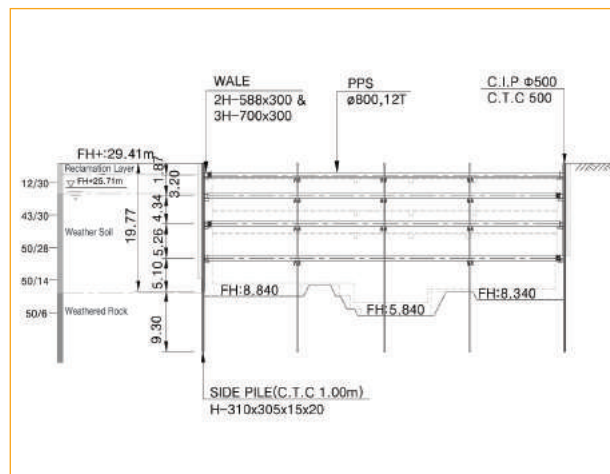
Plan



Measured DATA



Sectional View



Number	Excavation Height (m)	Occurrence Depth (m)	Maximum Horizontal Displacement (mm)	
			Occurrence Displacement	Acceptable Standards
IN-4	23	14	20,39	69
IN-5	20,66	2	- 6,1	61,98
IN-7	19,77	12	0,56	59,31
IN-8	21,76	10,5	14,22	65,28

3. Incheon International Airport Second passenger Terminal link railway

Summary of Construction Site

- Name of Construction Site: Incheon International Airport Second passenger Terminal link railway
- Original Contractor: Hyundai Development Company
- Applied Construction Method: D/ Wall + PPS 2~3 layers
- Order Organization: Korea Rail Network Authority
- Construction Period: 2013.09 ~ 2014.12
- Maximum Extension of PPS and Total Executed Quantity: 35,0m (6,000m Construction)

▶ T2 Station Starting Section

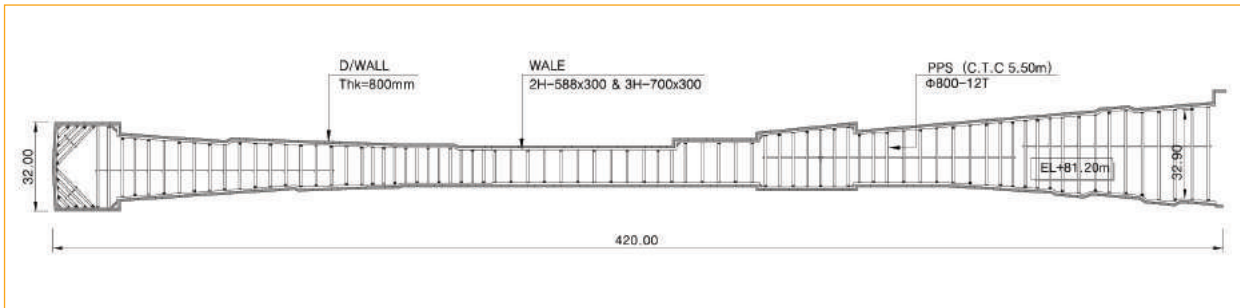


▶ T2 Station Starting Section

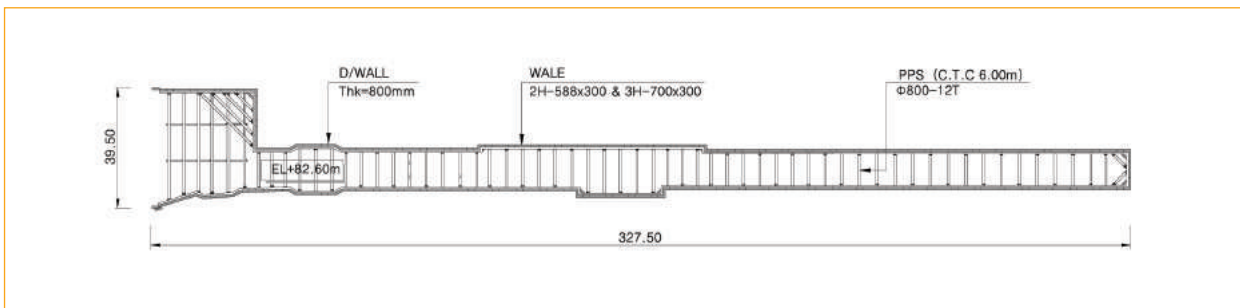
- **Soil Property**
 - Reclamation and Soil 9.0~18.0m
 - Weathered Rock 1.0~7.0m
- **Size of Construction Site**
 - 35.0m(W) X 740.0m(L)
 - Earthwork Depth 21.0~25.0m
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m): 45,894m²
 - Maximum depth: 28.6m
 - PPS(D=0.8m): 6,000m(2~3 layers)

Plan

► T2 Station Starting Section

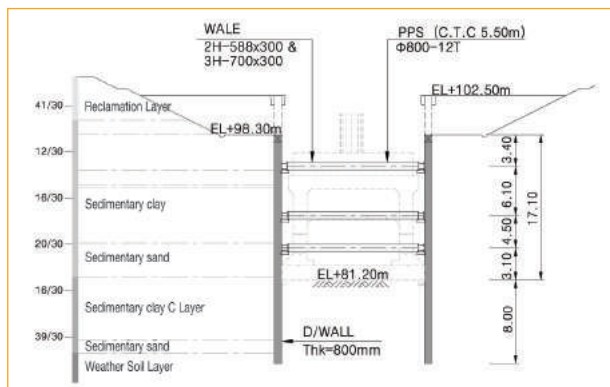


► T2 Station Ending Section

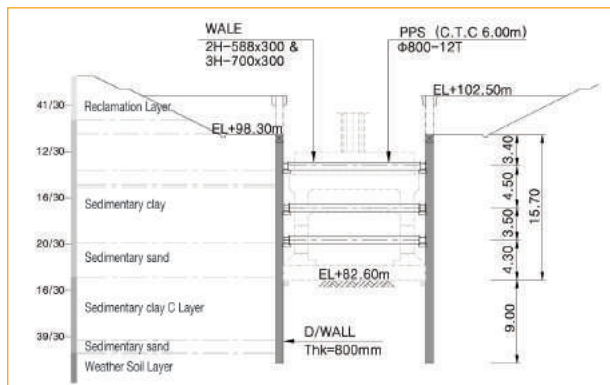


Sectional View

► T2 Station Starting Section



► T2 Station Ending Section



► T2 Station Ending Section

4. Gwangyang, E-Pyeonhan Sesang

Summary of Construction Site

- Name of Construction Site: Gwangyang, E-Pyeonhan Sesang
- Order Organization: Korea Real Estate Investment & Trust
- Original Contractor: DAELIM
- Construction Period: 2013.09 ~ 2014.09
- Applied Construction Method: D/ Wall + PPS 3 layers
- Maximum Extension of PPS and Total Executed Quantity: 50.0m (2,420m Construction)

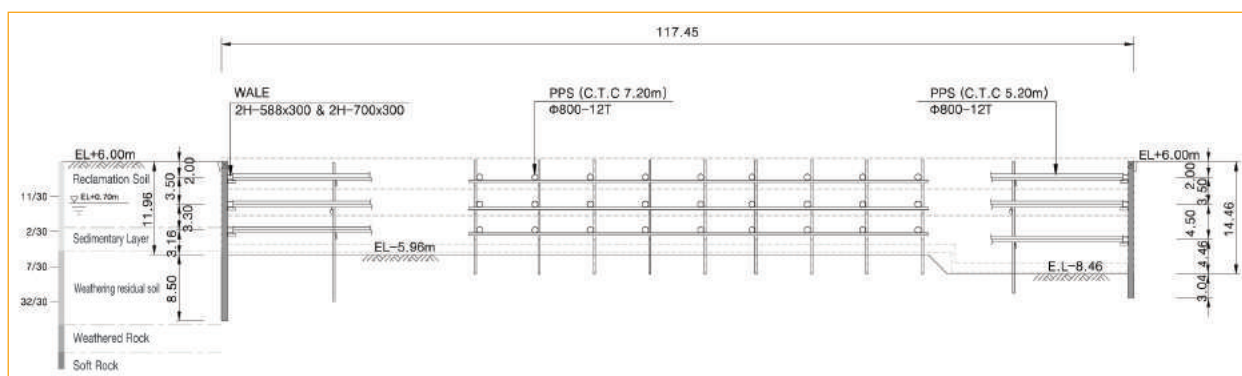
► View of Construction Site



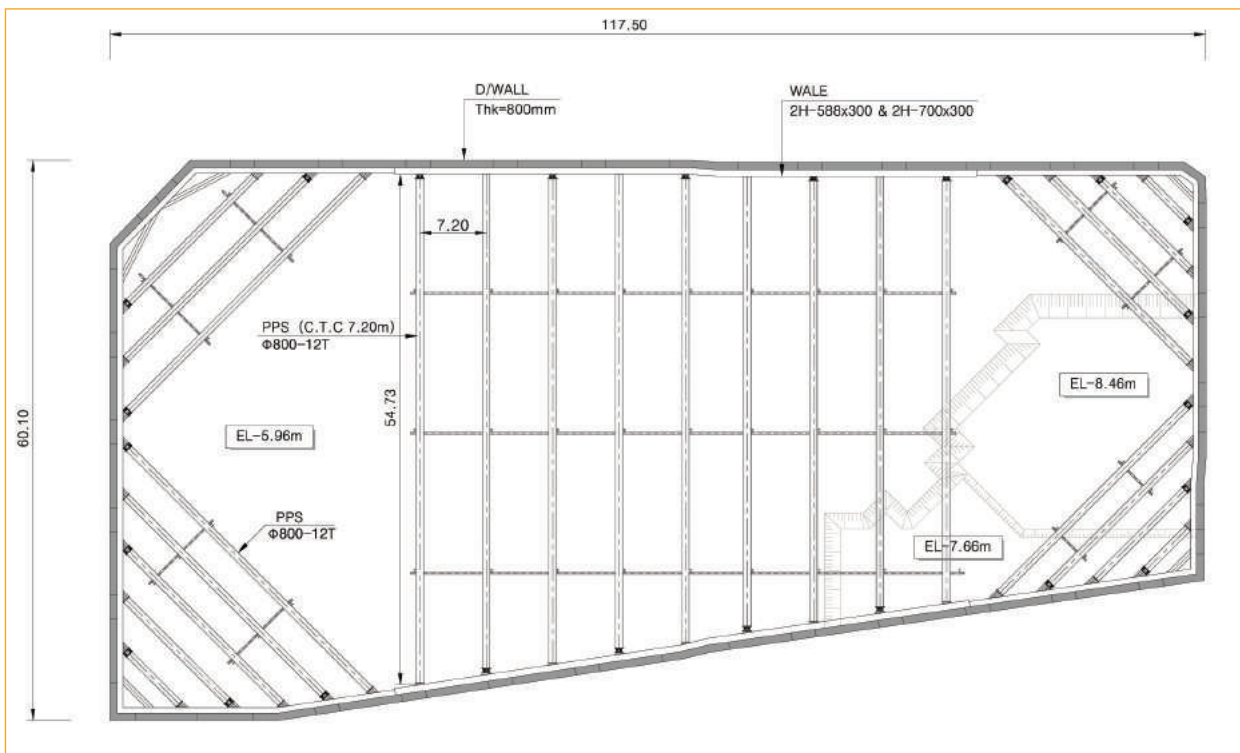
► Completion of Earth Work

- **Soil Property**
 - Reclamation and Sedimentary Layer 9.0~12.5m
 - Weathered Soil 6.0~9.5m
 - Weathered Rock 1.0~3.5m
 - Under Soft Rock Layer
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m) 6,000m² (Maximum depth: 21.5m)
 - PPS(D=0.8~1.0m): 2,420m(3 layers)
 - Earth-volume: 80,000m³
- **Size of Construction Site**
 - 59.0m(W) X 116.0m(L)
 - Earthwork Depth 15.5~20.9m

