Contract No. DC/2012/03
Happy Valley Underground Stormwater Storage Scheme

NEC Implementation in the Happy Valley Underground Stormwater Storage Scheme

Ellen Cheng, SE/DP1
C L Leung, E/D1
Kevin Cheung, E/D3
Tommy Tong, E/D20

Drainage Projects Division
Drainage Services Department
30 June 2017

Content

- Background, Team Building and Mindset
- Contract overview, Subcontract, Compensation Events and Stock Management
- Programme, Risk, Early Warning and Defect
- Pain and Gain
- Q&A

THE PROBLEM

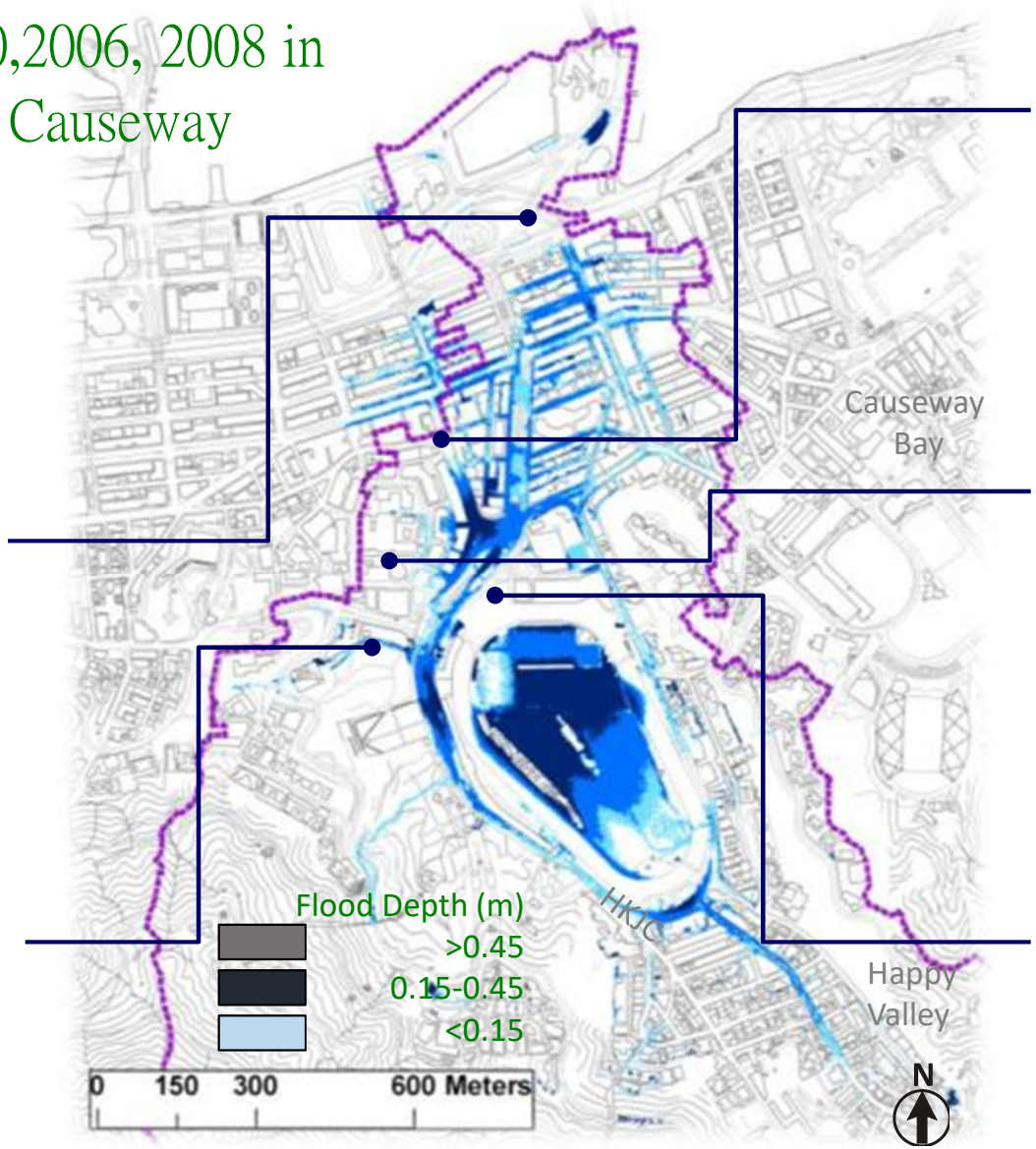
Over 26 ha of land was **flooded** in 2000,2006, 2008 in Happy Valley and Causeway Bay

Percival Street

Queen's Road East

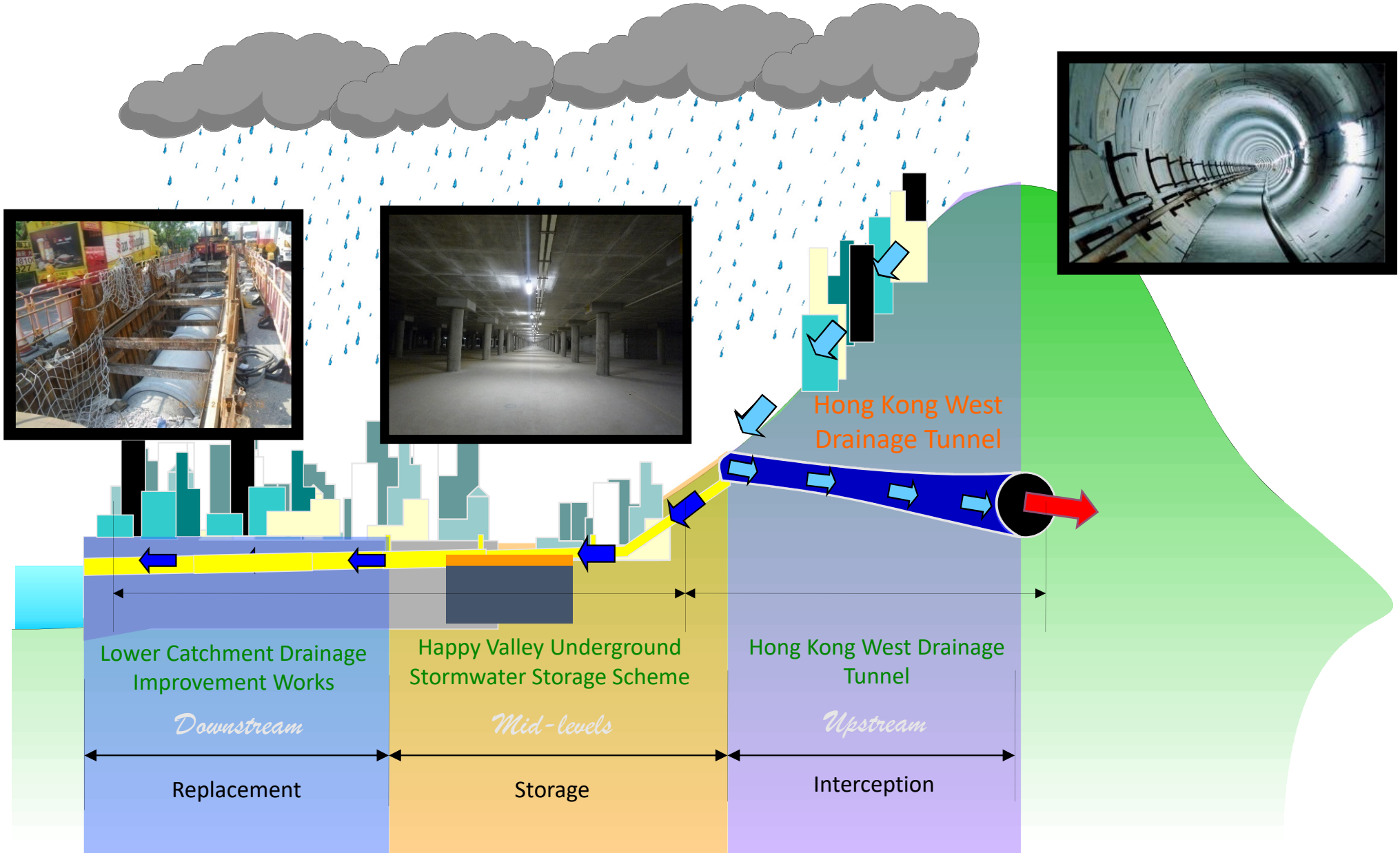
Lap Tak Lane

Wong Nai Chung Rd

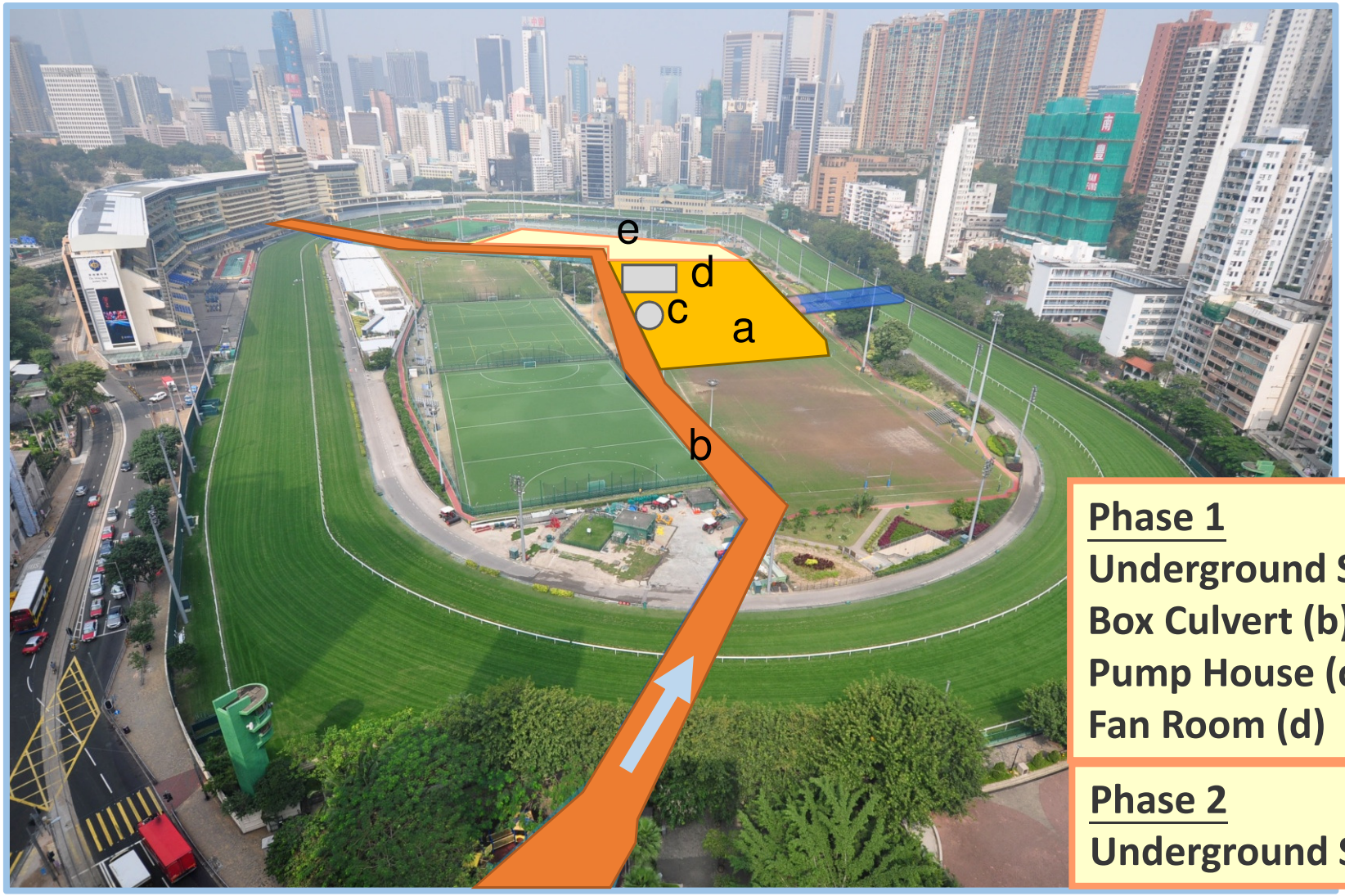


Happy Valley Recreation Ground and Race Course

Three-Prong Solutions for Long Term Flood Protection



THE PROJECT



Phase 1

Underground Storage Tank (a)
Box Culvert (b)
Pump House (c)
Fan Room (d)

Phase 2

Underground Storage Tank (e)

THE CONTRACT

Contract No.	DC/2012/03
Contract Name	Happy Valley Underground Stormwater Storage Scheme
Employer	**Drainage Services Department**
PM/Supervisor	**Chief Engineer/DPD, DSD**
Scope of Works	Construction of storage tank, box culvert, pump house
Original Target Cost	HK$ 678M
Duration	Sep 2012 – April 2018 (64 months)
NEC3 Option	**Option C – Target contract with activity schedule**
Contractor	**Chun Wo Construction & Engineering Co. Ltd.**
QS Consultant	**Mott MacDonald Hong Kong Limited**
NEC Advisor	**Arcadis / JCP**

THE PROJECT - HAPPY VALLEY

Heaven or Hell ??

HVRG

Race course

Innovation

Phase 1 Completion

New Contract Form

Target Cost/ Pain Gain

ICAC

Presentation/ Visit

THE NEC - SYSTEM

Trust

Collaboration

Common Goal

Fast Response

Clarity and Simplicity

Flexibility

Risk Management

Dispute Resolution

Stimulus to good management

…..

THE PEOPLE

PM

PM's Delegates

S

Supervisor's Delegates

RSS

QS Consultants

Main Contractor

Subcontractors

Suppliers

Stakeholders

....

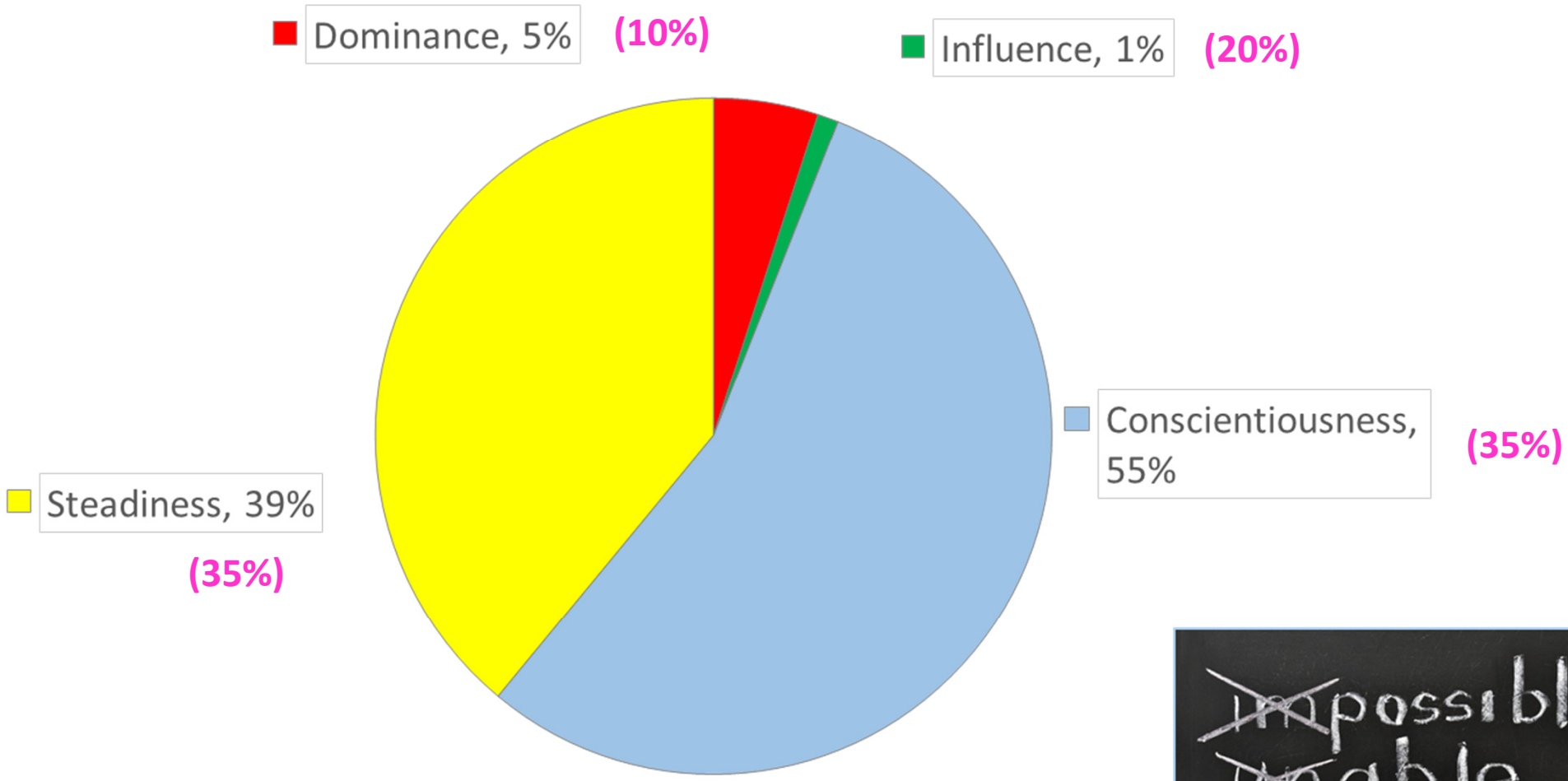
MUTUAL OBJECTIVES

	MUTUAL OBJECTIVES	TARGET
1	Time	Commissioning of storage system before 2018 wet season
2	Cost	Gain share 6% of tender price
3	Quality	98% compliance in first tests 100% compliance in final tests
4	Safety	No reportable accident Pioneer project - Considerate Contractors Award
5	Environment	No offence 10% of water, formwork, excavated material for reuse / recycle
6	Public Relations	Zero disruption to horse racing Recognitions from stakeholders/ district council
	VALUES and BEHAVIOURS	
7	Trust	Commitment; Punctual/ Quick response; Openness/ Communicate; Honour; Be considerate; Understanding and fair
8	Cooperation	Good planning; Joint ownership / responsibility; Sharing of information; Caring for each other; Empathy; Passion

