

**The New Economic Reality:  
Implications for the Construction Industry in Hong Kong**

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**Underground Utilities**

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Synopsis:

John Elsdén's paper traces the history of the civil engineering industry's problems with underground utility apparatus and the various attempts at change including three major reports through the mid 90's to early 2001 and including the 'Whose Risk?' conference of November 2000. He traces changes to Hong Kong Government procurement of civil engineering since that date and proposes further modest changes.

# **The New Economic Reality, Implications for the Construction Industry in Hong Kong**

## **Underground Utilities**

**By John P Elsdon<sup>1</sup>**

### **Introduction and Background**

1. In this paper I have been asked to update and reprise a paper that I gave to an earlier incarnation of this Conference <sup>2</sup> and in particular to address the following issues:
  - a) Summarise the risks faced by owner and contractor when dealing with utilities in the urban environment
  - b) Assess the risks of not identifying utilities
  - c) Consider ways to mitigate those risks by:
    - i) spending money on investigations;
    - ii) cataloguing utility information more accurately;
    - iii) changed contract terms aimed at sharing risk throughout the project;
    - iv) changed contract conditions resulting in paying for eventualities as they arise.
  
2. In the November 2000 ‘Whose Risk?’ paper (the ‘2000 paper’), I gave a brief history of the problems that the construction industry faced in dealing with underground utilities and the utility undertakers (both ‘u/u’), starting with attempts in the Joint Discussion Group <sup>3</sup> and its successor the Contracts Committee of the Construction Advisory Board (‘CAB/CC’) to have risks more evenly spread between employer and contractor. The 2000 paper also commented on two reports prepared for government (‘HKG’) – a paper prepared in 1996 by an ad hoc committee of the CAB/CC <sup>4</sup> and the report prepared by Jesse Grove III and delivered in June 2006. Following the 2000 paper, early the next year in January 2001, HKG published the ‘Tang Report’ <sup>5</sup> which it had commissioned to investigate the future path for the construction industry as a whole.
  
3. This paper will firstly review the risk balance as identified in these three reports and will then consider what changes have been made to the balance of risk in HKG civil

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<sup>2</sup> “*Whose Risk – Managing Risk in Construction – Who Pays?*” presentation for ACEHK [20/21 November 2000]

<sup>3</sup> A tripartite consultation body involving HKG, the HKCA, the ACEHK and other professional organisations

<sup>4</sup> The ‘Utility Working Group’

<sup>5</sup> “*Construct for Excellence - Report of the Construction Industry Review Committee*” chaired by the Hon. Henry YY Tang [Jan 2001]

engineering contracts and will make recommendations for further change. I will do this by quoting reasonably extensively from the 2000 paper (using a different font so that you can see where I have cheated); noting the considerations and recommendations of the Tang Report; and reviewing what changes to the 1998Ed General Conditions of Contract for Civil Engineering, relevant to the risk balance, have been made and included in the standard library of SCCs since 2001.

## **The 2000 Paper**

4. The 2000 paper introduced the problem thus:  
'Urban Hong Kong is serviced by a maze of utility undertakers' apparatus. Just as development in Hong Kong has been haphazard, so are the utility apparatus that service the development haphazard...

It is perhaps not well enough understood, particularly by policy-makers who are not engineers, that interference from u/u apparatus has much greater significance in civil engineering construction than it does in building. Building is usually carried out in small-footprint sites where the only utility problems relate to bringing in the services required in the building. Civil engineering, particularly highways, railways, land drainage and trunk water supply has typically large, or extended site areas and the interference with and from u/u apparatus can be very substantial.

In civil engineering, the unforeseen or unforeseeable effect of both physical conditions and artificial obstructions can have a devastating and dramatic impact on progress and cost. It is never possible, at the design stage, to do sufficient investigation of large or extended civil engineering sites to rule out the possibility, or even probability of unforeseen circumstances...'

This analysis is still valid and was commented on in the Tang Report as noted below.

5. The 2000 paper then considered, in a 1999 analysis prepared by Standards and Poors of the construction risk measured against size of construction market on the one hand and %age growth of the construction market on the other, the relative position of Hong Kong in relation to other major national economies. Hong Kong came out fairly poorly in the analysis, having more risk and less growth in a smaller market for construction than the average.

'The average given is for about 60 major developed or developing countries surveyed. Hong Kong is perceived as a small market, with low growth and high risk. A significant constituent of that perception is the exposure to unforeseen natural and artificial hazards.'

Unfortunately, I have not been able to find updated figures so have not included an update of the chart. However it is likely, post the 2008 credit crisis, that any figures relating to growth will be relatively meaningless.

6. The 2000 paper then went on to say:  
'It is my view that the risk to civil engineering contracting which arises from interference from existing or future utility apparatus is largely outside the control

of the contractor. Further, there is usually little that he can do to manage the risk. The risk is not insurable. In the absence of detailed u/u apparatus information in tender documents, it is not possible, in the time normally allocated for tendering civil engineering works in HK, to make a sensible prediction of the standard or location of the utility apparatus which will be encountered nor what the utility undertakers' intentions are regarding new or upgraded plant. At present, the contractor is required to take a guess, perhaps consult a fortune-teller or see what the tarot cards say. It is my proposition therefore that the risk of interference from utilities' apparatus is a risk that the promoter of the scheme should bear.'