Sectional View



Plan



5. Sungsu-dong, Woori bank call center

Summary of Construction Site

- Name of Construction Site: Sungsu-dong, Woori bank call center
- Original Contractor: Hwangbo construction(Earth Work) / Dongbu (architecture)
- Applied Construction Method: D/ Wall + PPS 3~4 layers
- Construction Period: 2011.04 ~ 2012.03
- Maximum Extension of PPS and Total Executed Quantity: 50.0m (1,400m Construction)

► View of Construction Site



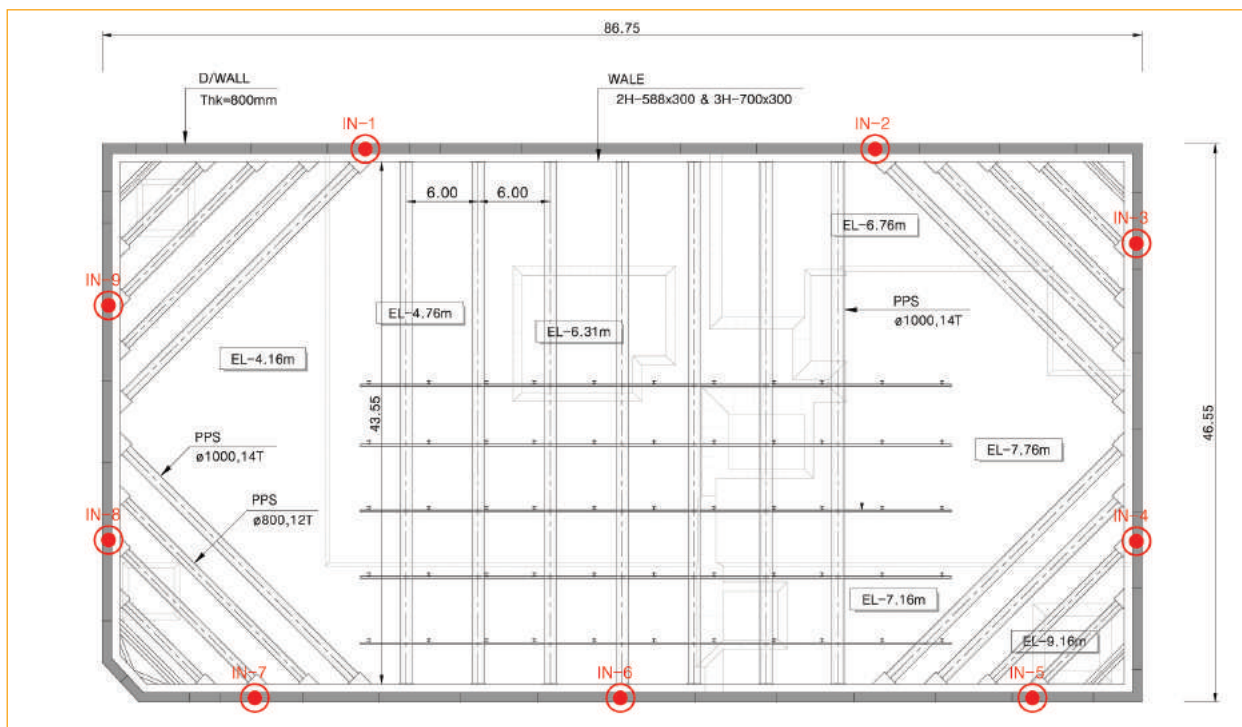
► Earth Work

- **Soil Property**
 - Reclamation and Sedimentary Layer 19.0m
 - Weathered Rock 19.0~22.0m
 - Under Soft Rock Layer
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m) 5,000m² (Maximum depth: 23.5m)
 - PPS(D=0.8~1.0m): 1,400m(2~3 layers)
 - Earth-volume: 59,000m³
- **Size of Construction Site**
 - 47.0m(W) X 87.0m(L)
 - Earthwork Depth 17.5~21.0m
 - Basement 4th floor, 13th Floor above ground

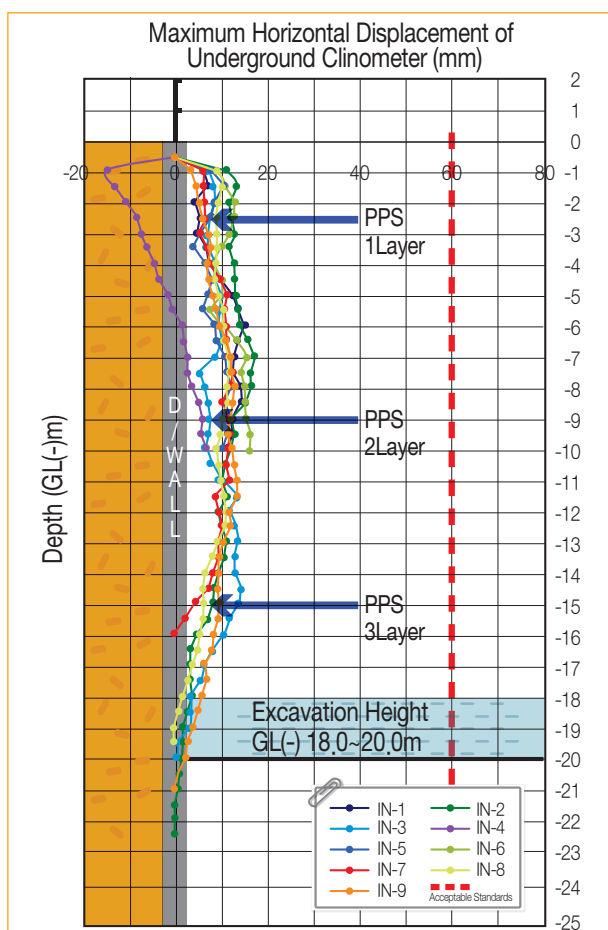


► Lower View

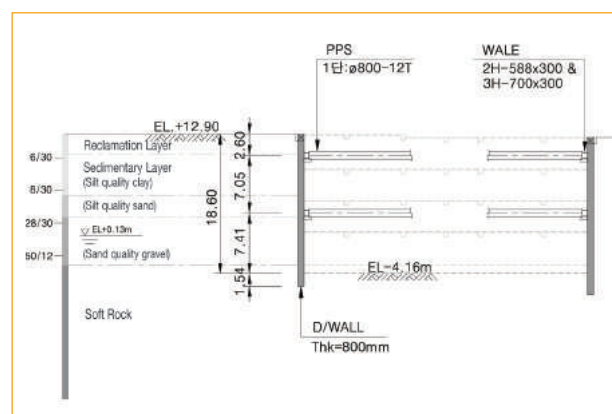
Plan



Measured DATA



Sectional View



Number	Excavation Height (m)	Occurrence Depth (m)	Maximum Horizontal Displacement (mm)	
			Occurrence Displacement	Acceptable Standards
IN-1	20	6	14,11	60
IN-2	20	7	16,11	60
IN-3	20	14,5	12,77	60
IN-4	18	1,5	-11,97	54
IN-5	18	9	10,93	54
IN-6	18	9,5	15,53	54
IN-7	18	7,5	11,67	54
IN-8	18	7,5	11,31	54
IN-9	20	11	12,62	60

6. Jamsil I' PARK new construction work

Summary of Construction Site

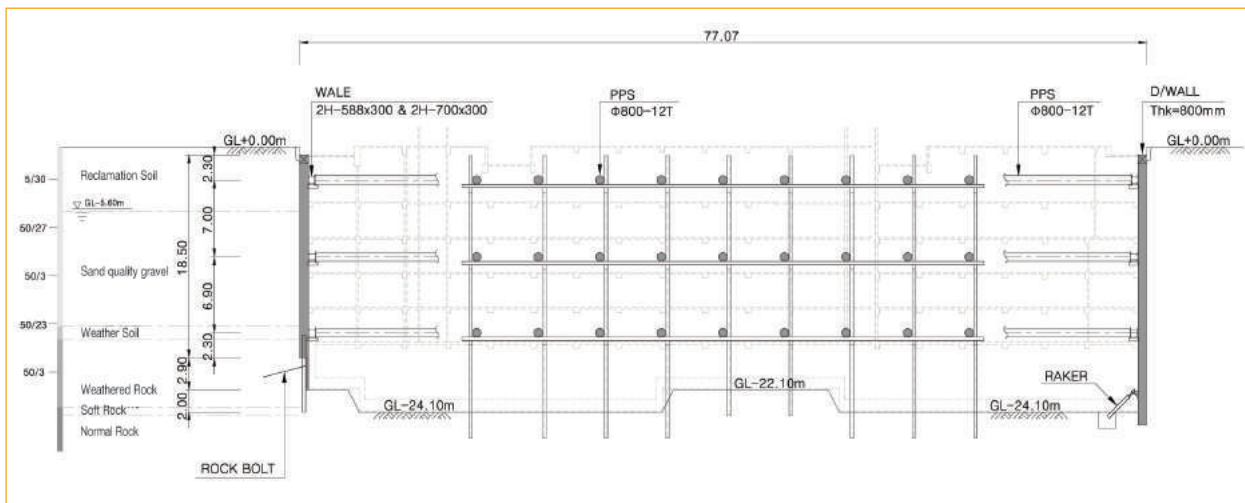
- Name of Construction Site: Jamsil I' PARK new construction work
- Original Contractor: Hyundai Development Company
- Applied Construction Method: D/ Wall + PPS 3 layers
- Order Organization: KB bukuk no.1 development expertise
- Construction Period: 2012.03 ~ 2012.12
- Maximum Extension of PPS and Total Executed Quantity: 26.0m(1,000m Construction)