DICS - Character and Mind-set

	Task Focus	People Focus
Quick Response	**Dominance** 掌控 	**Influence** 影響 
Slow Response	**Conscientiousness** 謹慎 	**Steadiness** 穩定 

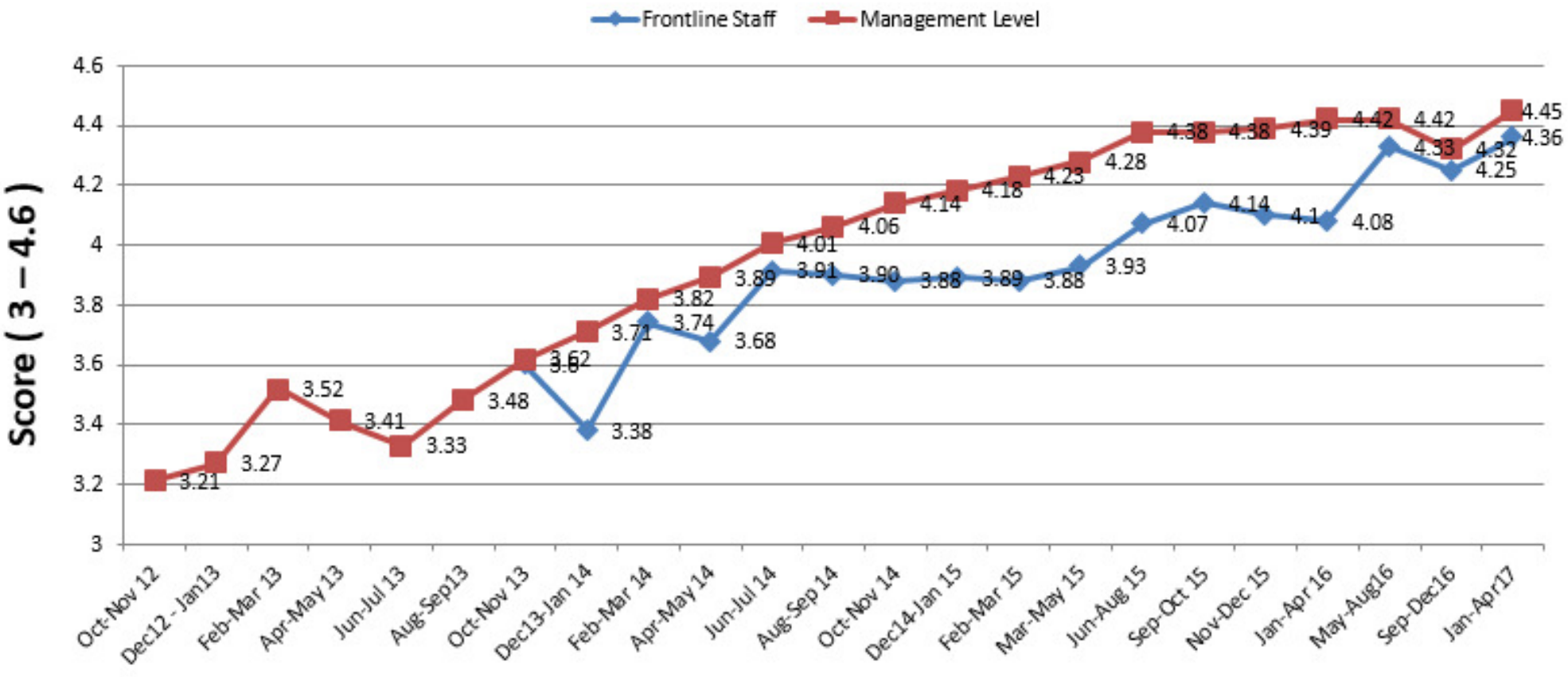
HVUSSS


Dominance, 5%
(10%)
Influence, 1%
(20%)
Conscientiousness, 55%
(35%)
Steadiness, 39%
(35%)

Impossible
Unable

“KNOWING ME KNOWING YOU” WORKSHOP

PARTNERING SCORE

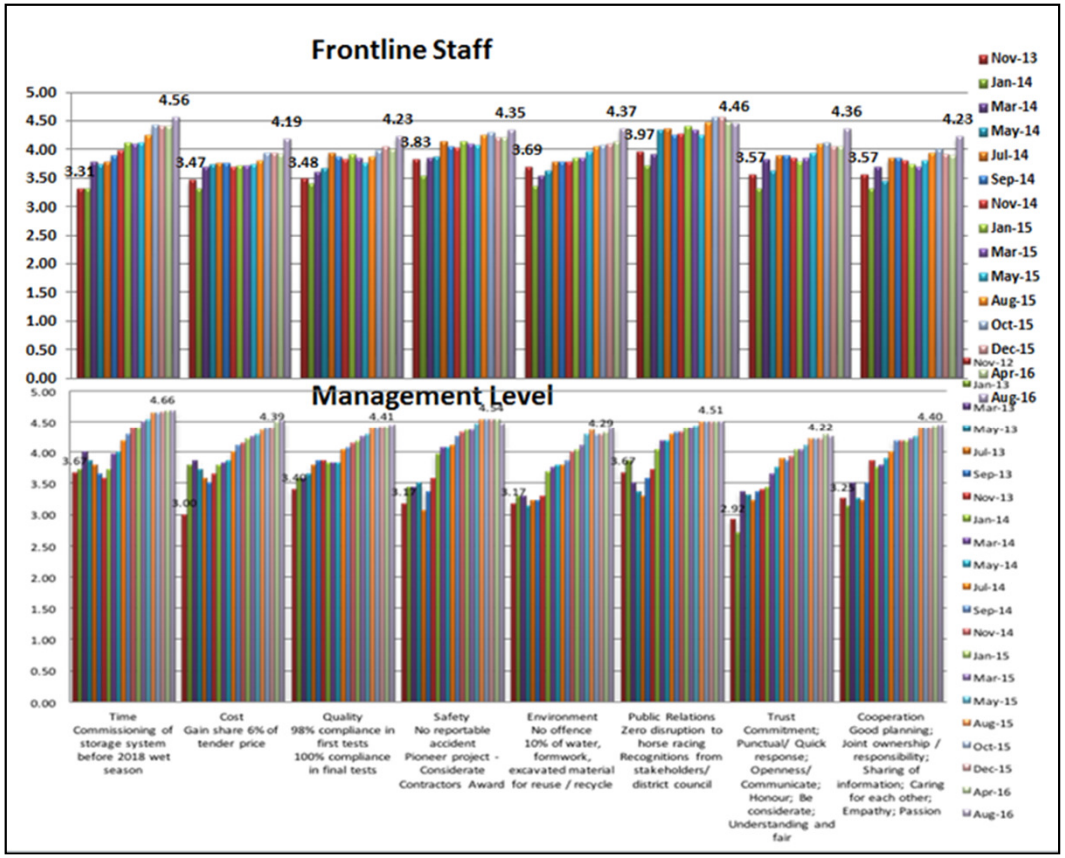


	Oct-Nov 12	Dec12 - Jan13	Feb-Mar 13	Apr-May 13	Jun-Jul 13	Aug-Sep13	Oct-Nov 13	Dec13-Jan 14	Feb-Mar 14	Apr-May 14	Jun-Jul 14	Aug-Sep 14	Oct-Nov 14	Dec14-Jan 15	Feb-Mar 15	Mar-May 15	Jun-Aug 15	Sep-Oct 15	Nov-Dec 15	Jan-Apr 16	May-Aug16	Sep-Dec16	Jan-Apr 17
Frontline Staff							3.6	3.38	3.74	3.68	3.91	3.90	3.88	3.89	3.88	3.93	4.07	4.14	4.1	4.08	4.33	4.25	4.36
Management Level	3.21	3.27	3.52	3.41	3.33	3.48	3.62	3.71	3.82	3.89	4.01	4.06	4.14	4.18	4.23	4.28	4.38	4.38	4.39	4.42	4.42	4.32	4.45

DSD		
Kan Hon Shing	Ellen Cheng	C L Leung

Chun Wo		
Ken Ko	William Leung	Allen Man

Mott MacDonald
Hayman Choi



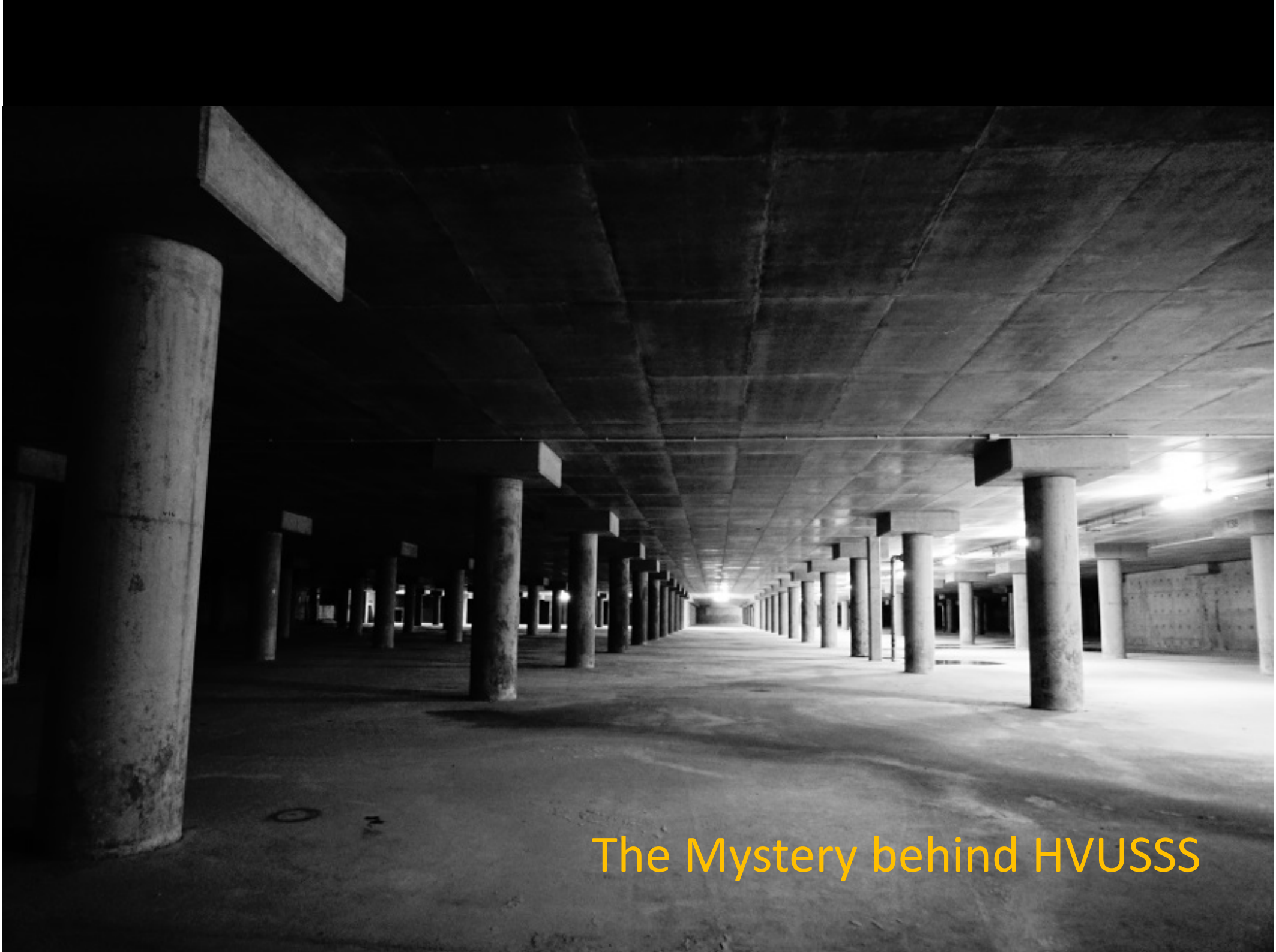
CONCLUSION

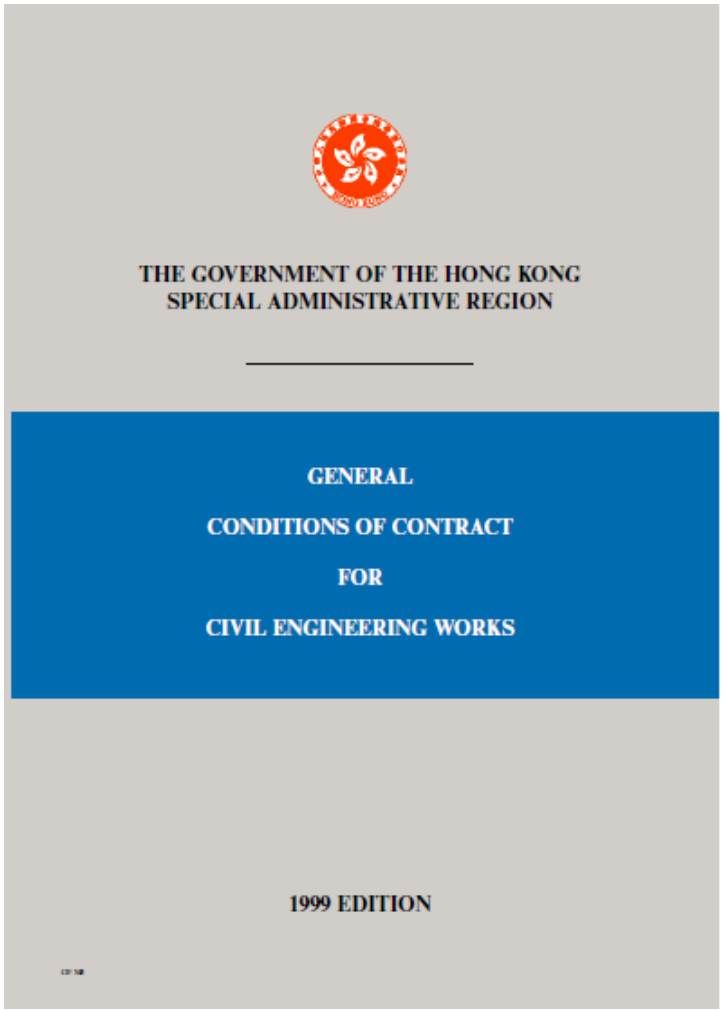
Common Goals

System

People

Good Project Delivery


The Mystery behind HVUSSS


THE GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION
GENERAL
CONDITIONS OF CONTRACT
FOR
CIVIL ENGINEERING WORKS
1999 EDITION


nec3
nec3
engineering and construction contract

DSD Research & Development Forum 2013

(28-11-2013)

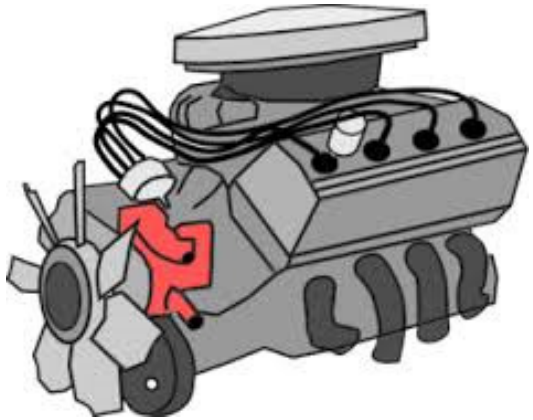
The Drivers to Success in Happy Valley (Cost-related aspects)

1. Incentives to achieve early completion

2. Active Subcontractor Management

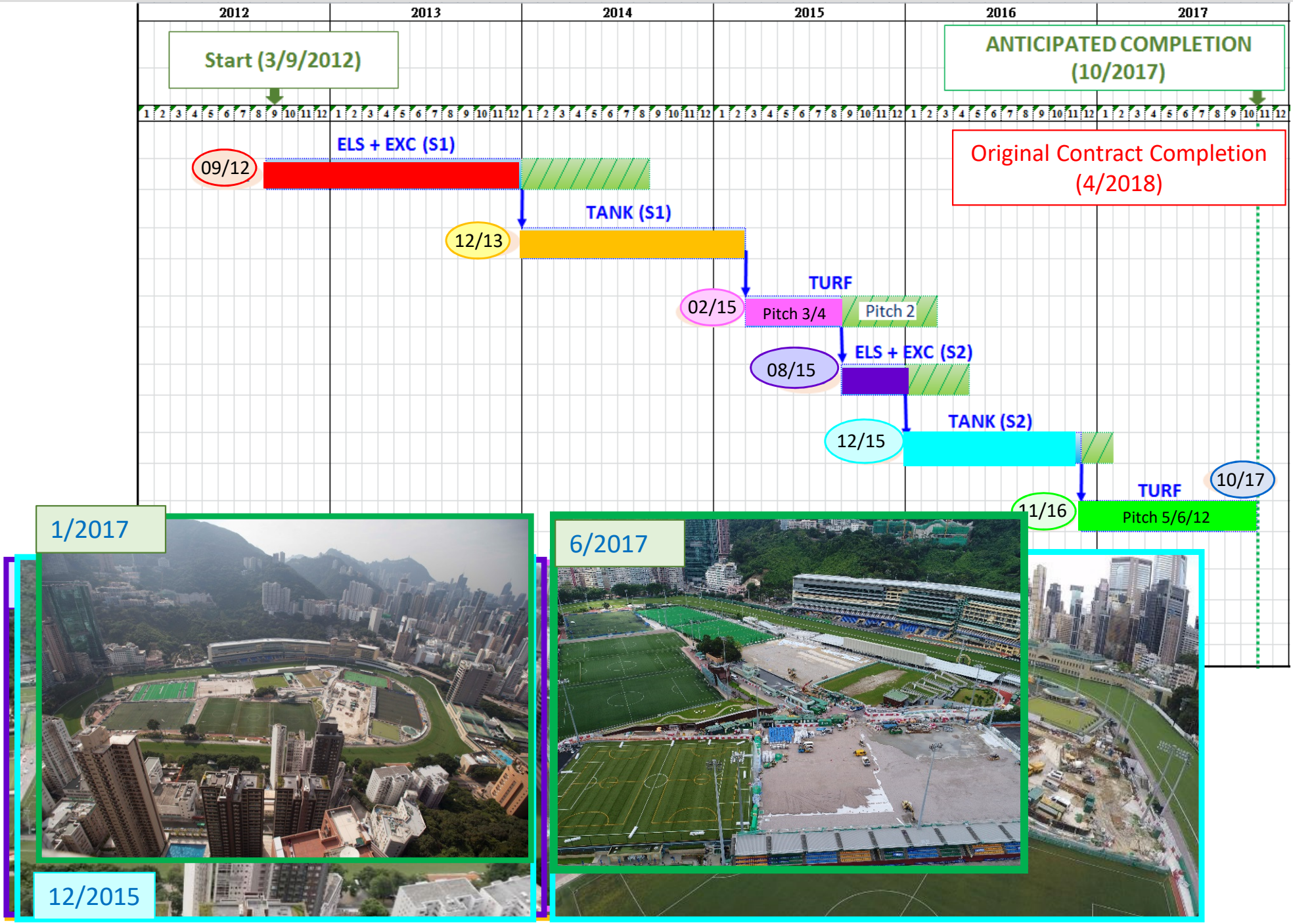
3. Quick CE notification, agreement on CE Quotations and subcontract final account

4. Effective Stock Management to maximize the value of resources



(1) Incentives for early completion

The Current Construction Programme



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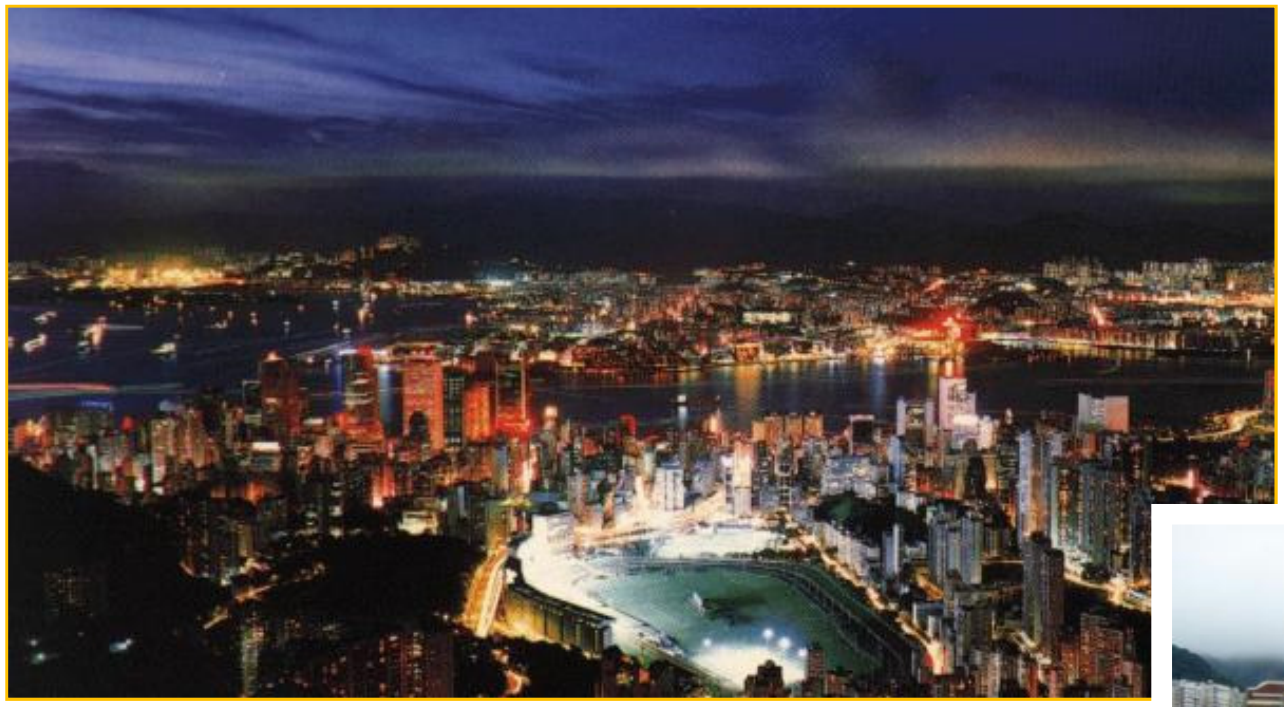

INCLEMENT WEATHER

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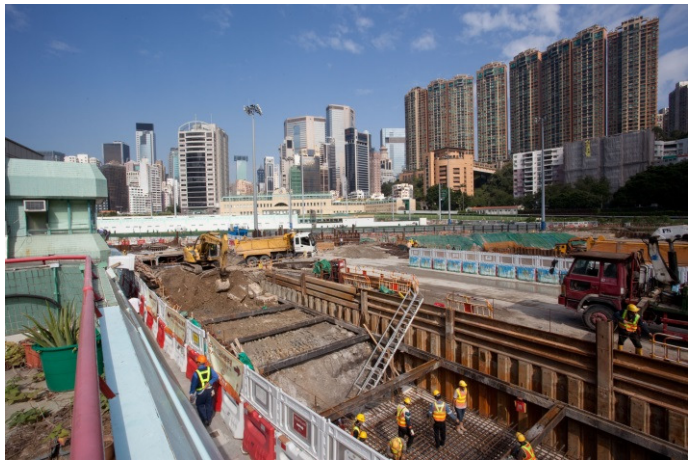
HARD Materials

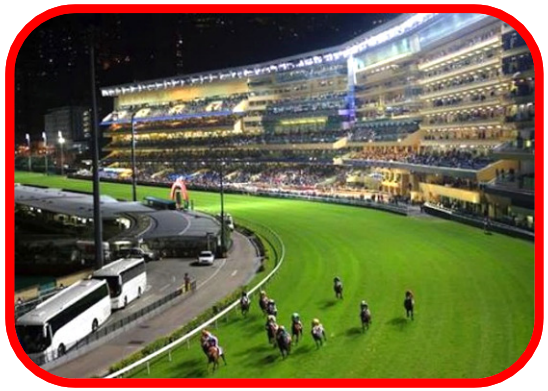


SOFT Materials

HKJC Optical Fiber

人

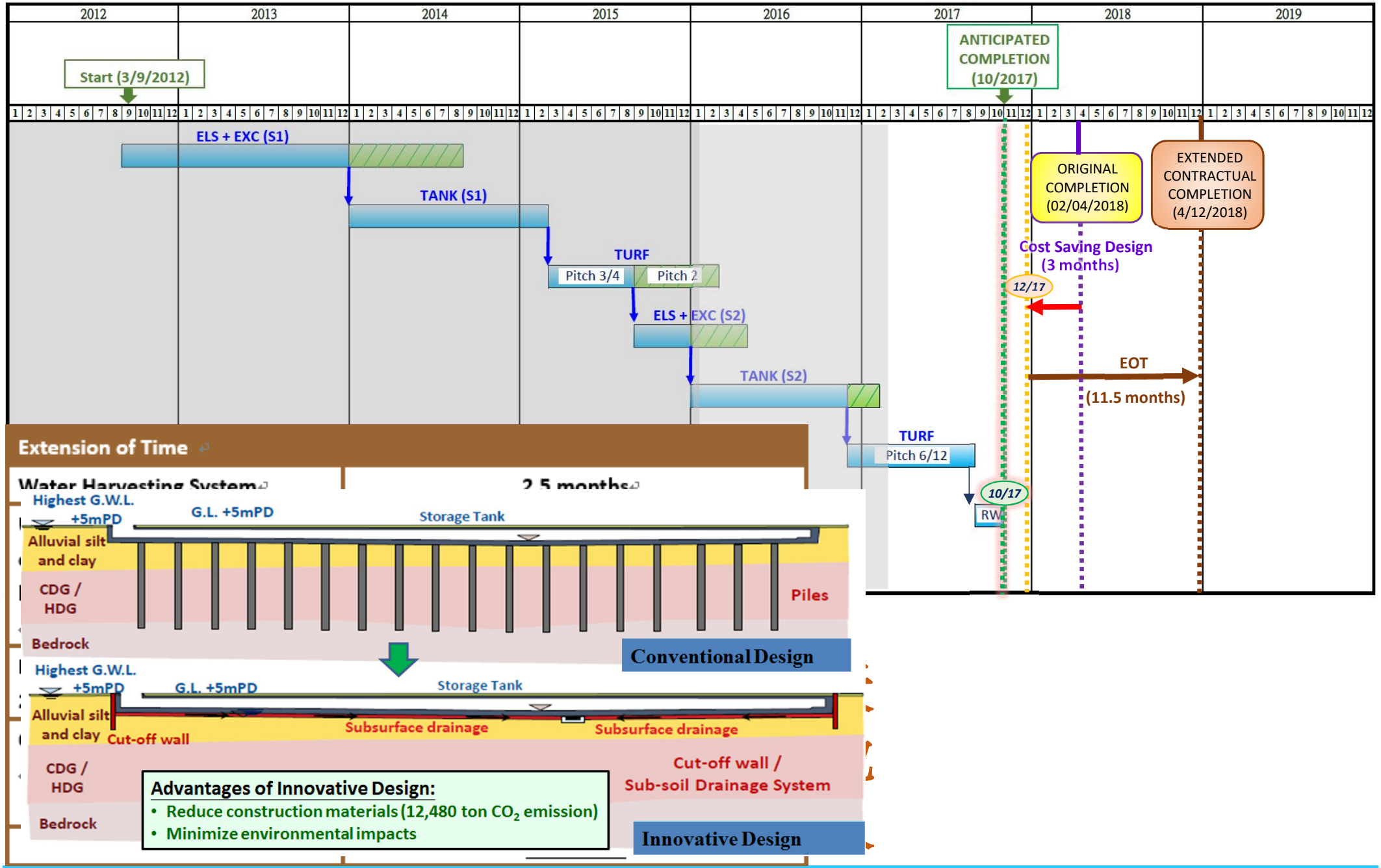
PUBLIC

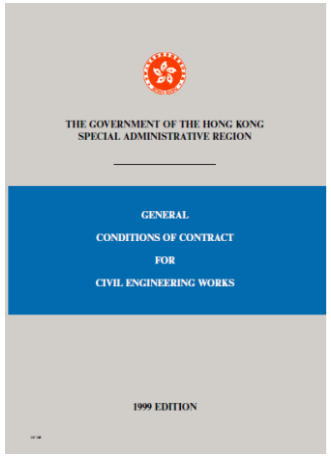


HKJC

Concrete Supply, Working Area…

The Construction Programme





Extended Contract Completion Date

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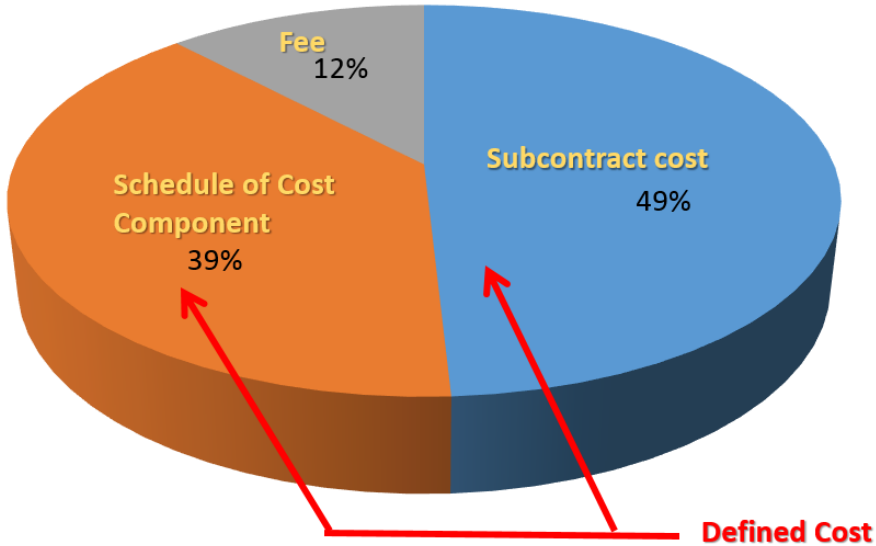
Substantial Completion Date

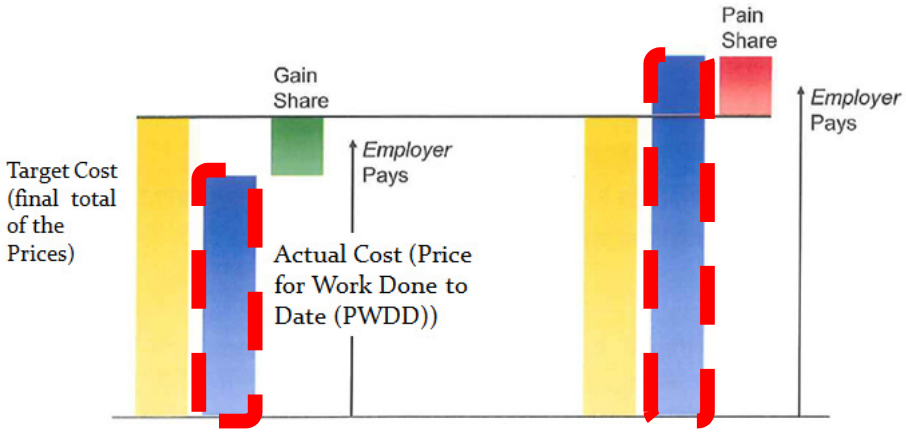
→ No prolongation!

→ No Liquidated damages!