► View of Construction Site

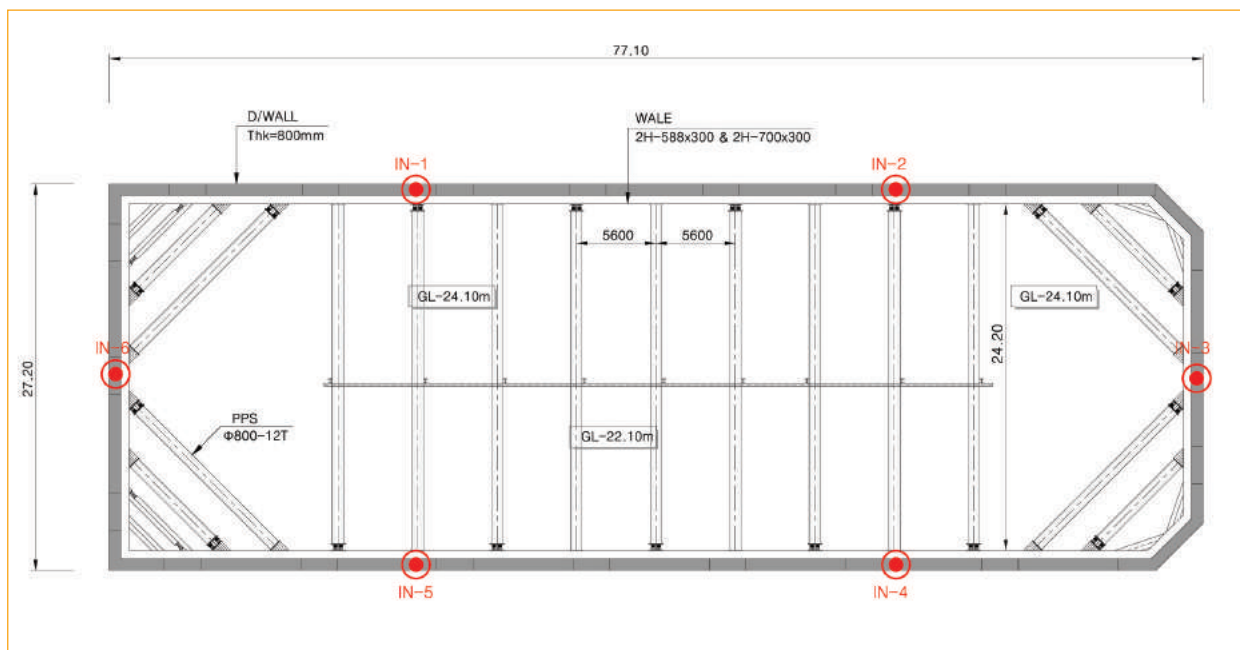


- **Soil Property**
 - Sand-gravel 16.0~18.0m
 - Weathered Rock 19.0~22.0m
 - Under Soft Rock Layer
- **Size of Construction Site**
 - 27.0m(W) X 76.0m(L)
 - Earthwork Depth 18.8~23.7m
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m) 4,300m² (Maximum depth: 24.6m)
 - Lower Underpinning
 - PPS(D=0.8m): 1,000m(3 layers)
 - Earth-volume: 44,000m³
 - Including Permanent Drainage and Measurement

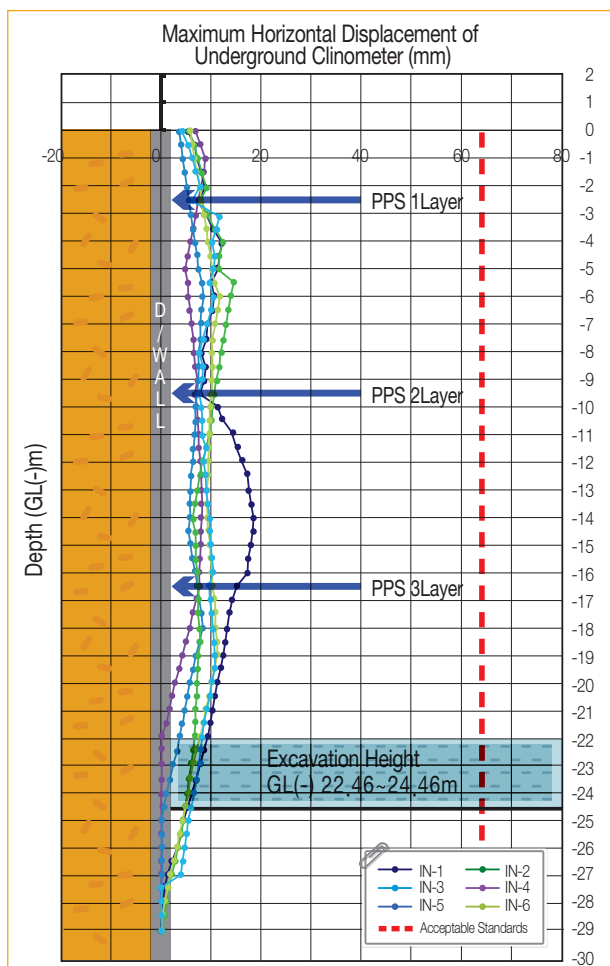
Sectional View



Plan



Measured DATA



Number	Excavation Height (m)	Occurrence Depth (m)	Maximum Horizontal Displacement (mm)	
			Occurrence Displacement	Acceptable Standards
IN-1	21	14	18,67	63
IN-2	21	5,5	14,34	63
IN-3	21	3	11,2	63
IN-4	21	1	8,79	63
IN-5	21	6	8,26	63
IN-6	21	6	11,69	63

7. Yeongdeungpo Officetel new construction work

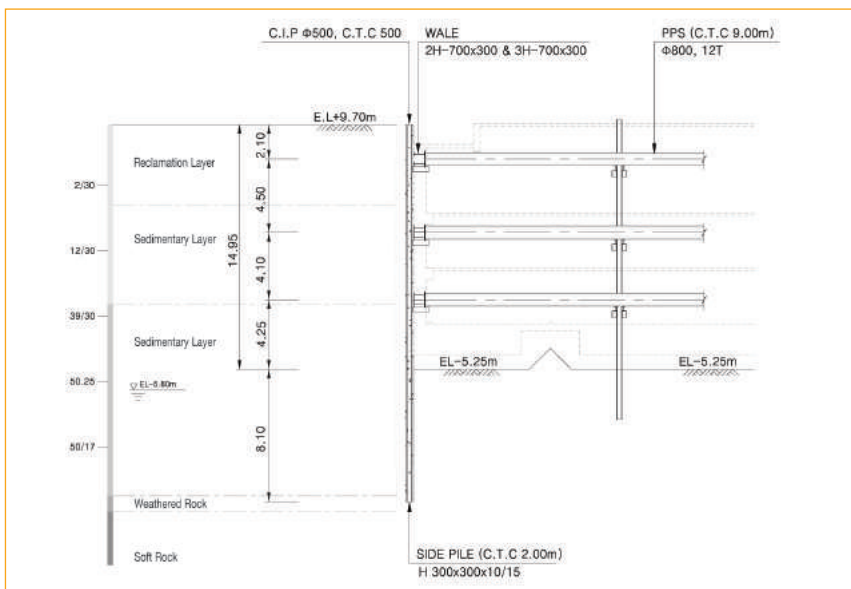
Summary of Construction Site

- Name of Construction Site: Yeongdeungpo Officetel new construction work
- Order Organization: KT estate
- Construction Period: 2014.10 ~ 2015.05(Completion of Earth Work)
- Original Contractor: Taeyoung
- Maximum Extension of PPS and Total Executed Quantity: 62,5m (2,720m Construction)
- Applied Construction Method: C.I.P + PPS 3~4 layers

► View of Construction Site



Sectional View



● Soil Property

- Alluvium Layer(Silt and Sand-gravel) 23.5~25.0m
- Weathered Rock 1.0~2.0m

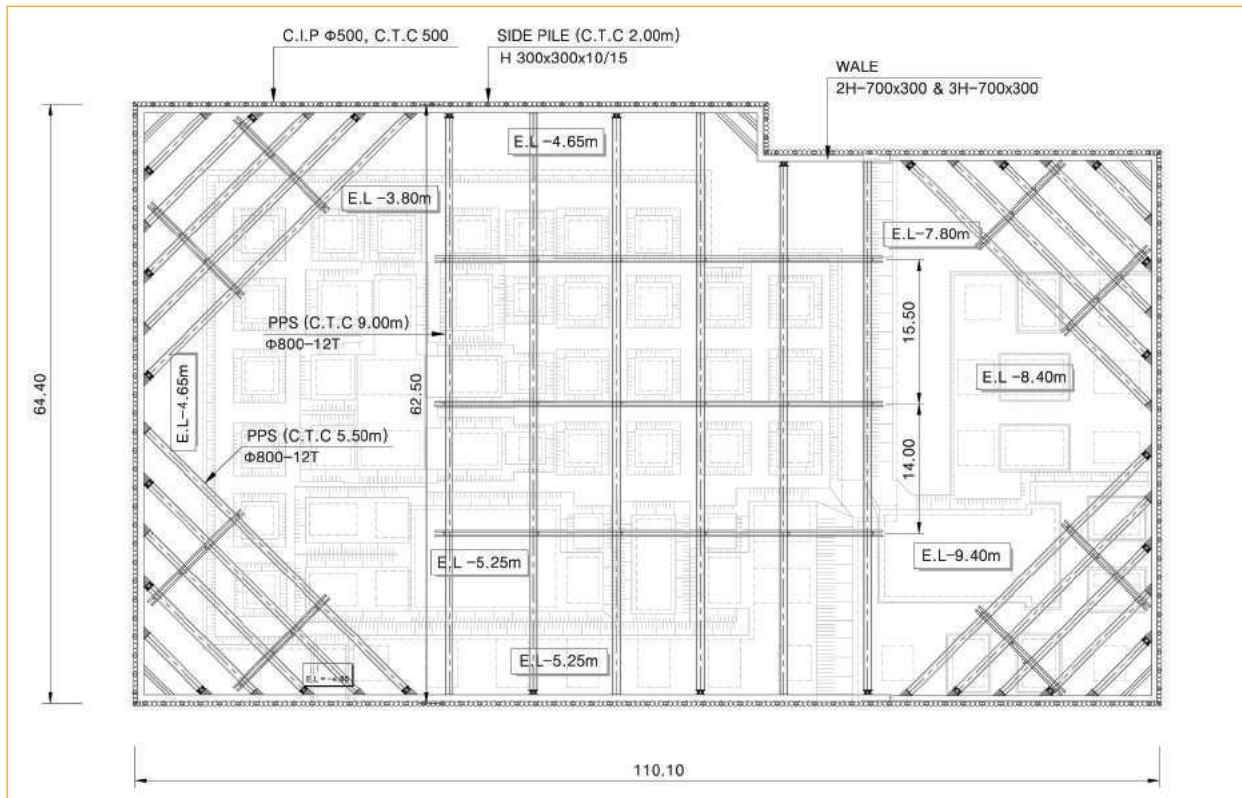
● Size of Construction Site

- 110.1m(W) X 64.4m(L)
- Earthwork Depth 14.1~17.9m

● Quantity per Contracted Process

- C.I.P(D=0.5m) 17,040m
- L,W Grouting 17,040m
- Earth Work: about 97,700m³
- PPS (D=0.8m): 2,720m(3~4 layers)

Plan



8. Seokchon-dong, Bulgwangsa Jungchangbalsa new construction work

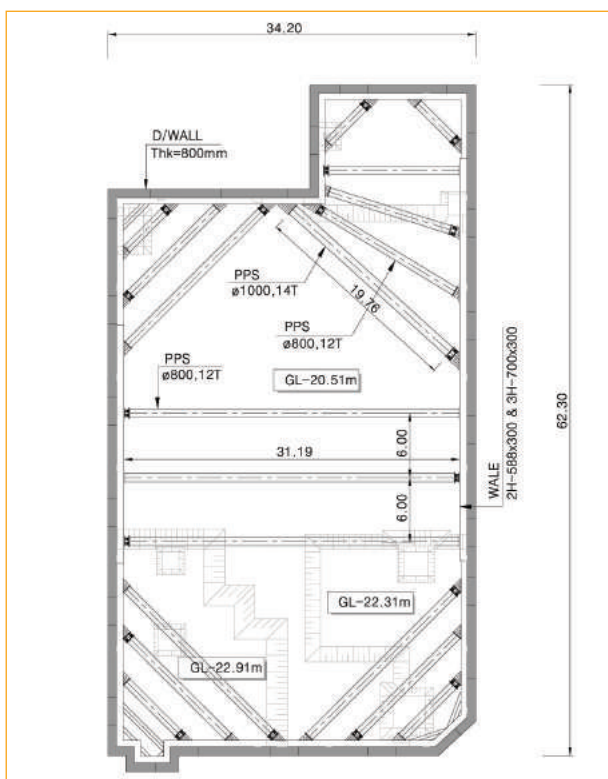
Summary of Construction Site

- Name of Construction Site: Seokchon-dong, Bulgwangsa Jungchangbalsa new construction work
- Original Contractor: Sungil construction
- Applied Construction Method: D/ Wall + PPS 3 layers
- Order Organization: Jogye order of Korean Buddhism
- Construction Period: 2011.06 ~ 2013.03
- Maximum Extension of PPS and Total Executed Quantity: 30.0m (250m Construction)

► View of Construction Site



Plan

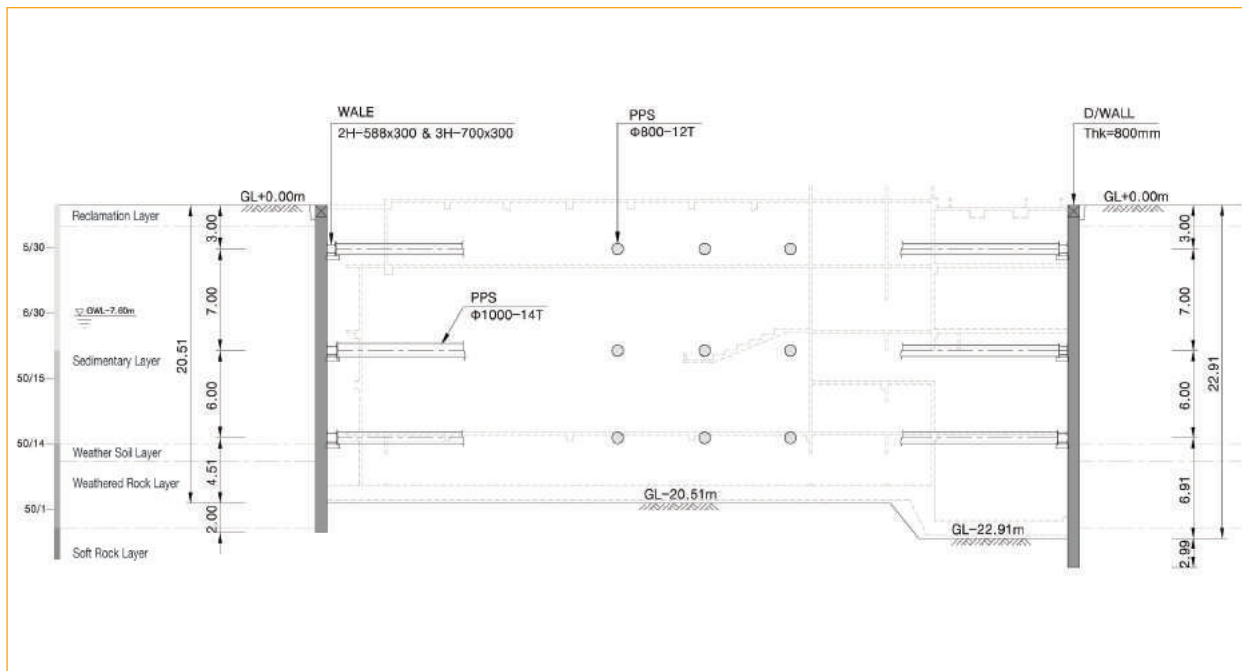


- **Soil Property**
 - Reclamation and Sedimentary Layer 11.0m
 - Weathered Rock 2.5~4.6m Under Soft Rock Layer
- **Size of Construction Site**
 - 34.0m(W) X 59.0m(L)
 - Earthwork Depth 20.5~22.9m
 - Basement 5th floor, 5th Floor above ground
- **Quantity per Contracted Process**
 - D/ Wall (T=0.8m): 4,590m²
 - Maximum depth: 23m
 - PPS(D=0.8~1.0m): 711m(3 layers)
 - Earth-volume: 52,630m³
 - Lining construction: 700m²
 - Accessorial Public Works: Water and Sewage



► Various install

Sectional View



9. Sangam Doosan We've centium new construction work

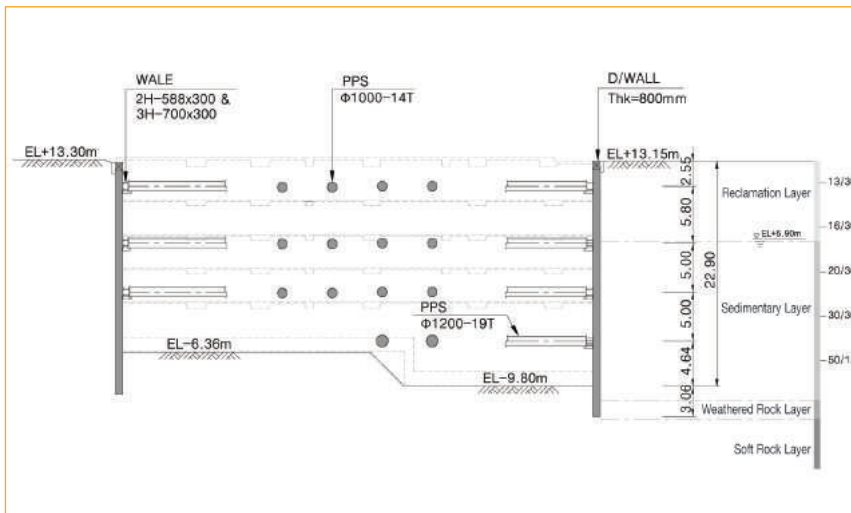
Summary of Construction Site

- Name of Construction Site: Sangam Doosan We've centium new construction work
- Original Contractor: Doosan Engineering & Construction
- Applied Construction Method: D/ Wall + PPS 3~4 layers
- Construction Period: 2011.06 ~ 2012.04
- Maximum Extension of PPS and Total Executed Quantity: 30,0m (840m Construction)

► View of Construction Site

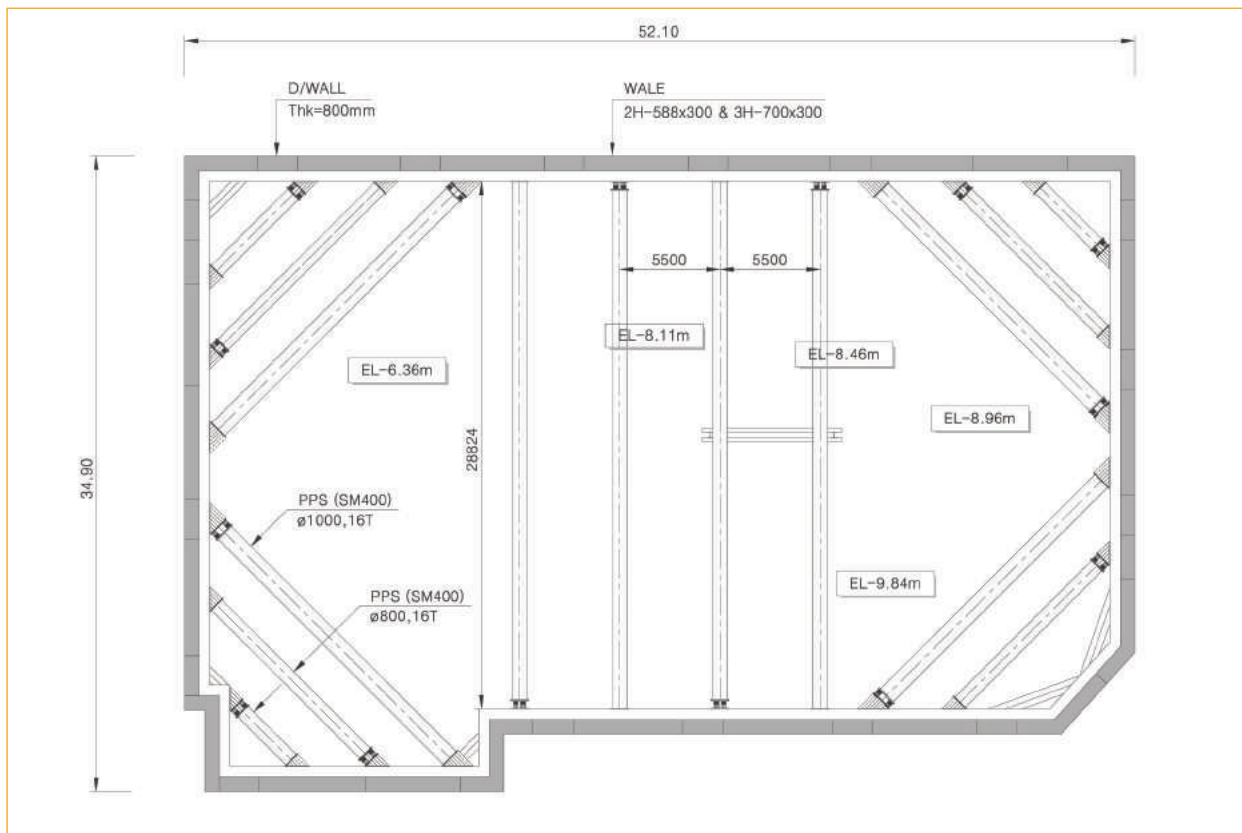


Sectional View



- **Soil Property**
 - Reclamation and Soil Layer 0.0~20.0m
 - Weathered Rock 20.0~23.0m
- **Size of Construction Site**
 - 34.0m(W) X 52.0m(L)
 - Earthwork Depth 19.0~23.0m
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m): 4,400m²
 - PPS(D=0.8~1.0m): 840m(3~4 layers)
 - Earth-volume: 38,000m³