In NEC Target Cost Contract, savings in time = savings in $$$$

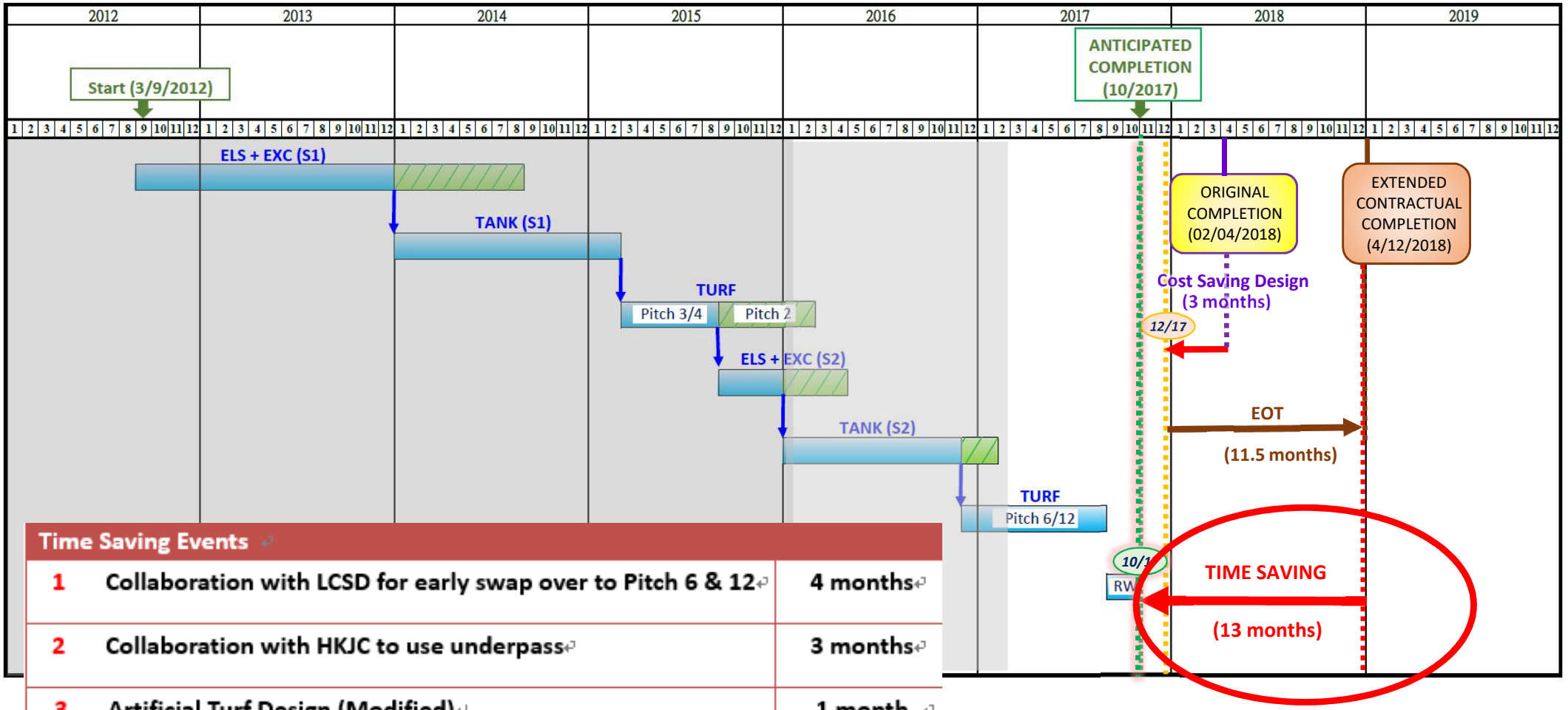
Figure in HVUSSS





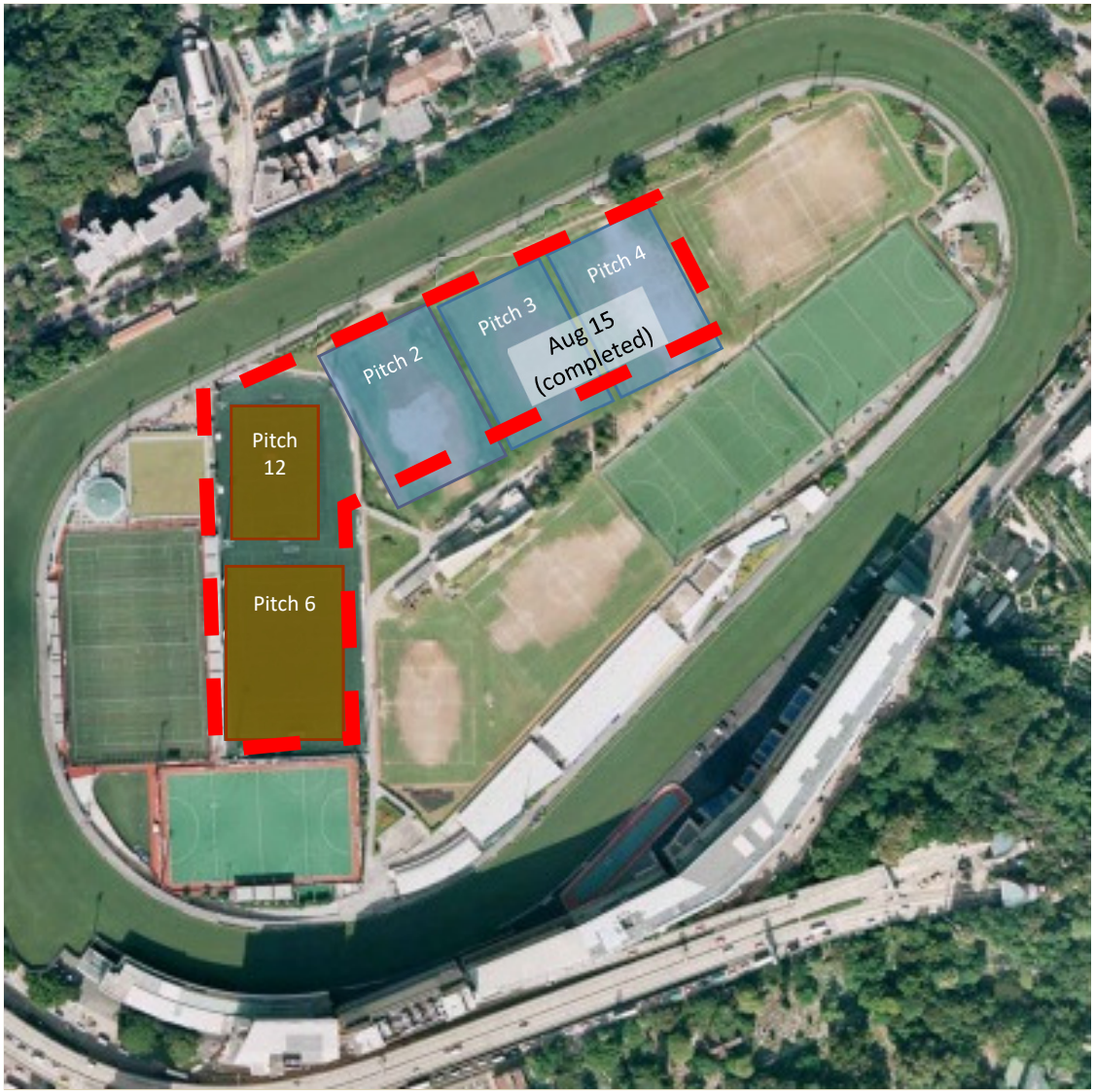
STRONG INCENTIVE !!

The Construction Programme – Time Saving Proposals

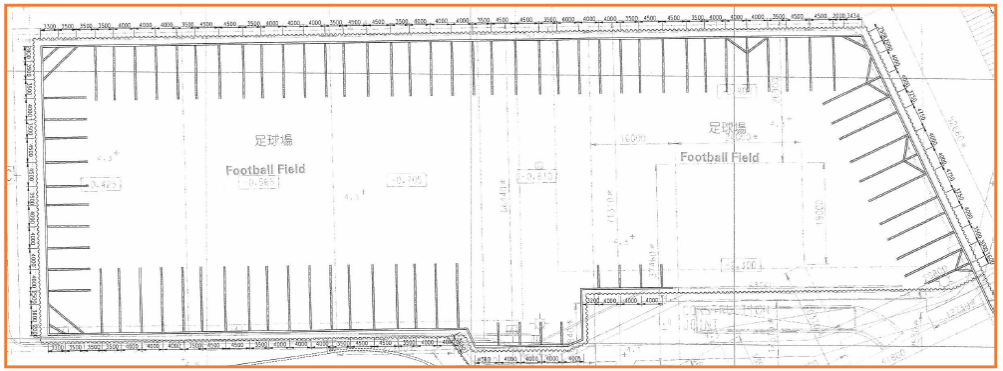


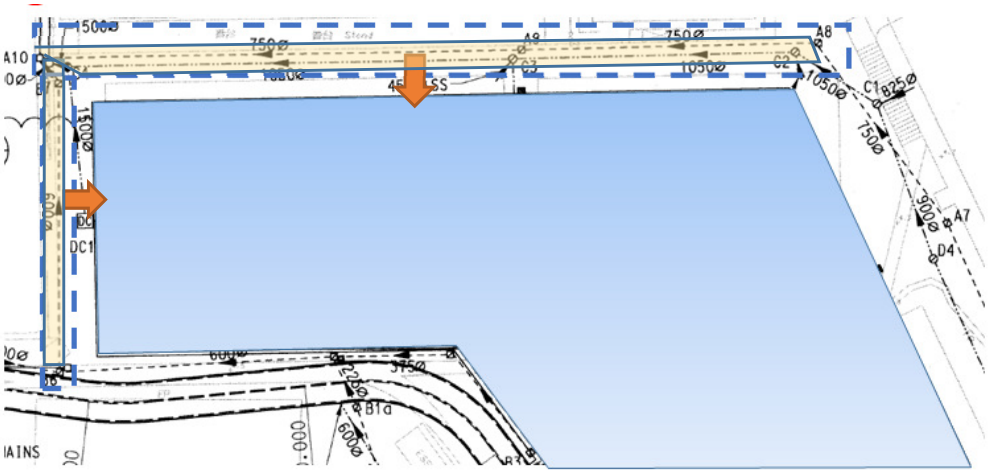
Time Saving Events		
1	Collaboration with LCSD for early swap over to Pitch 6 & 12	4 months
2	Collaboration with HKJC to use underpass	3 months
3	Artificial Turf Design (Modified)	1 month
4	Phase 2 ELS design (Modified)	2 months
5	Others - Quick Decision=> Minimize Idling Time - Entrusted Works=> less interface/more working areas	3 months
	Total:	13 months

① Early Swap over to Pitch 6 & 12

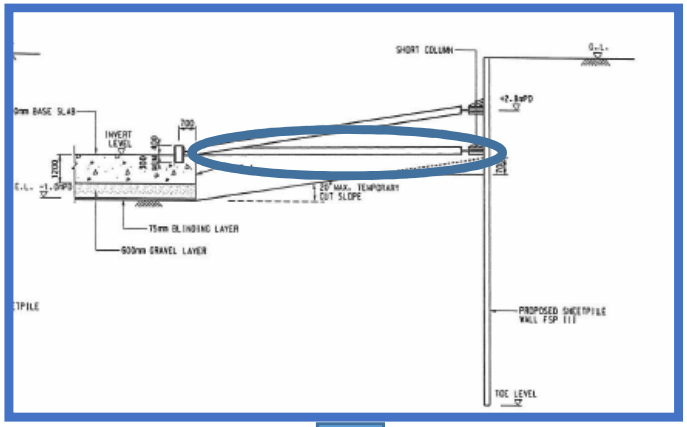


④ Modification of ELS Design for Phase 2 Storage Tank



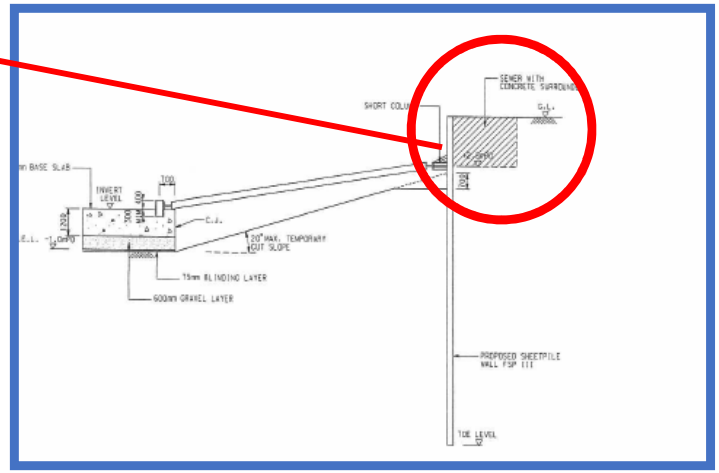


④ Modification of ELS Design for Phase 2 Storage Tank



Drains with concrete surround

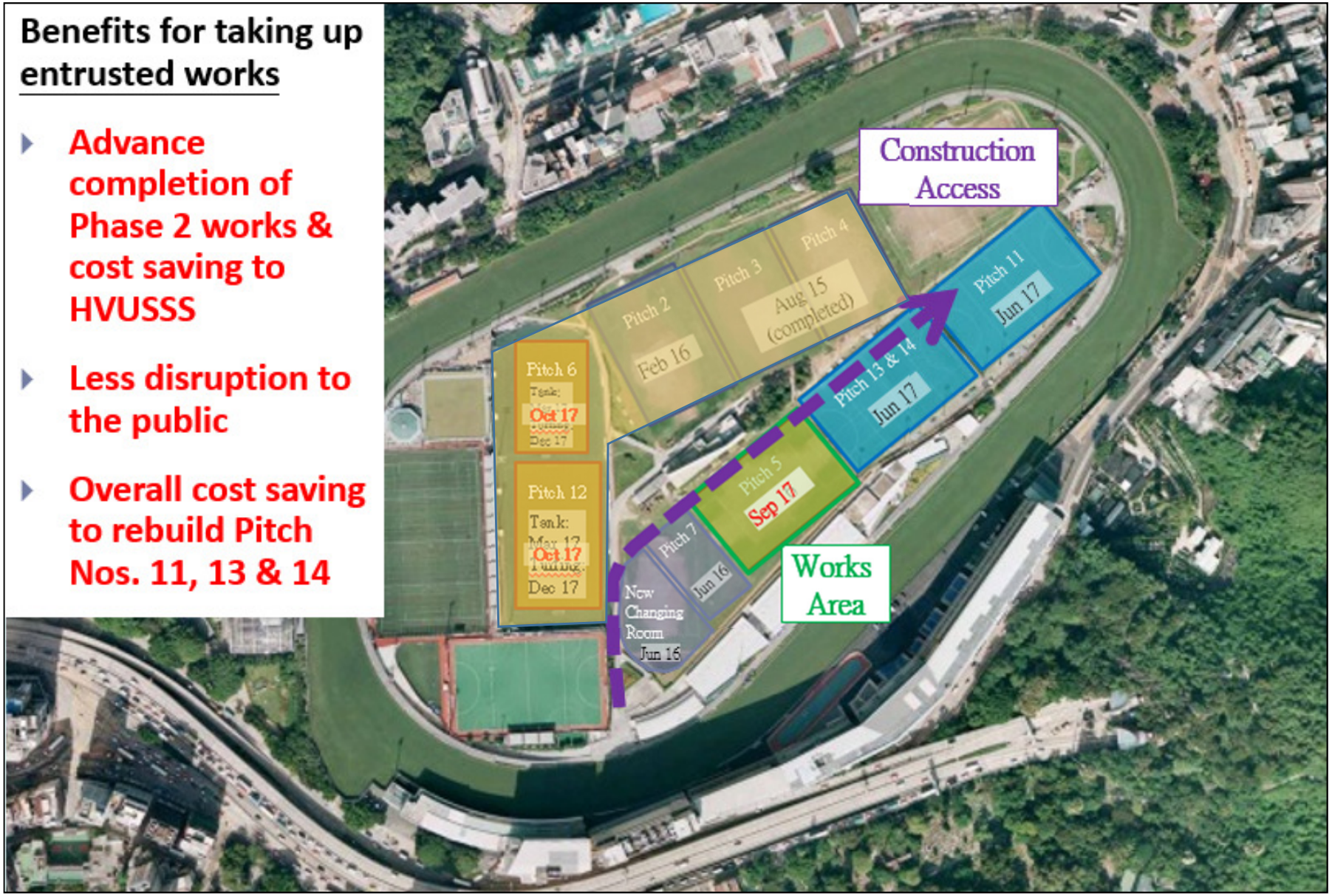
Save one layer of Strut



5 Entrustment Works

Benefits for taking up entrusted works

- **Advance completion of Phase 2 works & cost saving to HVUSSS**
- **Less disruption to the public**
- **Overall cost saving to rebuild Pitch Nos. 11, 13 & 14**

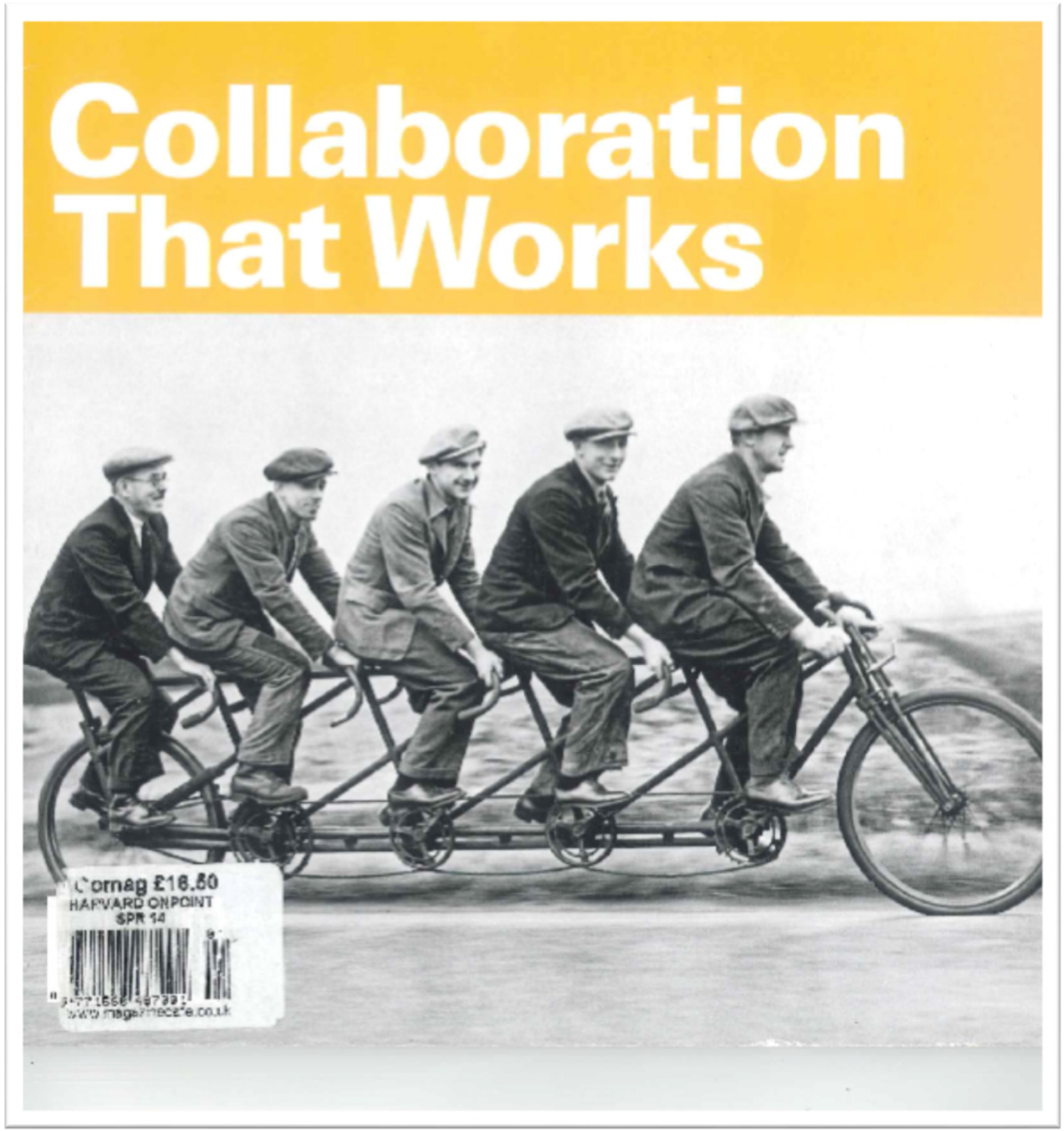


Time Saving

	Employer	Project Manager	Contractor	Sub-contractor
1 Early swap over to Pitch 6 & 12				
2 Make Use of HKJC's underpass				
3 Turf Design (Modified)	 *			
4 Phase 2 ELS design (Modified)				
5 Others				