Plan



10. Pusan Yonghoman complex facility new construction work

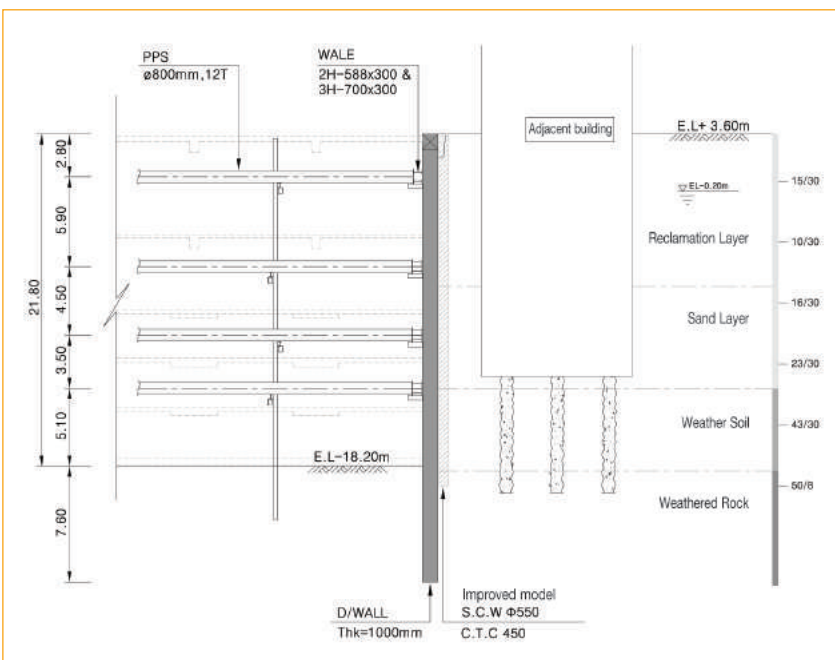
Summary of Construction Site

- Name of Construction Site: Pusan Yonghoman complex facility new construction work
- Original Contractor: IS DONGSEO
- Applied Construction Method: D/ Wall + PPS 4 layers
- Construction Period: 2014.09 ~ 2015.02 (Completion of Earth Work)
- Maximum Extension of PPS and Total Executed Quantity: 58.0m (1,850m Construction)

► View of Construction Site

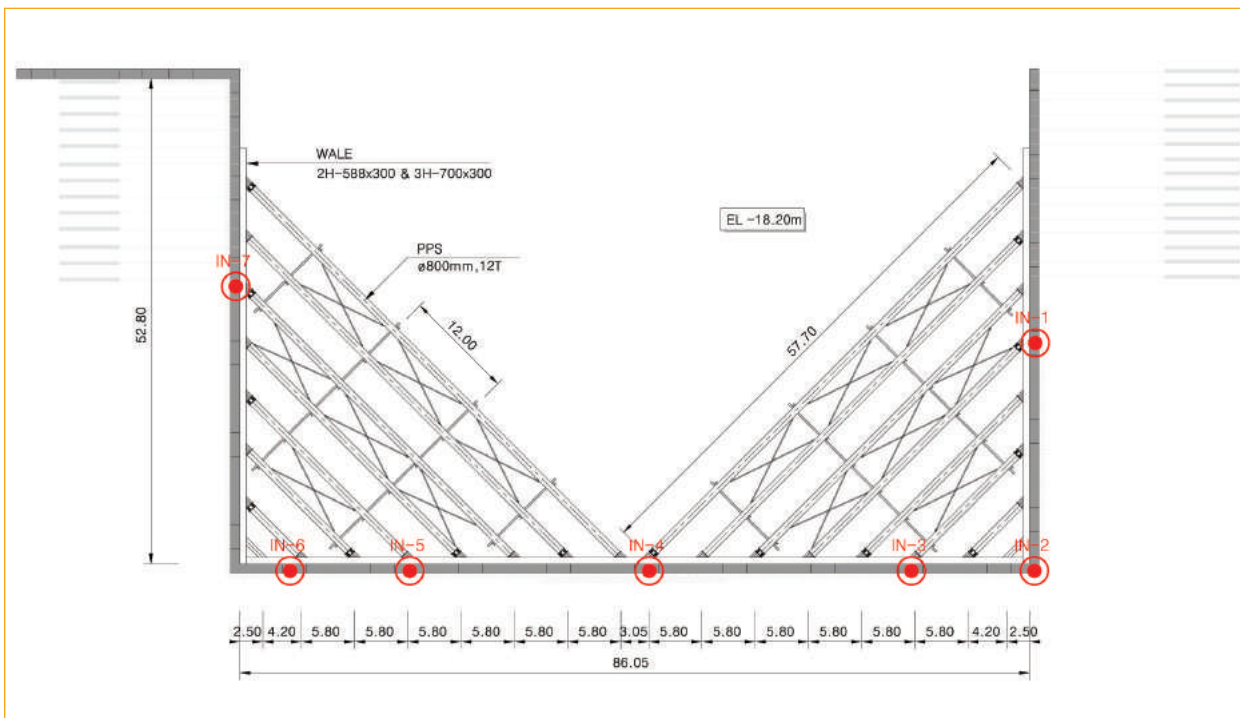


Sectional View

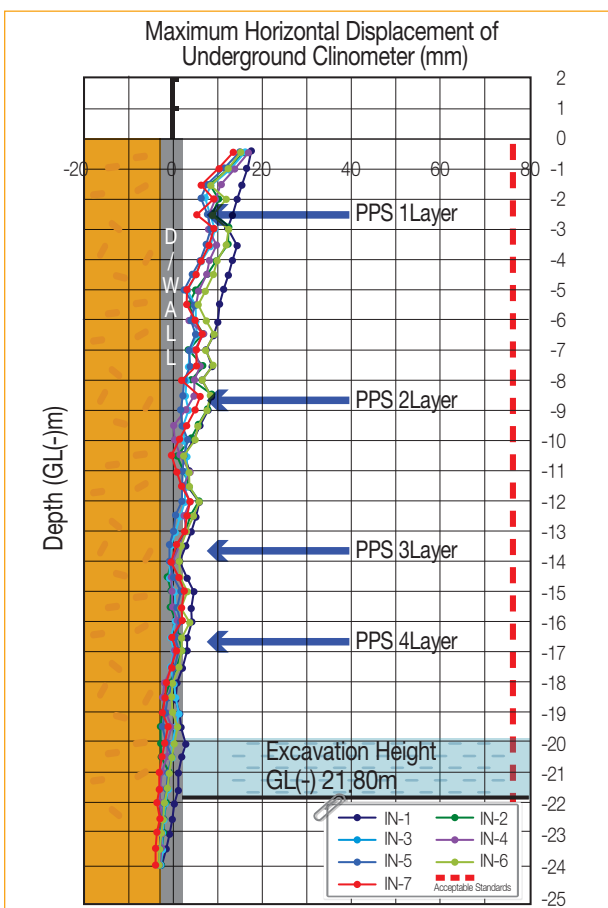


- **Soil Property**
 - Reclamation and Soil Layer 14.0~16m
 - Weathered Soil 6.0~7.0m
 - Weathered Rock 10.0m More
- **Size of Construction Site**
 - 86.0m(W) X 55.0m(L)
 - Earthwork Depth 21.5m
- **Quantity per Contracted Process**
 - PPS(D=0.8m): 1,850m(4 layers)

Plan



Measured DATA



Number	Excavation Height (m)	Occurrence Depth (m)	Maximum Horizontal Displacement (mm)	
			Occurrence Displacement	Acceptable Standards
IN-1	21.8	0.5	16,650	76.3
IN-2	21.8	0.5	14,080	76.3
IN-3	21.8	0.5	15,390	76.3
IN-4	21.8	0.5	16,160	76.3
IN-5	21.8	0.5	14,390	76.3
IN-6	21.8	0.5	14,620	76.3
IN-7	21.8	0.5	13,900	76.3

11. International Temple stay new construction work

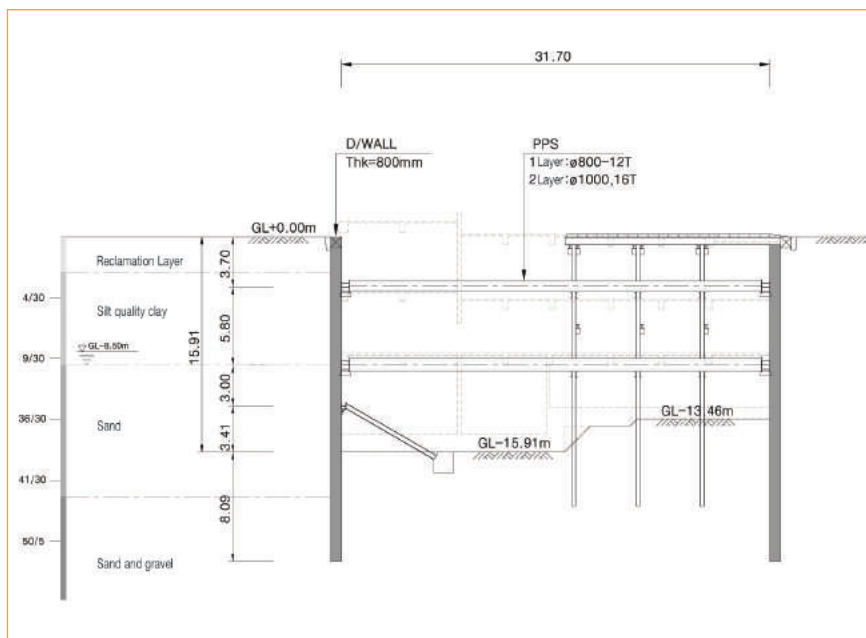
Summary of Construction Site

- Name of Construction Site: International Temple stay new construction work
- Original Contractor: Samwhan Corporation
- Applied Construction Method: D/ Wall + PPS 2 layers
- Order Organization: Jogye order of Korean Buddhism
- Construction Period: 2008.10 ~ 2009.11
- Maximum Extension of PPS and Total Executed Quantity: 32.0m (662m Construction)