(2) Subcontract

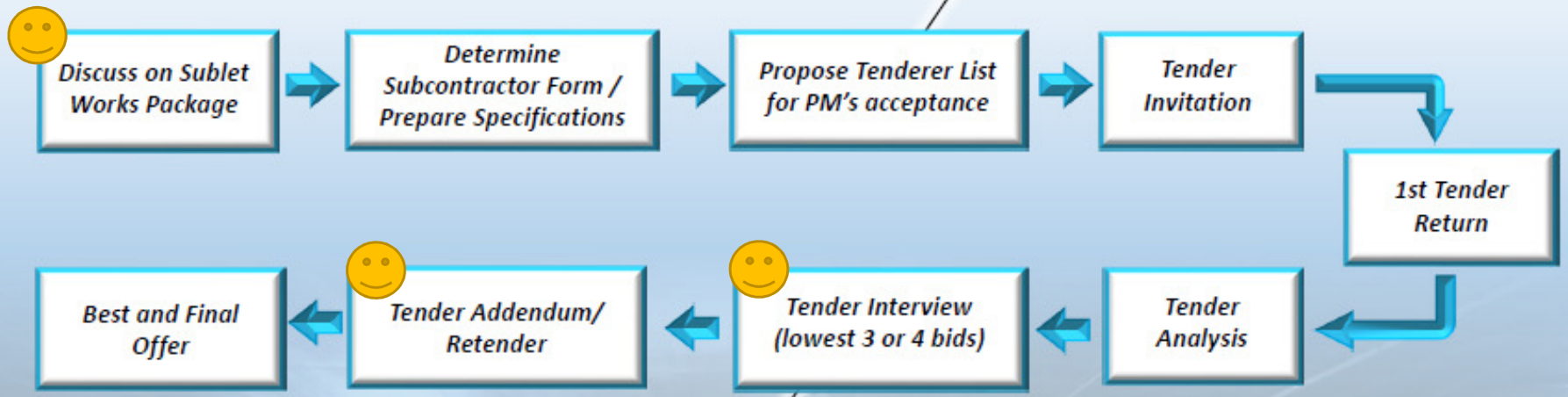
Site Idling


Collaboration
That Works

Active Subcontract Procurement through Additional Clause

Extract from the Additional Clause

"The Contractor before inviting any tenders for any subcontract shall submit to the Project Manager for comments and acceptance his procedure for selecting Subcontractors for the purpose of preventing corruption practices."



Extract from the Additional Clause

"… For the purpose of this sub-clause, tender interviews refer to meetings conducted by the Contractor in the presence of the representative of the Supervisor or the Project Manager to ensure that the potential tenderers are competent and fully understand the requirements of the proposed subcontract…"

Active Subcontractor Management

Tender Interview

- Individual Tender (lowest 3 or 4 bids)
- Contractor (QS and Site Agent)
- PMR
- Independent Cost Consultant

Contractor's In-house Rules

Site Constraints

Construction Method/ Innovations

Programme

Payment

Alternative Design

Discrepancies/ Queries

Risks

Job Reference/ experiences

Tender Interview

BENEFITS

- Assurance of Subcontractor's Quality
- Capturing Subcontractor's Expertise
- Early Clarification of Technical Queries/ Discrepancy
- Unc tion/ lifications
- Cla
- Tra

ıtive Turf Proposal

Save $3M

out of $16M

No. of RFIs

Disputes in

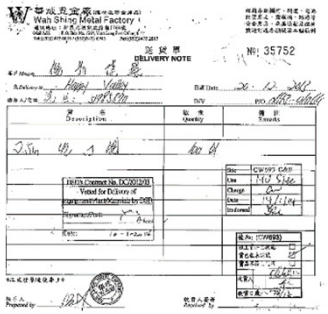
programme,

Advance Progress

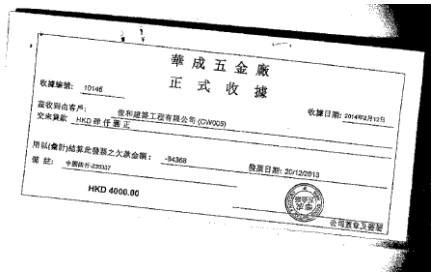
payment

by 1 month

Pay when Paid under Open Book Account



Delivery Notes



Receipt

Gold Award for Model Subcontractor – CCSAS 2015

One Team
One Goal

NEC Awards 2017

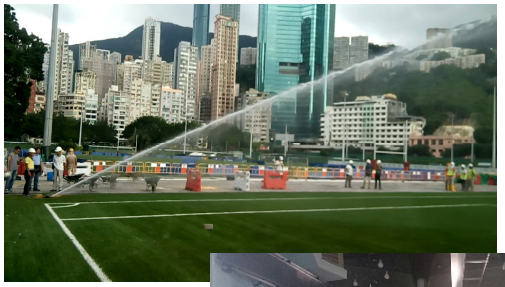
Winner Award

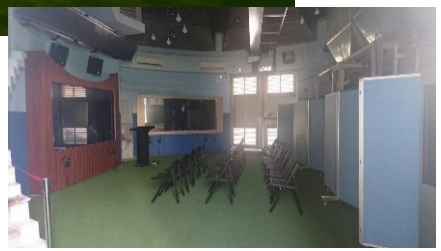
in the category of

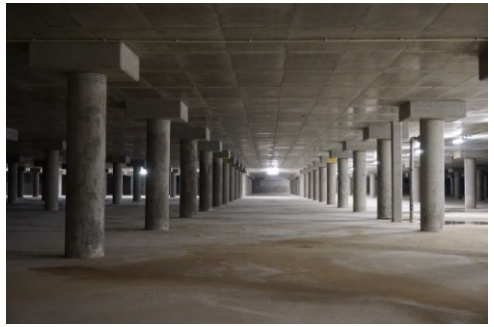
"NEC Contract Innovation through Additional Clause Award"

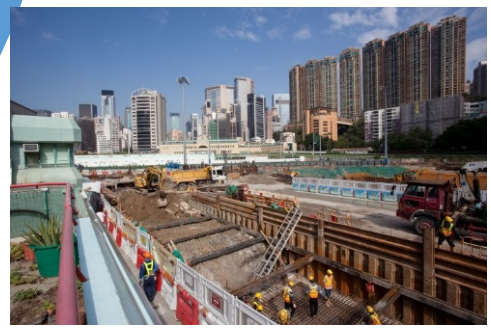
(3) Compensation Events

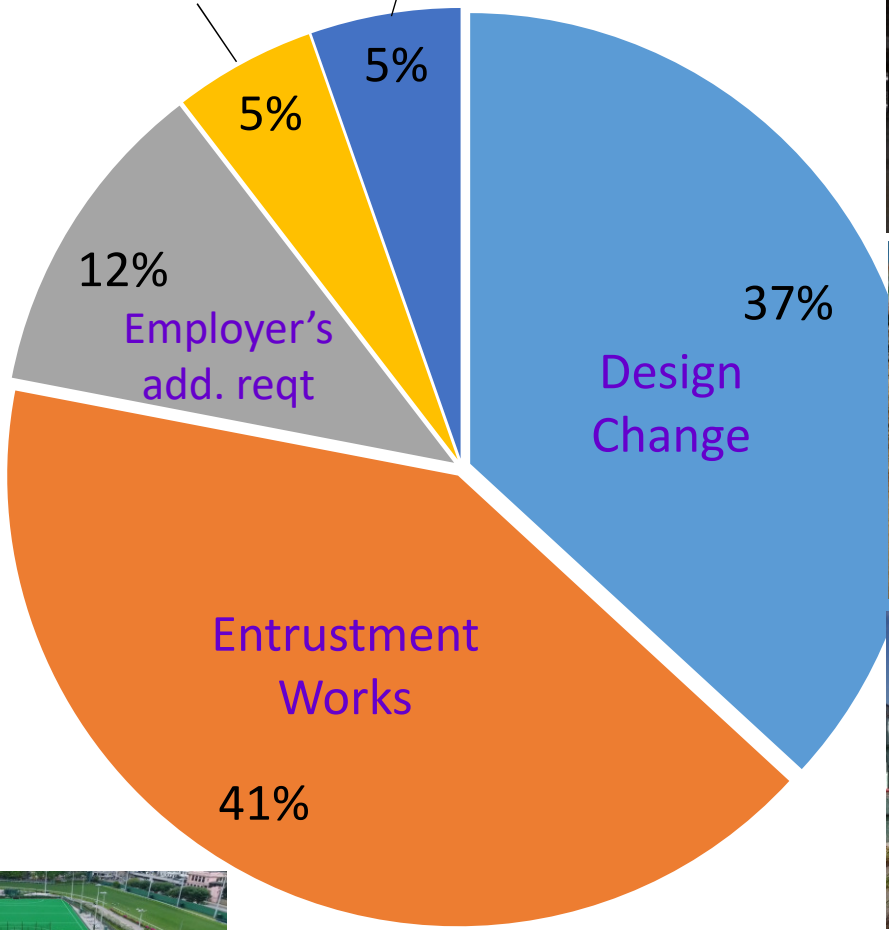
Distribution of CEs in HVUSSS











Star Rates / Missing Items?

Facilitators in assessment of CE Quotations

1. Open Book Account for latest market rates

2. Call Subcontracts and use Open Tender Rates

→ Quick Justification on Open Market Rates from a fair and open tender procedure

→ No Argument on rate justification

Additional Supervision Cost

Entrustment Works Value at approx. $150M

Assessment Method

1. Compare the latest with the baseline manpower schedule

Post	Name		2012	2013	2014	2015	2016	2017	2018	2019	CW's Claim	DSD's Assessment on 25.4.2017	Remarks
Planning and Engineering Team											4,391,409	3,547,069	
Deputy Site Agent	~~Eric Tang~~	Baseline	0.2	0.8	1.0	1.0	1.0	1.0	0.8	-	0	0	
	~~James Au~~	Latest	0.2	0.8	1.0	1.0	1.0	1.0	0.8	-			
	~~Ben Siu~~	CW	-	-	-	-	-	-	-	-			
	Richard Fung	DSD	-	-	-	-	-	-	-	-			
Sub-Agent	S Y Cheung	Baseline	0.8	1.0	1.0	1.0	0.8	-	-	-	0	0	
		Latest	0.8	1.0	1.0	1.0	0.8	-	-	-			
		CW	-	-	-	-	-	-	-	-			
		DSD	-	-	-	-	-	-	-	-			
	Kenny	Baseline	0.8	0.4	-	-	-	-	-	-	0	0	
	Ivan Wong	Latest	0.8	0.4	-	-	-	-	-	-			

CE No.	Title	Management	QS	Engineering	Operation and Production	Safety and Environmental	Administrative Support	BS	Mechanical/Electrical Support	Surveying	Total
206	Renovation and Widening of Jogging Track in Happy Valley Recreation Ground and Associated Works	$0	$142,271	$193,282	$126,637	$117,386	$0	$0	$0	$0	$579,576
222	Reinstatement of Pitch No. 7 & associated drainage works	$0	$142,271	$193,282	$126,637	$117,386	$0	$0	$0	$0	$579,576
259	Fitting out Works for New Toilet Block	$0	$0	$191,344	$0	$0	$0	$362,405	$0	$0	$553,749
327	Drainage Improvement Works at Leighton Road and Wong Nai Chung Road in Happy Valley	$0	$419,999	$1,439,986.08	$1,375,776	$704,314	$0	$0	$208,400	$0	$4,148,476
328	Renovation Works at Fan Room	$0	$0	$0	$79,726	$0	$0	$0	$104,200	$0	$183,926
329	Refurbishment of Pitch Nos. 11, 13 and 14	$0	$790,304	$1,335,892.97	$1,731,820	$704,314	$0	$0	$729,400	$0	$5,291,731
495	Reinstatement of Pitch No. 5 & Associated Drainage Works	$0	$142,271	$193,282	$126,637	$117,386	$0	$0	$0	$0	$579,576
	People Cost Assessed by DSD (A)	$0	$1,637,116	$3,547,069	$3,567,233	$1,760,786	$0	$362,405	$1,041,999	$0	$11,916,608
	Latest Total People cost in each field (B)	$6,708,667	$18,299,854	$30,480,303	$12,311,876	$7,583,290	$6,055,764	$1,960,031	$2,929,158	$1,102,076	
	Percentage of DSD's assessed amount (A)/(B)	0%	9%	19%	19%	10%	0%	2%	6%	0%	

(4) Stock Management

Stock Management

Checking of:-

- Wastage of Materials and Plant
- Availability & utilization of resources
- Credit value upon disposal of unused resources, e.g. Materials and Plants

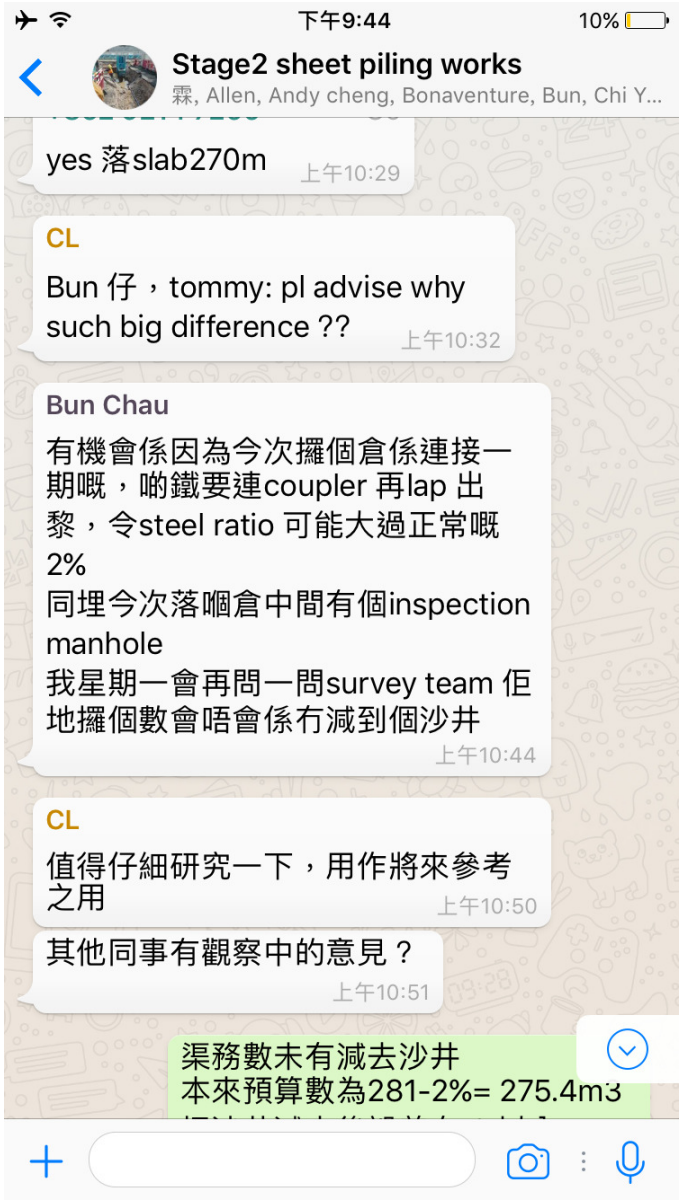
PM's involvement is essential to ascertain all amounts paid as Defined Cost

Permanent → Wastage Control

Temporary → Beneficial Reuse/Resale

Concrete

To check against the survey information and to closely monitor the wastage %



Residual Materials

- Regular Stock Taking

- Early identification and tackling of residual materials

  ➡ Release of stockpiling areas and facilitate final account

- Ways to deal with residual materials

  ➡ Beneficial reuse

  ➡ Take up by maintenance parties

  ➡ Resale as scrap materials/ to other contracts

  ➡ Recycling industry

  ➡ Landfill disposal

Programme

Contract Provision

- first programme shall be submitted for acceptance within 2 weeks of the Contract Date;
- revised programme shall not be submitted at intervals longer than 5 weeks;
- Time of reply: 2 weeks, unless extension of *period of reply* is agreed between the two parties.