► View of Construction Site

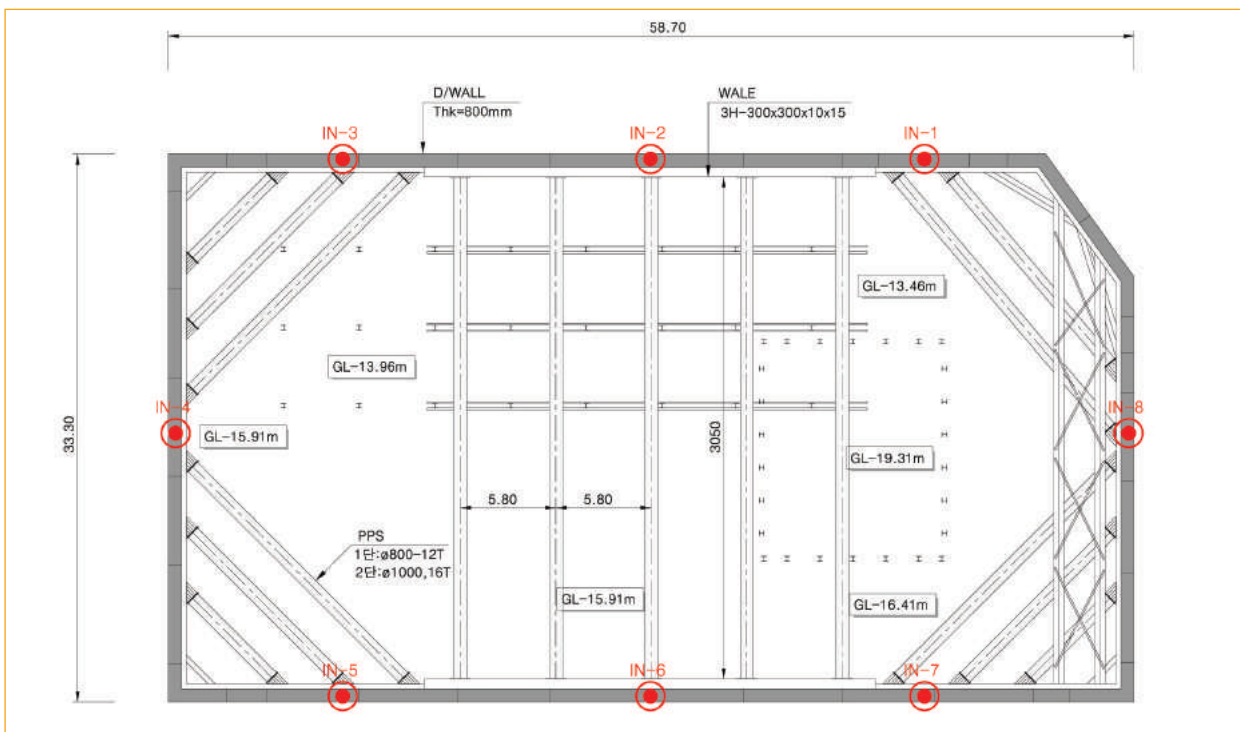


Sectional View

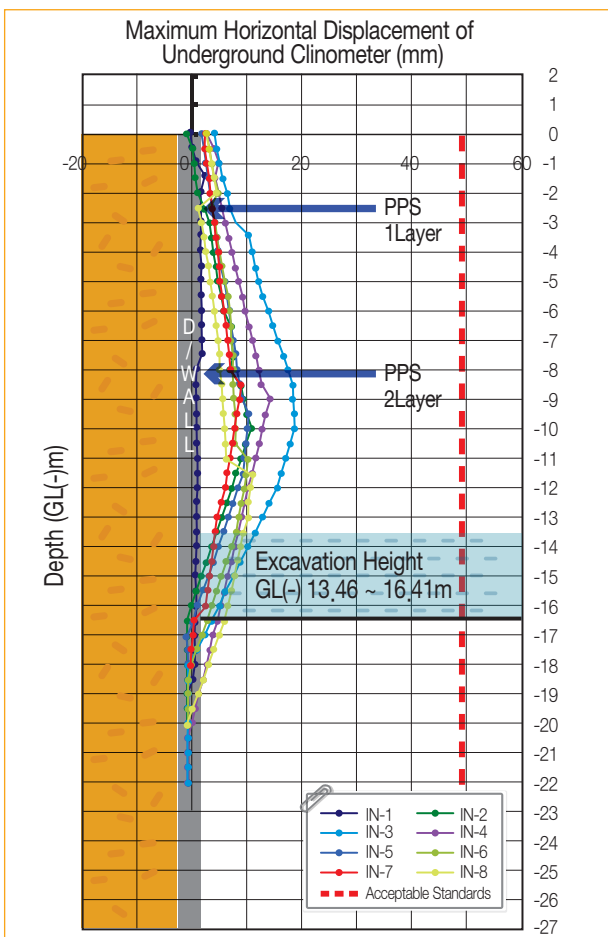


- **Soil Property**
 - Soil Layer 19.0~29.0m
 - Under Weathered Rock Layer
- **Size of Construction Site**
 - 32.0m(W) X 59.0m(L)
 - Earthwork Depth 14~20m
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m) 4,650m²
 - PPS(80cm): 630m(2 layers)
 - Earth-volume: 27,684m³
 - Micro Pile: 7,752m

Plan



Measured DATA



Number	Excavation Height (m)	Occurrence Depth (m)	Maximum Horizontal Displacement (mm)	
			Occurrence Displacement	Acceptable Standards
IN-1	13.46	1.5	2.61	40.38
IN-2	13.46	10	11.46	40.38
IN-3	13.46	10	19.05	40.38
IN-4	16.41	9	14.66	49.23
IN-5	15.91	9.5	10.87	47.73
IN-6	15.91	11	10.89	47.73
IN-7	15.91	8.5	9.46	47.73
IN-8	15.91	11.5	11.49	47.73

12. Wirye New City IS central tower new construction work

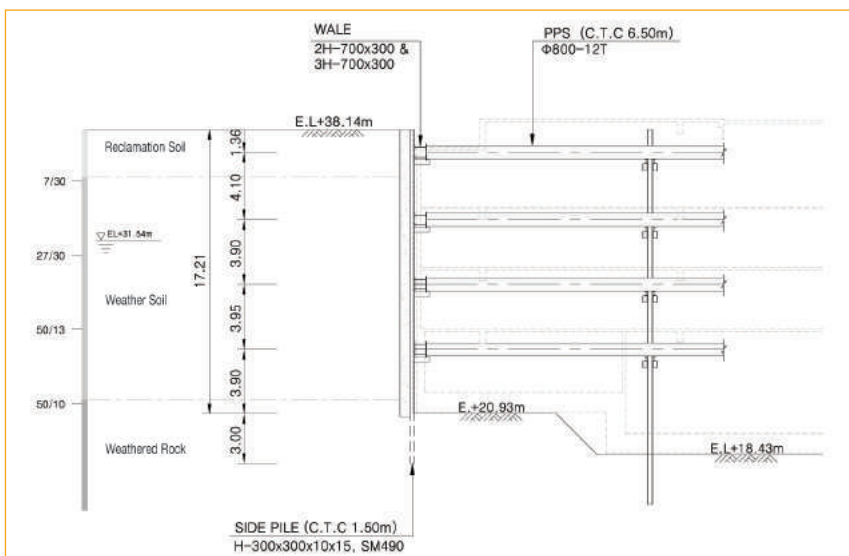
Summary of Construction Site

- Name of Construction Site: Wirye New City IS central tower new construction work
- Original Contractor: IS DONGSEO
- Applied Construction Method: H-PILE + PPS 3~4 layers
- Construction Period: 2015.02 ~ 2015.06 (Completion of Earth Work)
- Maximum Extension of PPS and Total Executed Quantity: 62.5m (1,740m Construction)

▶ View of Construction Site

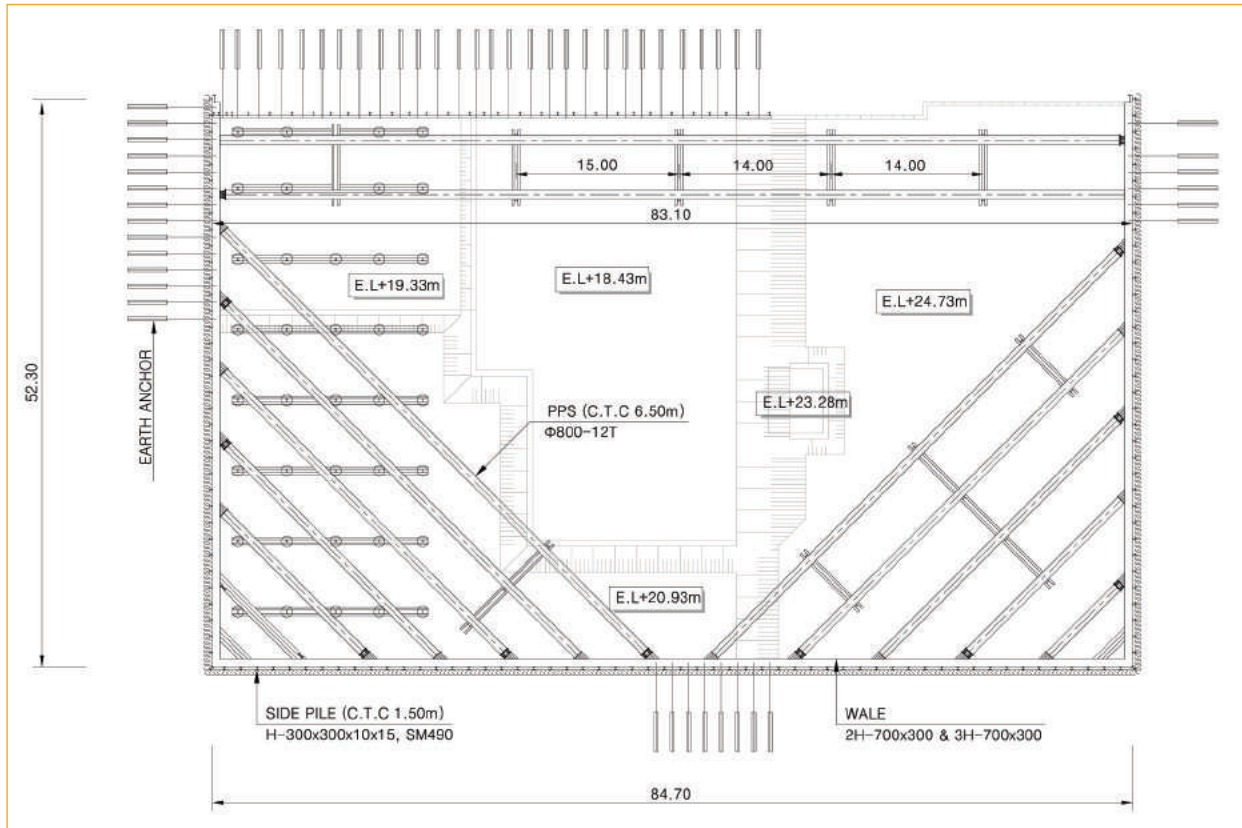


Sectional View



- **Soil Property**
 - Reclamation Layer 2.5~3.5m
 - Weathered Soil(Silt and Sand) 12.6~26.6m
- **Size of Construction Site**
 - 84.7m(W) X 52.3m(L)
 - Earthwork Depth 14.0~18.5m
- **Quantity per Contracted Process**
 - PPS(D=0.8m): 1,740m(3~4 layers)

Plan



13. North Port Bridge private capital project (MP2, MP3)

Summary of Construction Site

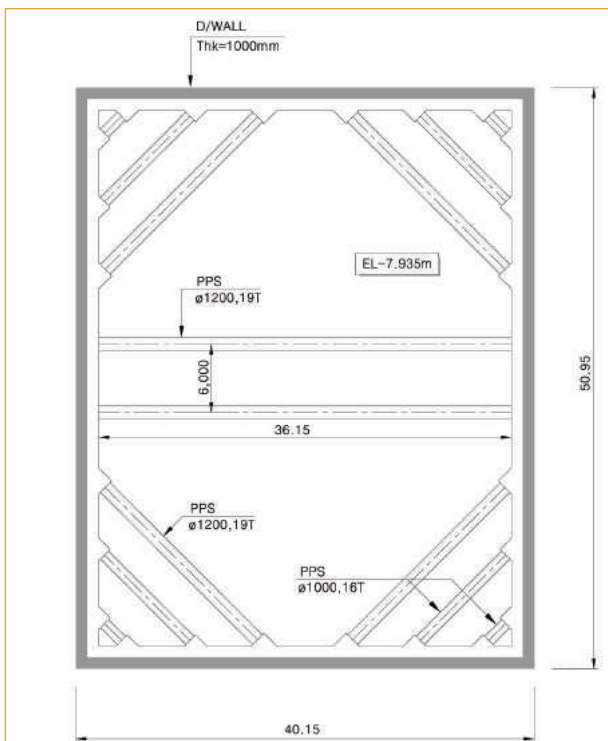
- Name of Construction Site: North Port Bridge private capital project (MP2, MP3)
- Original Contractor: Hyundai Development Company
- Applied Construction Method: D/ Wall + PPS 1~2 layers
- Order Organization: North Port I-Bridge
- Construction Period: 2007.07 ~ 2009.08
- Maximum Extension of PPS and Total Executed Quantity: 40.0m (760m Construction)

► MP2 Main Pier foundation

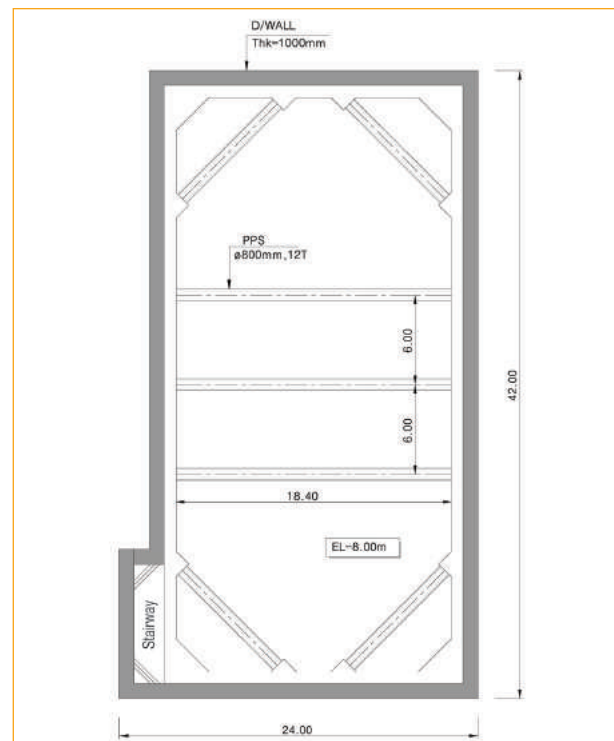


- **Soil Property**
 - Sedimentary Soil(Sand and Gravel): 9.0~17.3m
 - Weathered Soil 9.0~10.0m
 - Weathered Rock 0.0~5.8m
- **Size of Construction Site**
 - MP2: 50.95m(W) X 40.15m(L)
- **Quantity per Contracted Process**
 - MP2: D/ Wall(T=1.0m): 4,380m²
 - CB/ Wall(T=1.0m): 1,690m²
 - R.C.D(D=2.5m): 2,045m
 - PPS(D=1.2m): 250m(1 layer)

MP2 Main Pier foundation plan



MP3 Main Pier foundation plan



▶ MP3 Main Pier foundation



● Soil Property

- Soil Layer 6.8~9.5m
- Weathered Rock 0.3~2.0m

● Size of Construction Site

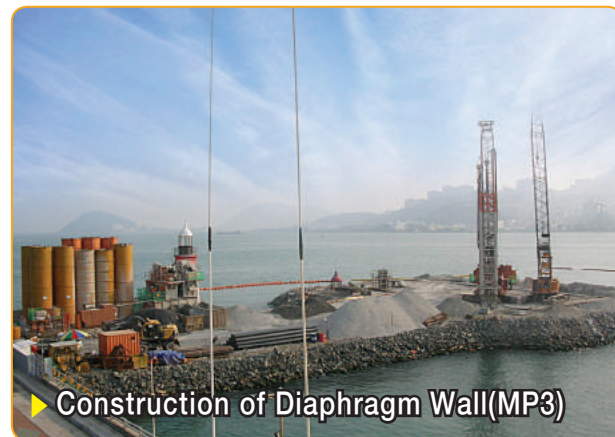
- MP3: 22m(W) X 32m(L)
Earthwork Depth 11.9m

● Quantity per Contracted Process

- MP3: D/ Wall(T=1.0m): 1,760m²
PPS(D=1.2m): 182m (2 layers)
G.C.P



▶ Construction of R.C.D(MP2)



▶ Construction of Diaphragm Wall(MP3)



▶ The whole view of north port bridge MP construction

▼ Yeongdo-gu

MP3 Main Pier foundation ▶

◀ MP2 Main Pier foundation

Nam-gu ▼

14. Algeria Oman fertilizer plant project - INTAKE

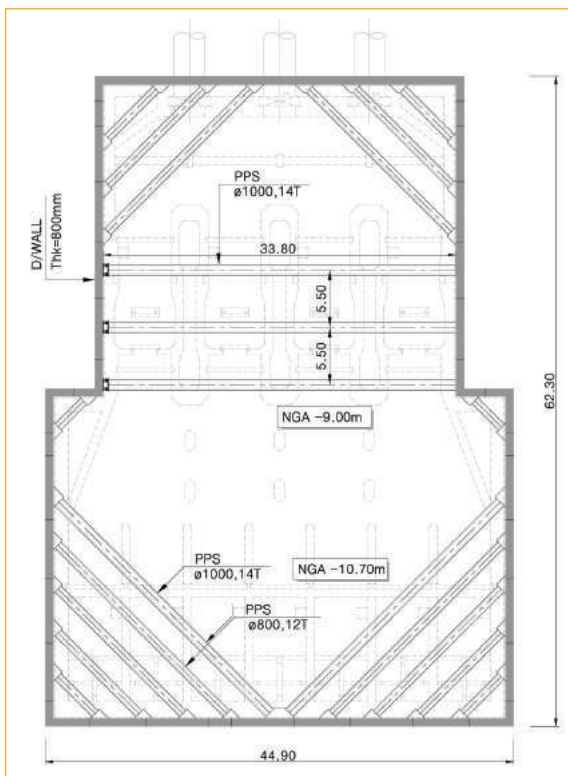
Summary of Construction Site

- Name of Construction Site: Algeria Oman fertilizer plant project - INTAKE
- Original Contractor: Daewoo E&C
- Applied Construction Method: D/ Wall + PPS 1 layer
- Construction Period: 2009.11 ~ 2011.10
- Maximum Extension of PPS and Total Executed Quantity: 45.0m (319m Construction)

► View of Construction Site

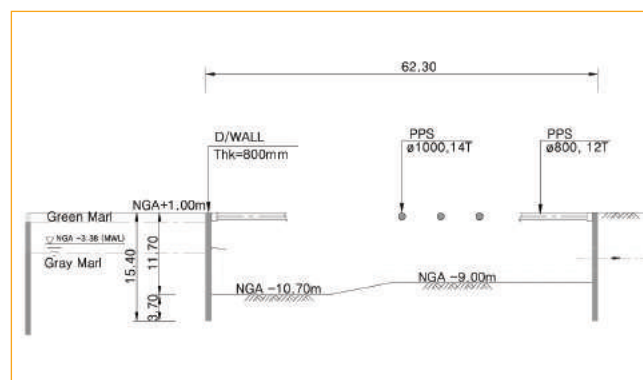


Plan

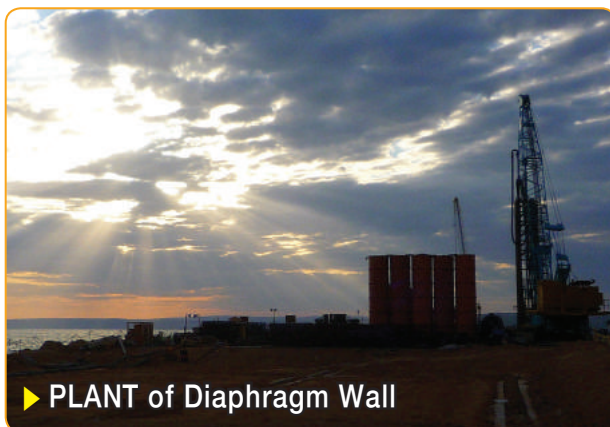
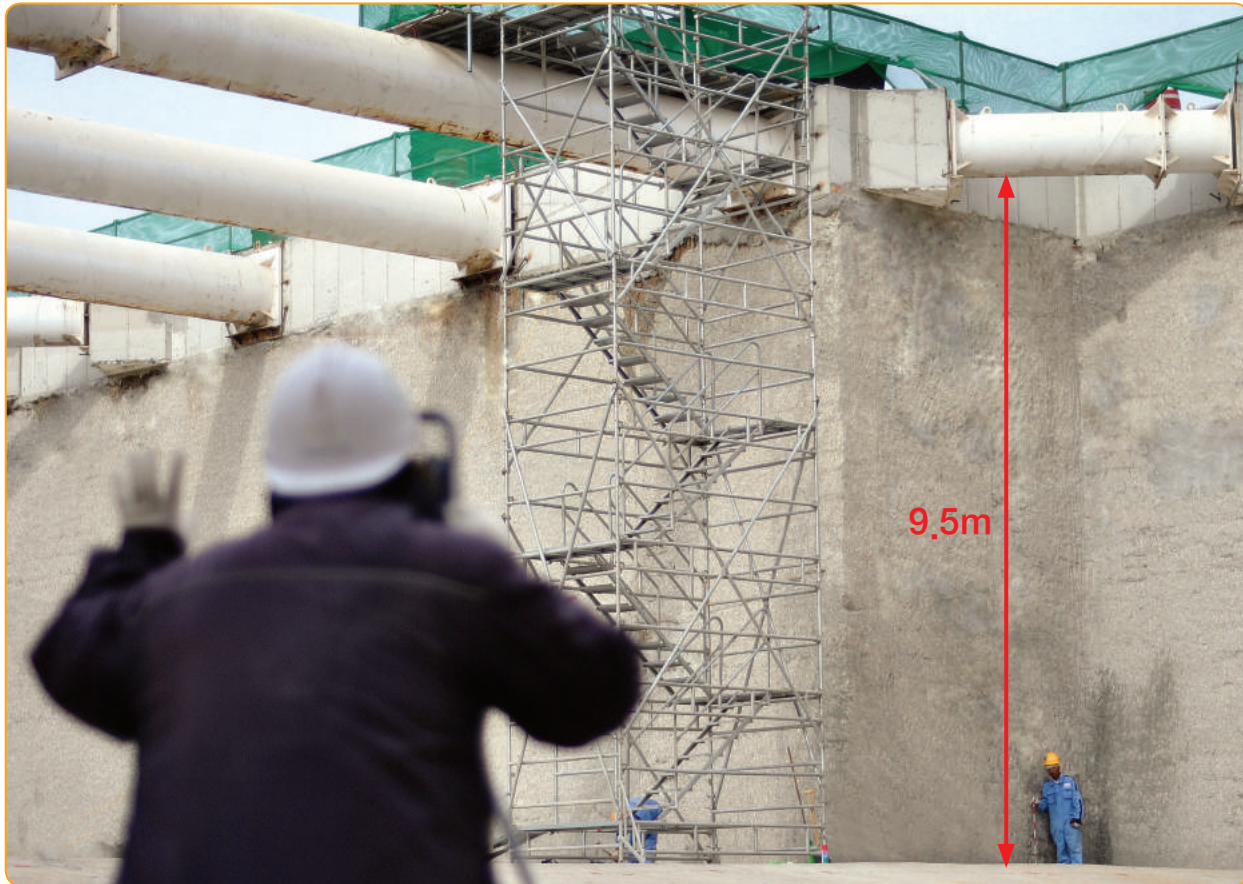