3 Key Information shown in the programme

- Key Dates and Completion Date
- Compensation Event
- Subletting and procurement time

Key Elements

- End Date of Section of Works (Milestone)
- **Construction sequence (Activity)**

Construction Sequences

Activities

- ELS
- Construction of Base Slab
- Construction of Columns and Walls
- Construction of Top Slab
- Construction of U-channel
- Laying Irrigation system and lighting system
- Laying Granular fill and subsoil drain
- Laying Asphalt layer
- Laying Turf

Example of Stage 2 Tank and Pitch Construction

Happy Valley Underground Stormwater Storage Scheme (Contract No. : DC/2012/03)
Progress Photo - View 1 (Date : 17March 2016)

Example of Stage 2 Tank and Pitch Construction

Happy Valley Underground Stormwater Storage Scheme
Progress Photo - View 1

Contract No. : DC/2012/03
(Date : 15 Dec 2016)

Example of Stage 2 Tank and Pitch Construction

Happy Valley Underground Stormwater Storage Scheme
Progress Photo - View 1

Contract No. : DC/2012/03
(Date : 19 May 2017)

Example of Stage 2 Tank and Pitch Construction

Happy Valley Underground Stormwater Storage Scheme
Progress Photo - View 1

Contract No. : DC/2012/03
(Date : 22 Jun 2017)

Key Elements

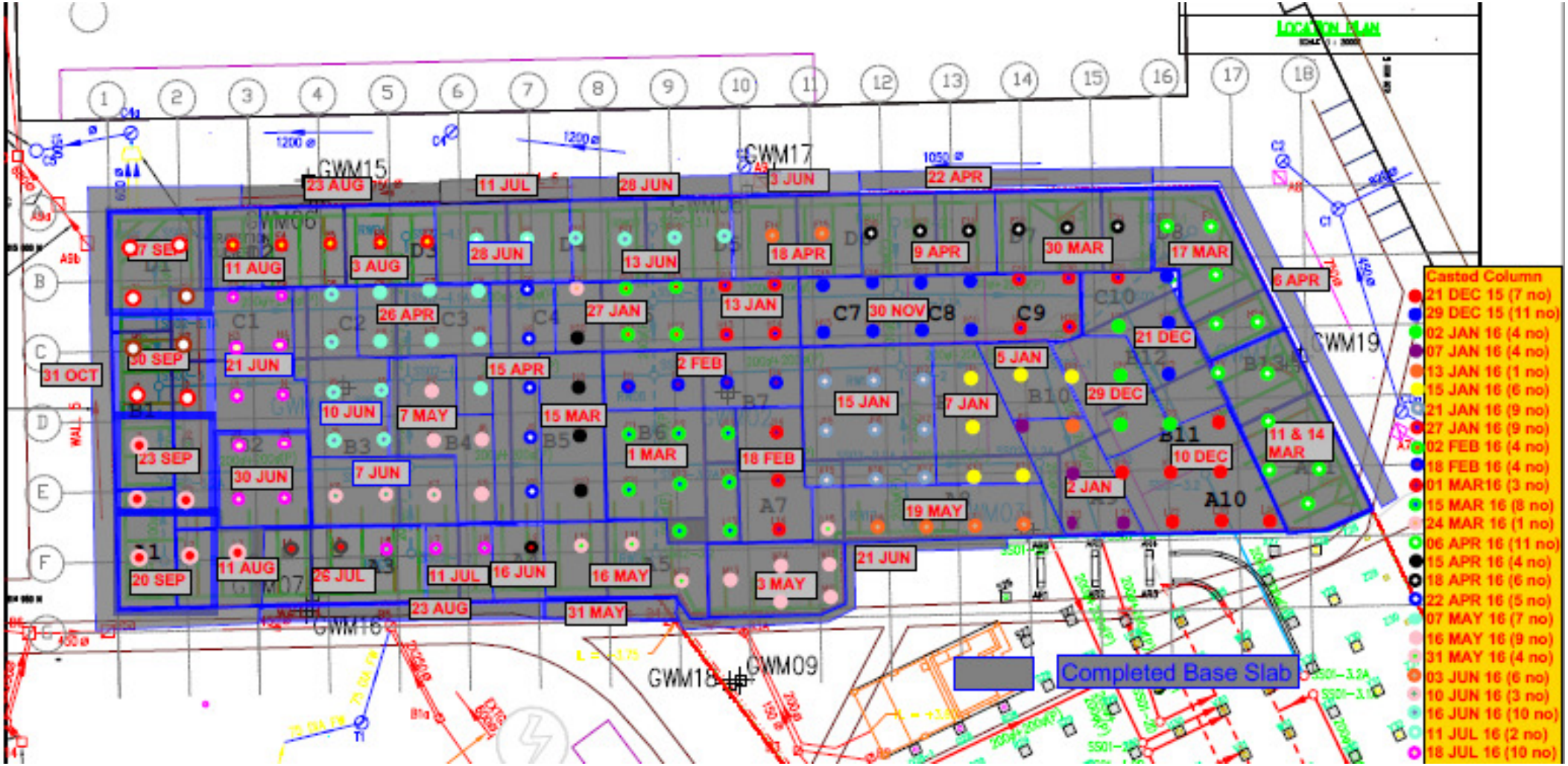
- End Date of Section of Works (Milestone)
- Construction sequence (Activity)
- **Site Constraint (Relationship of Activity)**

Site Constraint

- Concrete Supply
- Temporary Access

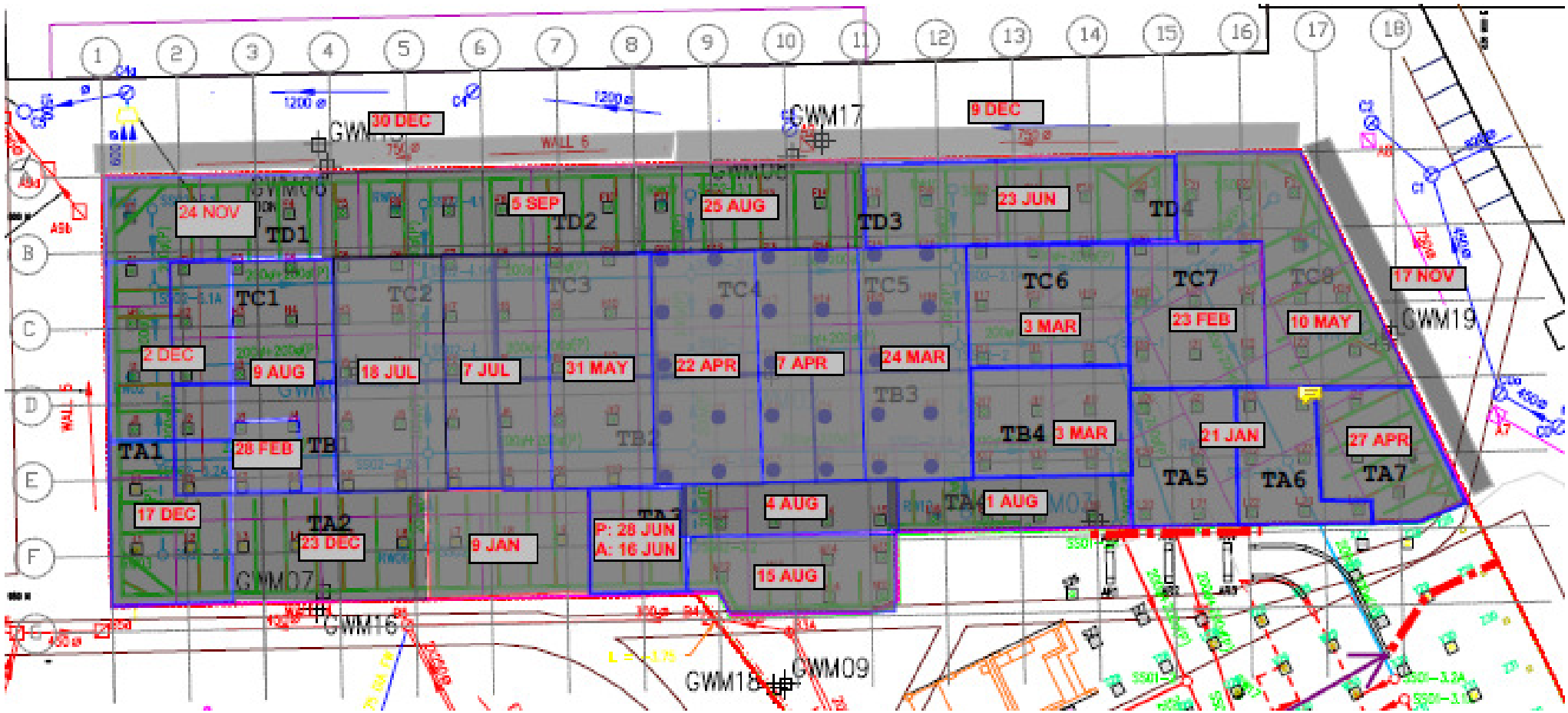
Site Constraint – (1) Concrete Supply

- CJ of Base Slab (40 bays)



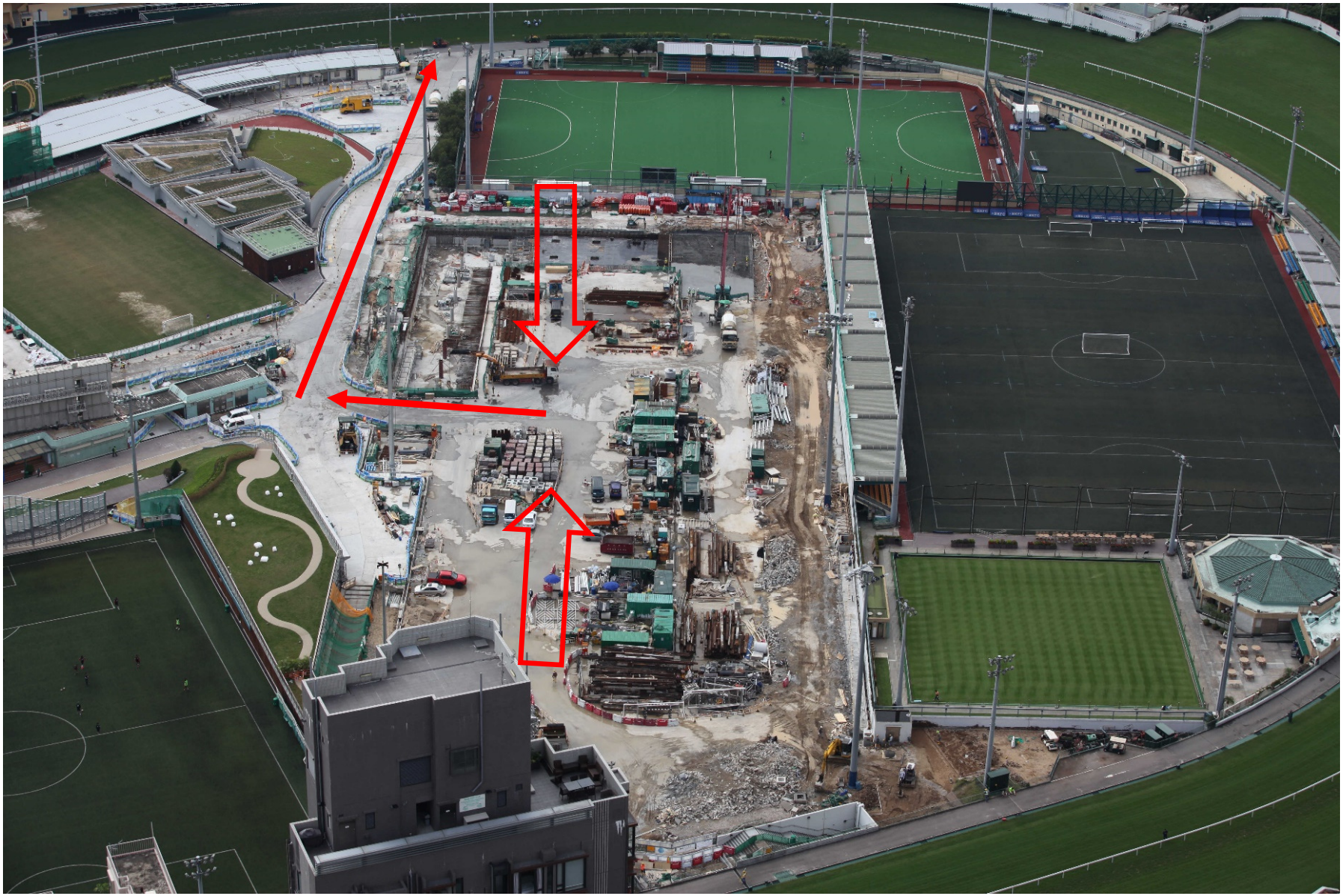
Site Constraint – (1) Concrete Supply

- CJ of Top Slab (26 bays)



Site Constraint – (2) Temporary Access

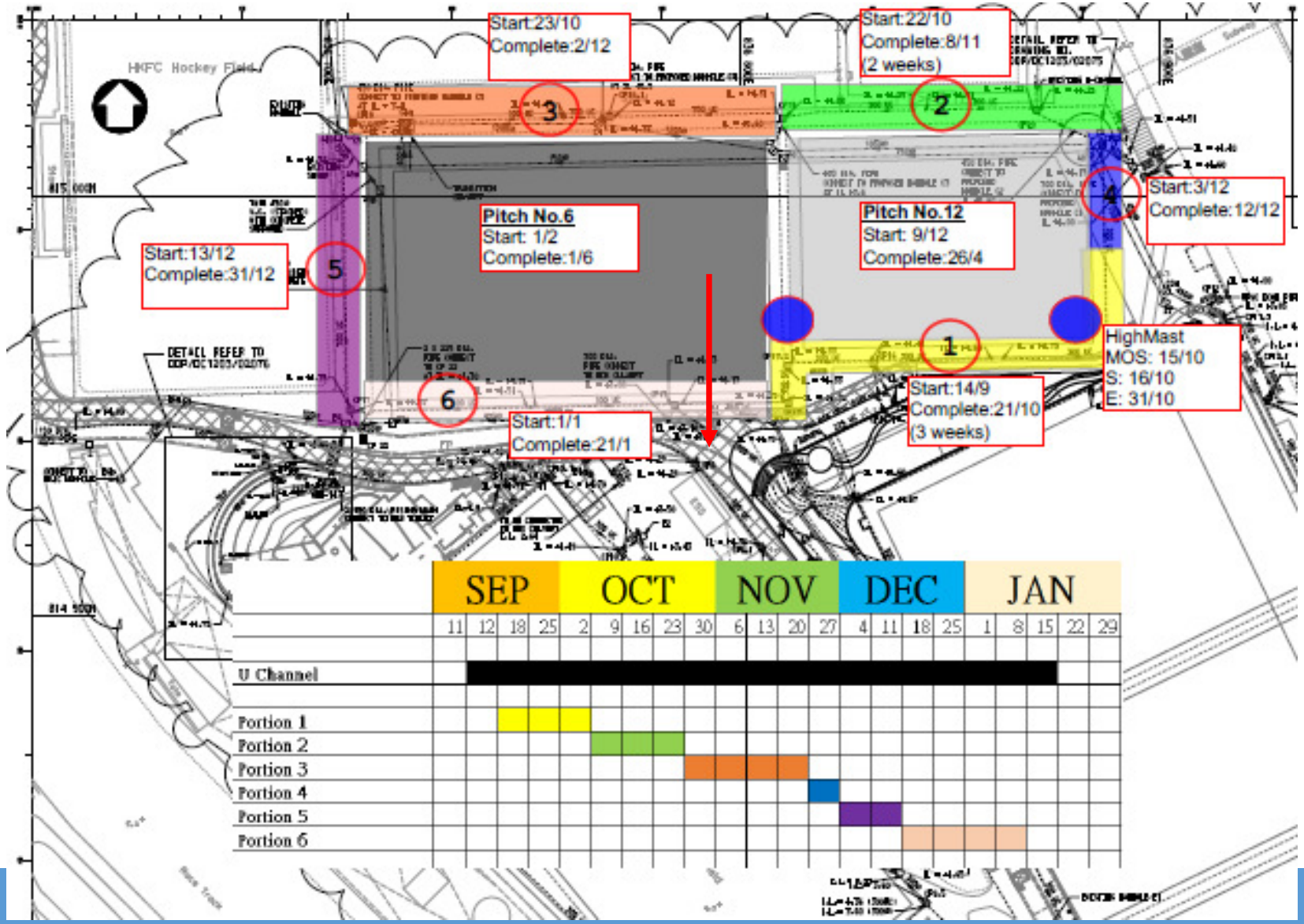
Site Constraint – (2) Temporary Access



Site Constraint – (2) Temporary Access

Site Constraint – (2) Temporary Access

- Different Phases of U-channel



Key Elements

- End Date of Section of Works (Milestone)
- Construction sequence (Activity)
- Site Constraint (Relationship of activity)
- **Production rate (Duration)**

Product Rate of Resources

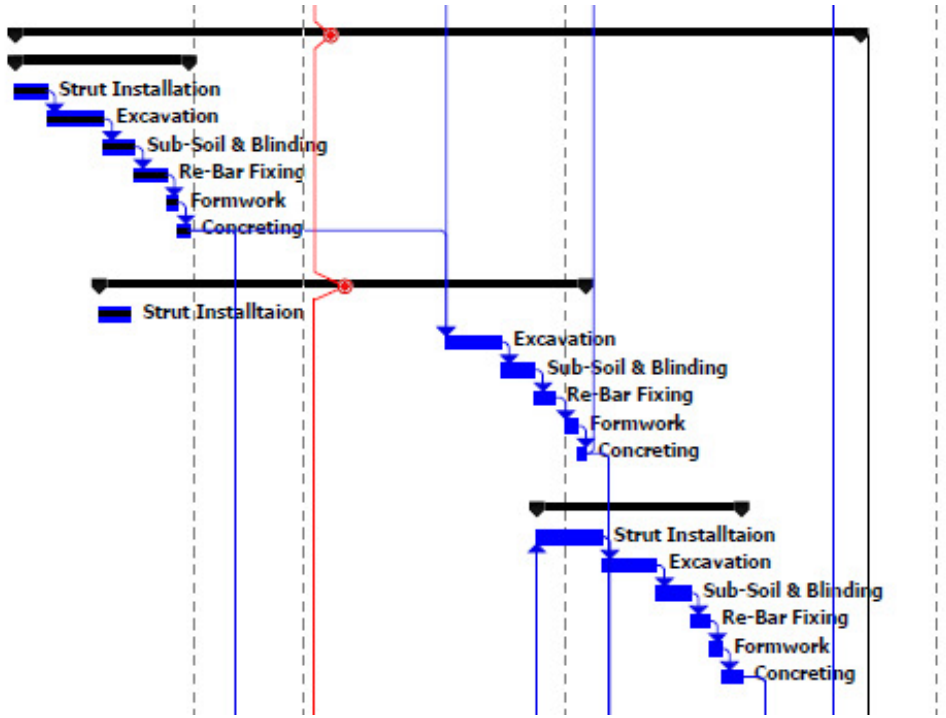
Item	Adopted Productivity in Tender	Adjustment Factor	Productivity (Previous Record)	Unit
A	B = C X D	C	D	E
Excavation (Bulk Excavation)	392	0.8	490	m3 / day / Excavator
Excavation (Under Wailing & Strut)	75	0.5	150	m3 / day / Excavator
Re-Bar Fixing (Pile Cap)	1.75	0.7	2.5	ton / manday
Formwork (Pile Cap)	10	1	10	m2 / manday
Concreting (Pump Truck) (Assume max. concrete supply in this tender = 700m3 / day)	350	1	350	m3 / day / set of pump trucks

Key Elements

- End Date of Section of Works (Milestone)
- Construction sequence (Activity)
- Site Constraint (Relationship of activity)
- Production rate (Duration)
- **Activity Programme**

Activity Programme

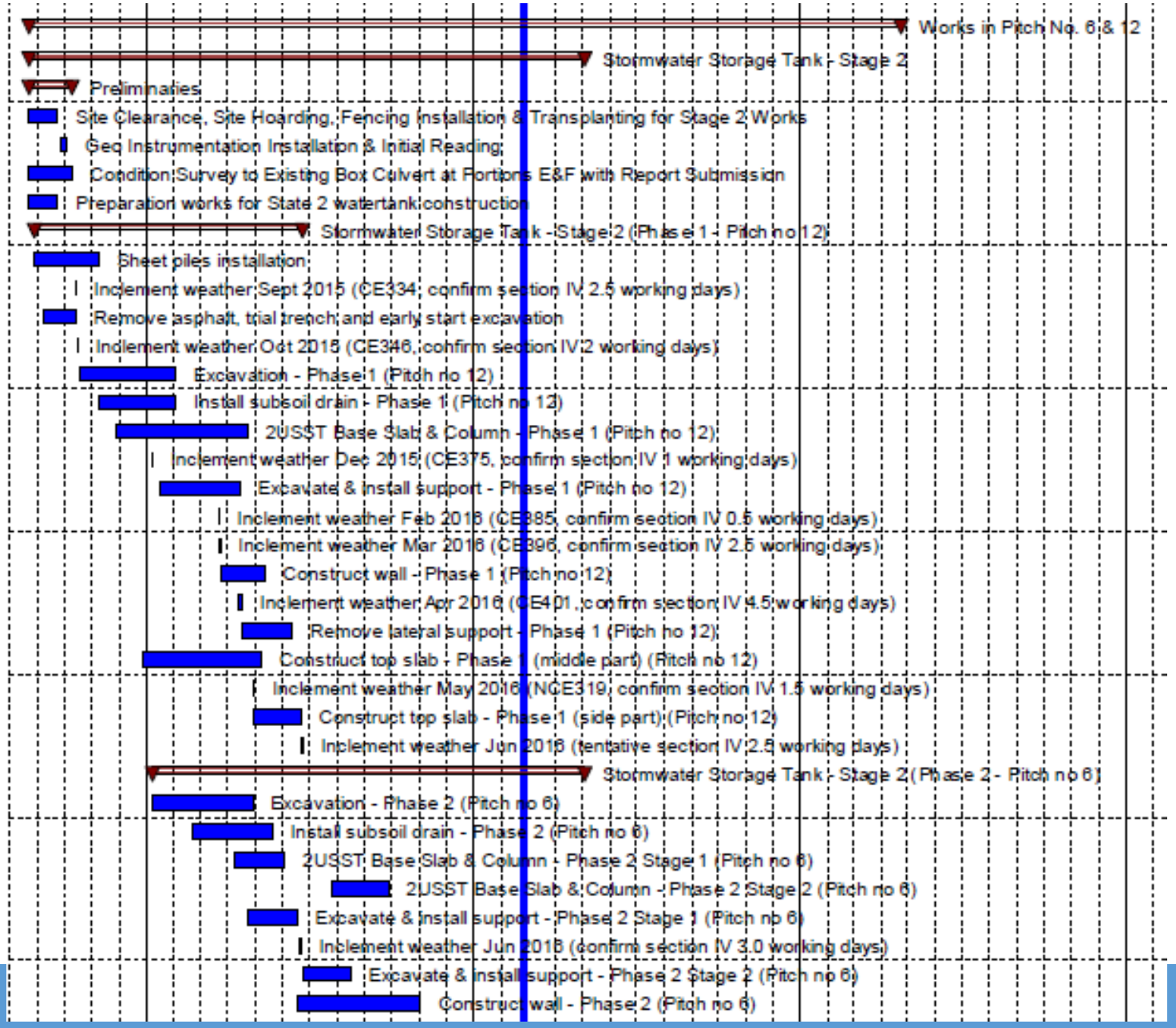
44		**Base Slab**	**67.13 days**	**Thu 16/6/16**	**Thu 25/8/16**	
45	✓	D3	14 days	Thu 16/6/16	Thu 30/6/16	
46	✓	Strut Installation	3 days	Thu 16/6/16	Sat 18/6/16	
47	✓	Excavation	4 days	Sat 18/6/16	Thu 23/6/16	46
48	✓	Sub-Soil & Blinding	3 days	Thu 23/6/16	Sat 25/6/16	47
49	✓	Re-Bar Fixing	2 days	Sat 25/6/16	Tue 28/6/16	48
50	✓	Formwork	1 day	Tue 28/6/16	Wed 29/6/16	49
51	✓	Concreting	1 day	Wed 29/6/16	Thu 30/6/16	50
52						
53		D2	38 days	Thu 23/6/16	Tue 2/8/16	
54	✓	Strut Installtaion	3 days	Thu 23/6/16	Sat 25/6/16	
55		Excavation	4 days	Fri 22/7/16	Tue 26/7/16	51,12
56		Sub-Soil & Blinding	3 days	Tue 26/7/16	Fri 29/7/16	55
57		Re-Bar Fixing	2 days	Fri 29/7/16	Sat 30/7/16	56
58		Formwork	1 day	Mon 1/8/16	Mon 1/8/16	57
59		Concreting	1 day	Mon 1/8/16	Tue 2/8/16	58
60						
61		D1	16 days	Fri 29/7/16	Mon 15/8/16	
62		Strut Installtaion	5 days	Fri 29/7/16	Wed 3/8/16	206FS+7 days
63		Excavation	4 days	Thu 4/8/16	Mon 8/8/16	62
64		Sub-Soil & Blinding	3 days	Mon 8/8/16	Thu 11/8/16	63
65		Re-Bar Fixing	2 days	Thu 11/8/16	Fri 12/8/16	64
66		Formwork	1 day	Sat 13/8/16	Sat 13/8/16	65
67		Concreting	1 day	Sat 13/8/16	Mon 15/8/16	66
68						



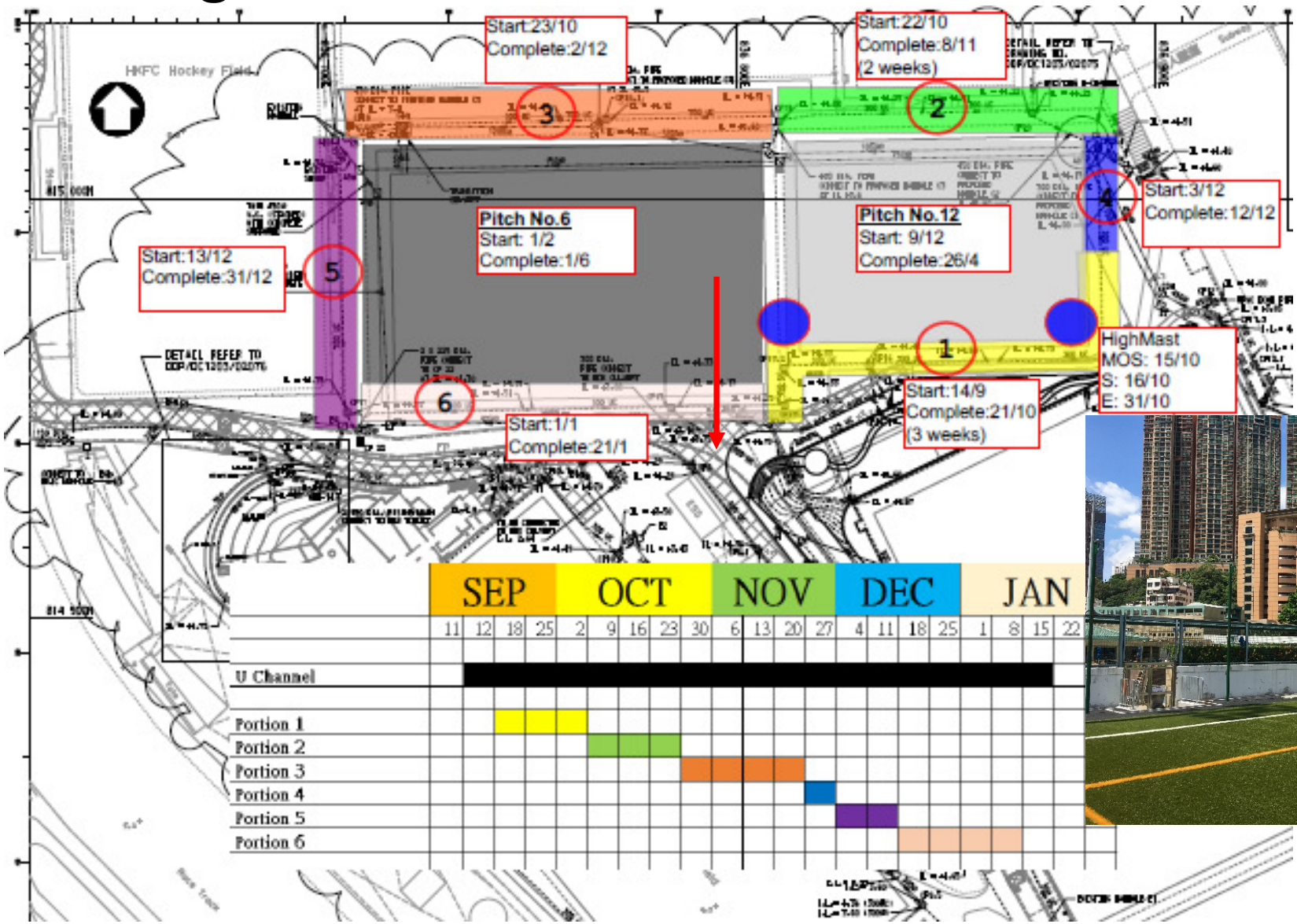
Key Elements

- End Date of Section of Works (Milestone)
- Construction sequence (Activity)
- Site Constraint (Relationship of activity)
- Production rate (Duration)
- Activity Programme
- **Master Programme**

Master Programme



Planning


HKFC Hockey Field
Start:23/10
Complete:2/12
Start:22/10
Complete:8/11
(2 weeks)
Pitch No.6
Start: 1/2
Complete:1/6
Pitch No.12
Start: 9/12
Complete:26/4
Start:3/12
Complete:12/12
Start:13/12
Complete:31/12
HighMast
MOS: 15/10
S: 16/10
E: 31/10
Start:14/9
Complete:21/10
(3 weeks)
Start:1/1
Complete:21/1
SEP
OCT
NOV
DEC
JAN
11 12 18 25 2 9 16 23 30 6 13 20 27 4 11 18 25 1 8 15 22
U Channel
Portion 1
Portion 2
Portion 3
Portion 4
Portion 5
Portion 6

Progress Monitoring

Progress Monitoring

Pitch No. 6 & 12 (Target End Oct)

	Pitch No.12	Pitch No.6
Aggregate	Completed	7/7/2017 70%
Sub-Base	Completed	15/7/2017 50%
Asphalt	Completed	31/7/2017 0%
Shock Pad	Completed	15/8/2017 0%
Turf	30/6/2017 80%	31/8/2017 0%
EPDM	17/7/2017 0%	31/8/2017 0%

Floodlight

1.	Cable Laying	15/7	70%
2.	Lantern Installation	24/7	50%
3.	Pillar Box	31/7	40%
4.	Lux Measure Set up	31/7	0%
5.	T&C	31/7	-
6.	Safety Pad MOS	19/8	-
7.	Safety Pad Install	21/8 – 26/8	0%

Pitch No. 6 & 12 Irrigation

~~1.~~	~~Trial~~	~~22/6~~	~~Completed~~
~~2.~~	~~EMSD 1st Inspection~~	~~23/6~~	~~Completed~~
3.	T&C	TBC mid July	-

Pitch 12

1.	白屋仔 (E&M)	8/7 – 15/7	0%

Pitch 12 (MOS)

1.	Type 2 Railing MOS	TBC
2.	Type 2 Railing Install	TBC

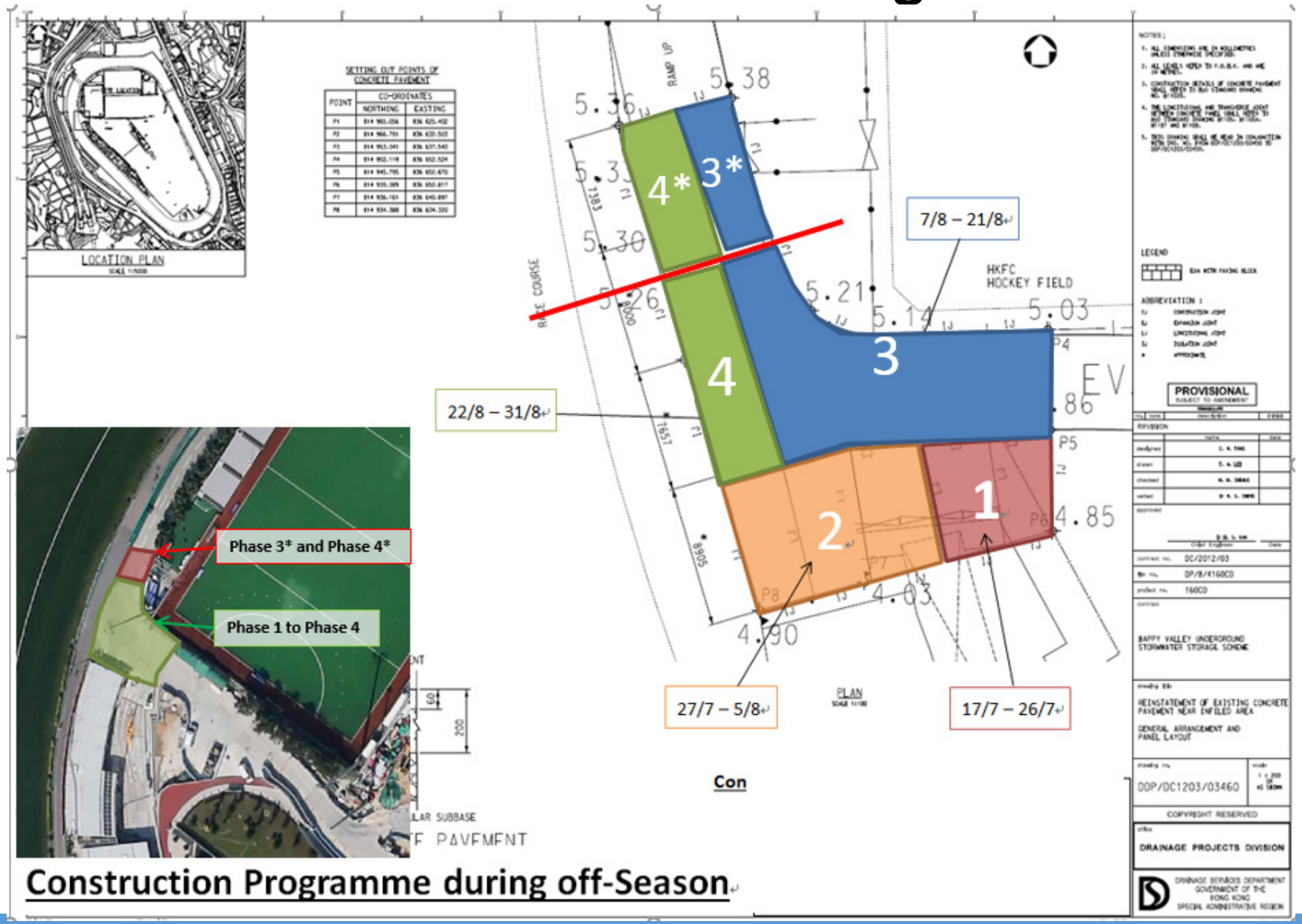
Pitch 6 (MOS)