- **Soil Property**
 - Intake: Reclamation Layer
- **Size of Construction Site**
 - Intake: 45.0m(W) X 62.0m(L)
 - Earthwork Depth 10.0m
- **Quantity per Contracted Process**
 - Intake:
 - D/ Wall(T=0.8m): 3,157m²
 - PPS(D=0.8m): 218m
 - PPS(D=1.0m): 101m

Sectional View



► Completion of Earth Work



► PLANT of Diaphragm Wall



► Installation of PPS and Connection



► CON'C WALE



► Sea Water Inflowing Gate

15. Algeria Oman fertilizer plant project - OUTFALL

Summary of Construction Site

- Name of Construction Site: Algeria Oman fertilizer plant project - OUTFALL
- Original Contractor: Daewoo E&C
- Applied Construction Method: D/ Wall + PPS 1 layer
- Construction Period: 2009.11 ~ 2011.10
- Maximum Extension of PPS and Total Executed Quantity: 16.0m (108m Construction)

► View of Construction Site



● Soil Property

- Outfall: Reclamation Layer

● Size of Construction Site

- Outfall: 30.0m(W) X 71.0m(L)
Earthwork Depth 11.9m

● Quantity per Contracted Process

- Outfall: D/ Wall(T=0.8m): 2,276m²
PPS(D=0.8m): 53m
PPS(D=1.0m): 55m

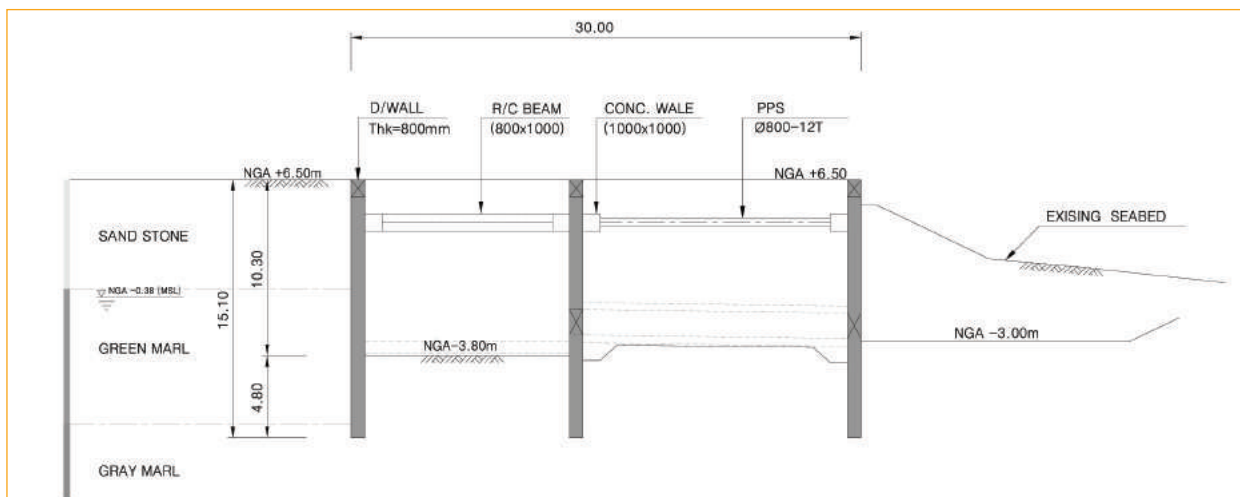


► OUTFALL Structure

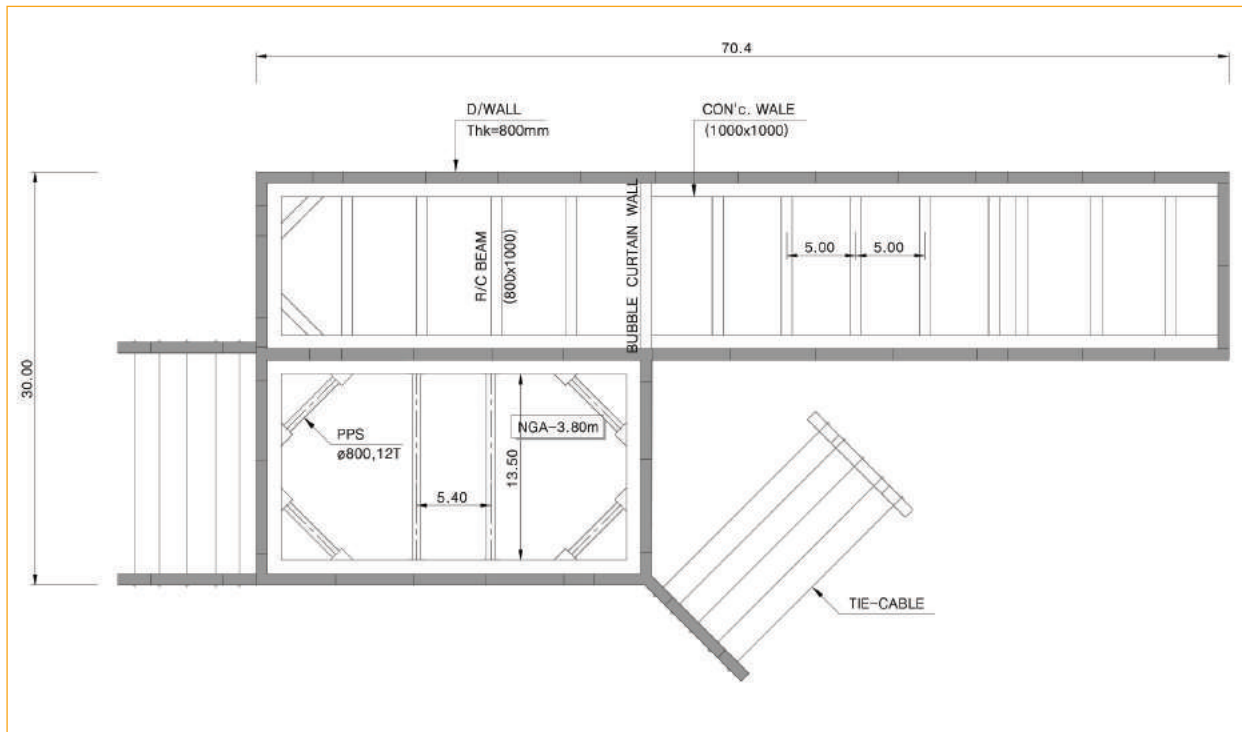


► OUTFALL Structure

Sectional View



Plan



16. Pyeongtaek integrated combined cycle second level Sea water Lifting Pump (S.L.P)

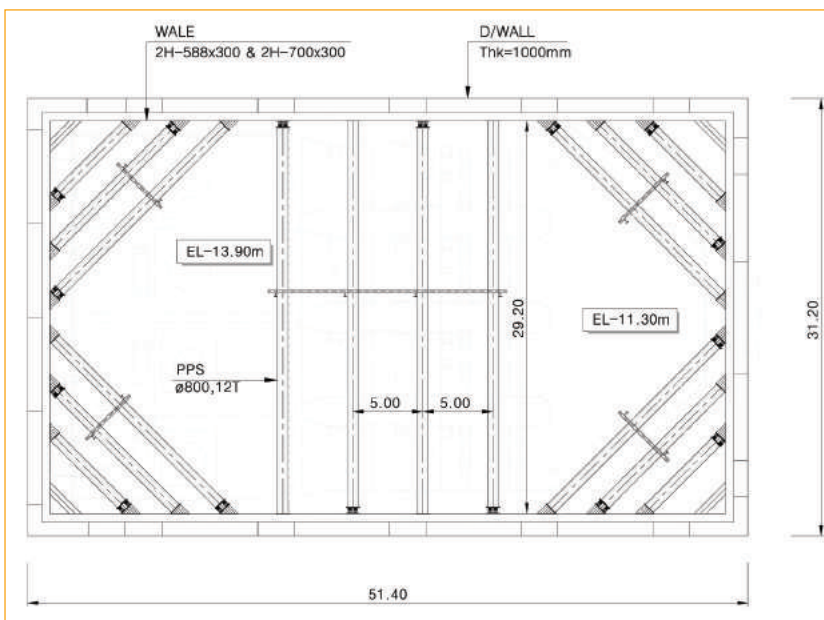
Summary of Construction Site

- Name of Construction Site: Pyeongtaek integrated combined cycle second level Sea water Lifting Pump (S.L.P)
- Original Contractor: Daewoo Consortium
- Applied Construction Method: D/ Wall + PPS 3~4 layers(C/BWALL)
- Order Organization: Korea Western Power
- Construction Period: 2012.12 ~ 2013.12
- Maximum Extension of PPS and Total Executed Quantity: 30.0m (840m Construction)

► View of Construction Site



Plan



- **Soil Property**
 - Reclamation and Soil 9.0~18.0m
 - Weathered Rock 1.0~7.0m
- **Size of Construction Site**
 - 31.0m(W) X 51.0m(L)
 - Earthwork Depth 15.5~20.9m
- **Quantity per Contracted Process**
 - D/ Wall(T=0.8m): 3,597m²
Maximum depth: 22m
 - CB/ Wall(T=2.0m): 711m
 - PPS(D=0.8m): 840m(3~4 layers)
 - Earth-volume: 32,700m³