1.	Shock Pad Material	30/6
2.	EPDM	17/7
3.	Goal Post/Flag	22/7

Coordination

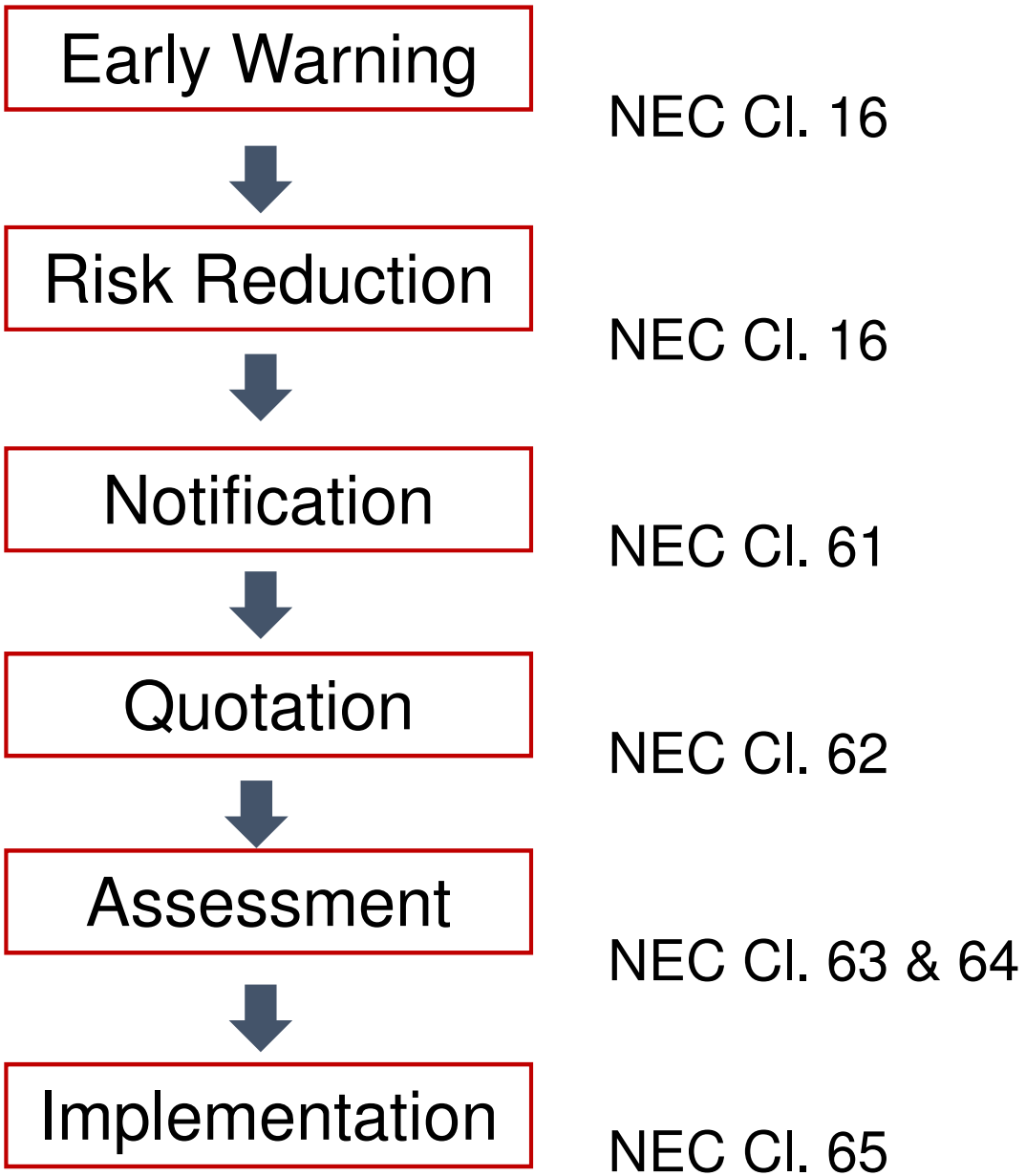
Interface with HKJC and HKFC during summer break

Interface with HKJC and HKFC during summer break



Risk Management

Risk Management in NEC Contract

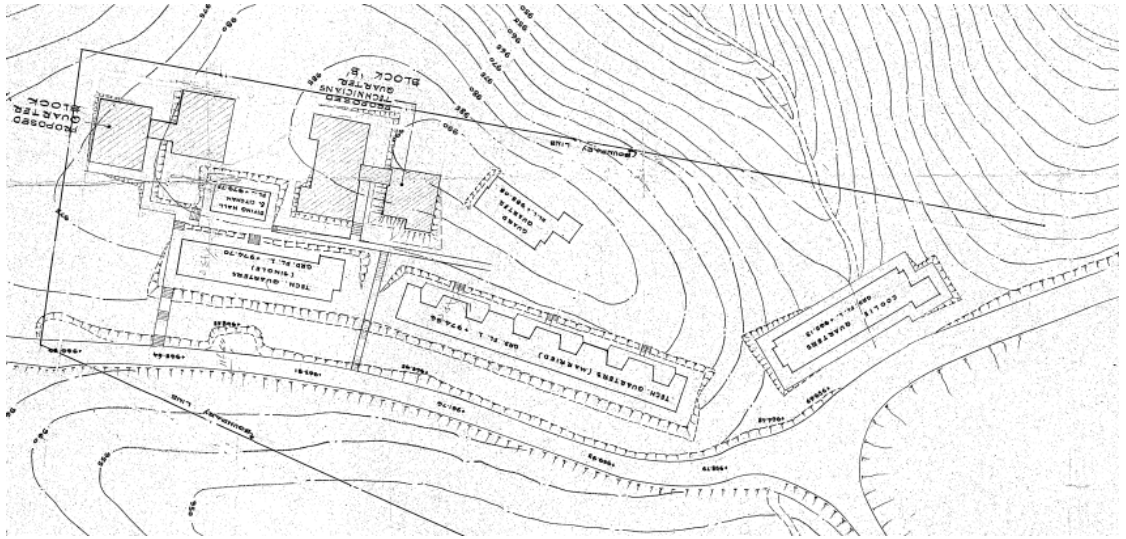


A Case Study – Demolition Works

A Case Study – Demolition Works

Risk

- Insufficient as-constructed record

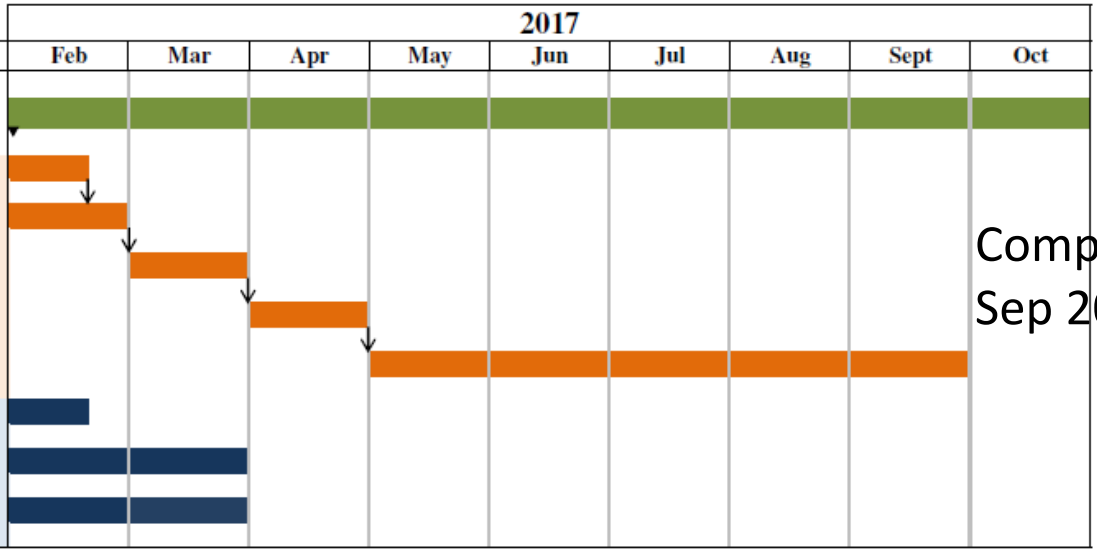


- Asbestos Material

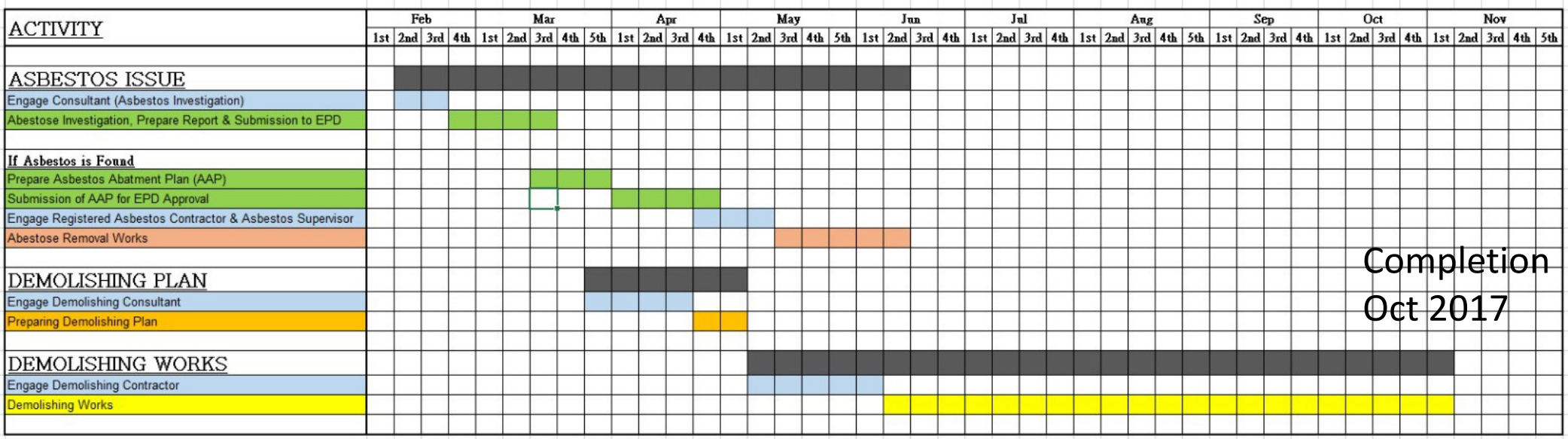
Photo 10. 1 no. of asbestos-containing cement pipe at Block E.

A Case Study – Demolition Works

Party	Item	Start	End
	Works Period	**1-Feb-17**	**31-Oct-17**
CW	Carry out Asbestos Survey	1-Feb-17	20-Feb-17
	Subletting - Demolition Consultatnt	1-Feb-17	30-Feb-17
	Preparation of Demolition Plan	1-Mar-17	31-Mar-17
	Subletting - Demolition Contractor	1-Apr-17	30-Apr-17
	Demolition Works	1-May-17	30-Sep-17
DSD	Prepare CE A - Demolition Plan Design	1-Feb-17	30-Feb-17
	Prepare CE B - Demolition Works in Mount Butler	1-Feb-17	31-Feb-17
	Liaise with DLO	1-Feb-17	31-Mar-17



Completion
Sep 2017



Completion
Oct 2017

A Case Study – Demolition Works

Asbestos

~~1.~~	~~Background Air Monitoring~~	~~11/6~~	~~Completed~~
2.	Setup Segregation BLK. E	24/6 – 26/6	30%
3.	Consultant Inspection	27/6	-
4.	Bamboo Scaffolding	22/6 - 28/6	40%
5.	Removal of Asbestos BLK. E	28/6	0%
6.	Removal of Asbestos BLK. F & G	3/7 – 10/7	0%

Demolition (Complete: Mid-Oct)

1.	BLK. E & F	Fencing	6/6 – 22/7	40%
2.	BLK. A	Propping & Fencing	12/7 – 22/7	0%
		Demolition	23/7 – 7/8	0%
3.	BLK. B	Propping & Fencing	23/7 – 6/8	0%
		Demolition	7/8 – 22/8	0%
4.	BLK. C	Demolition	22/8 – 30/8	0%
5.	BLK. E	Demolition	30/8 – 10/9	0%
6.	BLK. F	Demolition	10/9 – 25/9	0%
7.	BLK. D	Demolition	25/9 – 2/10	0%
8.	BLK. G + incinerator	Demolition	25/9 – 8/10	0%

A Case Study – Unsteady Concrete Supply

Risk

- Unsteady Concrete Supply
- Increase no. of CJ
- Increase cost and time

A Case Study – Unsteady Concrete Supply

Risk Reduction

- Early commencement of concreting
- Apply for construction noise permit for concreting works over 19:00

Defect

Highlight

- **For Option C and D, cost of rectifying Defects before Completion is reimbursable**

A Case Study – Completion of Storage Tank

Target

- Commissioning on 16/3/17

Risk after Commissioning

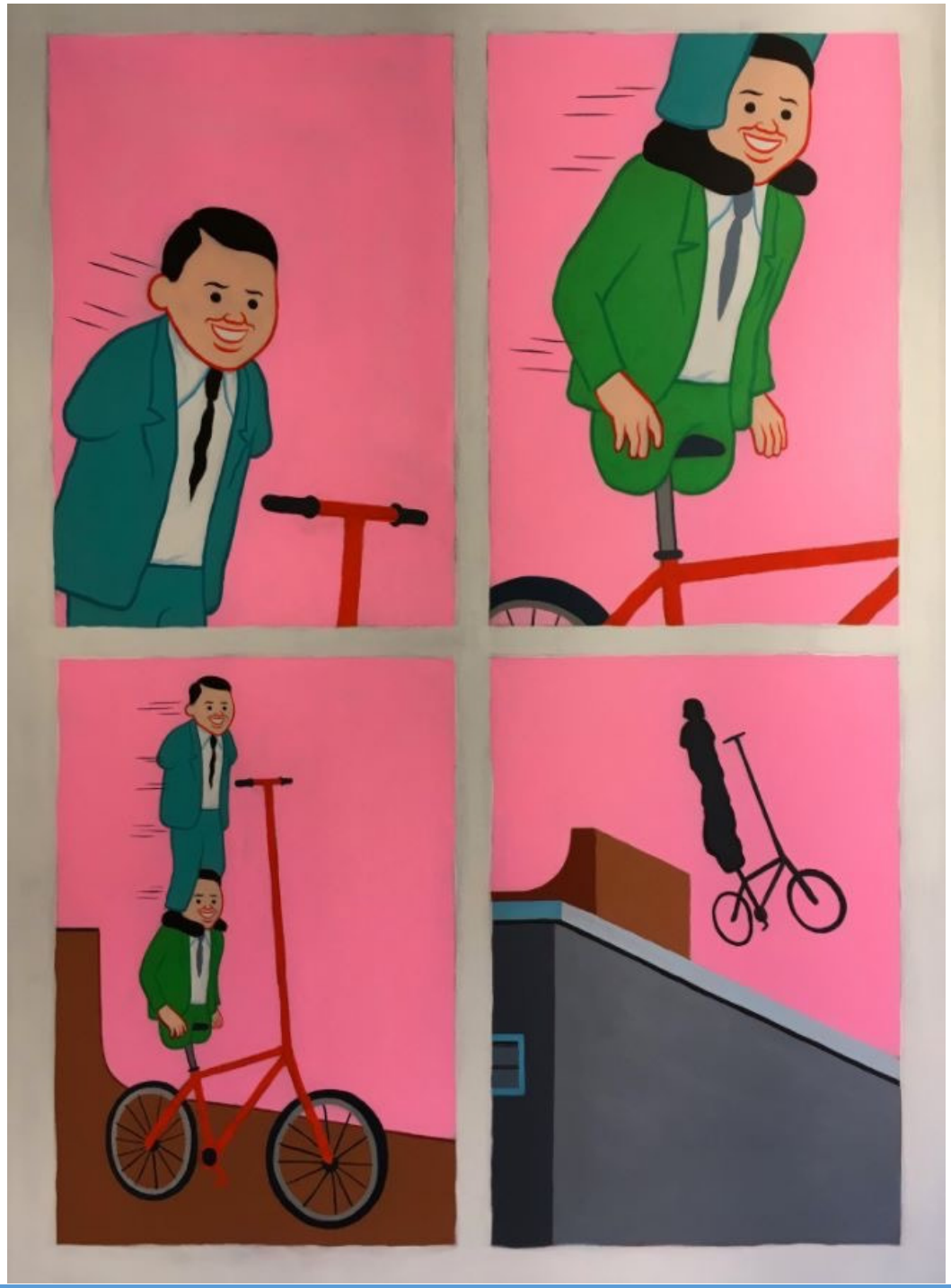
- Increase difficulty
- Increase cost and time
- Affect pain/gain share

Risk Reduction

- Early pre-handover inspection of tank in Dec 16
- Early rectification of defect

Conclusion

Mutual Trust + Collaboration



Unique

Teamwork


Happy Valley Underground Stormwater Storage Scheme
快活谷草上嘉年華
HAPPY VALLEY GREEN CARNIVAL

PAIN - GAIN

		Pain	Gain
DSD	HQ – *Employer*		
	CE/DP - *PM* & *S*		
	Es/DP - *PMR* & *SR*		
	RSS		
Contractor	HO		
	Site management		
	Superintendent, foreman		
Subcontractors	Civil		
	E&M		
	Specialist (turf, high mast, etc)		
Consultants	NEC advisory		
	Cost audit		
Stakeholders	LCSD, ArchSD		
	HKJC, HKFC, HKHA, HKRA….		
	Schools, hospital		
	Public, HVRG users		

Together
Progress
Opportunity