7. The 2000 paper described the establishment of the committee responsible for the first of the reports noted above thus:

'A 1995 paper to the CAB/CC prepared by HKCA re-ignited the issue of unforeseeable ground conditions – both natural and artificial. CAB/CC, in response to the utilities aspect of the issue, formed a Utilities Working Group ("UWG") in early 1996 with a remit to:

- *review the distribution of risk with regard to contract arrangements for work involving the installation/relocation of utility services under Government contracts; and*
- *identify and quantify the consequences of problems attributable to present contract arrangements and to recommend solutions to the Contracts Committee.'*

## **Utilities Working Group**

8. 'The UWG comprised representatives from HKG, HKCA, CLP and ACEHK. It invited further input from other utilities and MTRC later. The UWG set up two sub-groups to review (a) liabilities and (b) practicalities. The UWG or its sub-groups reviewed the HKG GCCs <sup>i</sup>, the General Specifications <sup>ii</sup>, the current Project Administration Handbook and the superseded Civil Engineering Manual. It asked members to define the top ten problems that they had encountered involving utilities' apparatus. With the invaluable assistance of the utility undertakers ("u/us") the UWG defined "best practice" <sup>iii</sup> for the treatment of utilities in civil engineering contracts generally and then compared that "best practice" with current HKG policy relating to utilities.

The UWG took note of the major problems described by members. These included EoT awards of more than one year with no allowance of delay costs. Several delay cost claims in the tens of millions of dollars were noted. The largest delay cost claim described was over HK\$500 million. None of these claims were paid. It also noted with surprise that even where works had been varied to overcome unexpected utility problems, no delay claim had been certified. The most frequent problem was inaccurate information provided. This created unexpected physical obstruction to the permanent works either because the u/u apparatus was not in the location shown or because extra apparatus not identified was discovered. There was also a failure to promptly identify redundant services. Necessary redesign was delayed. Problems also arose because of the poor quality of u/u's contractor's workmanship or because of the poor condition of u/u apparatus.'

9. 'The UWG reviewed the legal background relating to the position of the u/us and their obligations in respect of their apparatus in "unleased Government land" <sup>iv</sup>. The UWG recognised that this aspect of the u/u problem – the requirement of u/us to divert or realign their apparatus at the request of and free of charge to HKG – was a very significant factor in the risk equation as it was presently balanced. It also recognised that a change in this system to one in which u/us were paid to undertake diversion work would require legislation and revisions to many Block Grants. This was probably an unrealistic expectation.

The UWG liabilities sub-group ("LSG") identified, from the problems submitted, several different scenarios which caused problems to contract works:

1. U/u wished to lay new services during contract works;
2. U/u wished to upgrade existing services during contract works;
3. Diversions of u/u apparatus were required which did not arise from the contract works;
4. Diversions of u/u apparatus were caused by the contract works;
5. U/u apparatus were not shown on or shown wrongly on the contract drawings.

The u/us explained that the first three categories [9.1, 9.2, & 9.3] usually arose because of the five-year moratorium on road openings after road openings or construction was completed. U/us would try to anticipate future demand and upgrade or provide new services when undertaking other works directly required by the contract works. The LSG agreed that interference from these types of works, if it caused additional delay should be compensated by a time award ("EoT"). They could not agree whether such additional delays should entitle the contractor to cost.

The LSG recognised that interference from utility apparatus in contract works as per categories [9.4& 9.5] was presently refused a cost award and only entitled the contractor to EoT if the u/u failed to meet its agreed programme. The LSG also recognised that unforeseen u/u apparatus as [9.4 or 9.5] might be dealt with either:

- by varying the works, thus entitling the contractor to EoT and delay cost; or
- by requiring the u/u to undertake a diversion.

Because of the provisions, or the interpretation of HKG GCC Clause 13 <sup>v</sup>, there was no provision in the contract for the award of either EoT or delay cost if the latter course was taken.

The LSG was unable to agree whether guidance on the issue of whether to amend the works or the apparatus should be given to Architect/Engineers ("A/E") and if so what the guidance should be. Suggested criteria were:

- Least time; or
- Ease of construction; or
- Least cost?

If least cost, whose least cost:

- Employer; or
- Contractor; or
- Utility?

The sub-group reviewing the practicalities (“PSG”) defined best practice<sup>iii</sup> and compared this with present practice. The following problems were identified: insufficient time in tender period to undertake useful research on utilities; utilities do not, and are not capable of responding in typical tender periods; therefore contractor only has only information available in tender to work and plan from - hence the need for the information identified in “best practice”; contractors have no control over time actually taken by u/us to complete their works - although they have to coordinate their own and u/us’ works on site

The PSG noted that the Project Administration Handbook, which provides policy and guidance to designers both in house and consultants, positively discouraged incorporation of u/u apparatus information in tender documents as contract documents “...to avoid possible future claims”. The PSG noted that this is a retrograde step in terms of best practice as defined when compared with the provisions of the now-superseded Civil Engineering Manual:

*“...Amongst other [drawings included with tender documents] should be...utilities drawings and any other drawings required for providing tenderers with a good perspective of the extent and the nature of the work.”*

10. The UWG reported in Dec 1996 with the following recommendations:

- ‘HKG should follow best practice and provide the best possible information in tender documents including:
  - Details of existing, abandoned, new, diverted, upgraded, lowered/raised u/u apparatus as current at time of tender;
  - Periods required by u/us to do their works and periods of notice to start, and including any necessary sequence or timing including sequencing of multiple u/u apparatus in the same area;
  - Entrustment of the u/u works whenever possible.
- This information should be at the risk of HKG, changes subsequent to tender should constitute a variation.
- It was also desirable that best practice should include:
  - Designer’s assumptions as to likely methods and timing of construction – agreed to have no contractual status if included in tender documents;
  - Pre-tender investigation of u/u apparatus where they were particularly complex or uncertain;
  - Pre-contract clearing of u/u apparatus away from major sites (as MTRC practice) recognising that a balance must be found in relation to repeated road openings.
- The Project Administration Handbook should be amended to reflect best practice - the superseded Civil Engineering Manual was a better model;

- Records of u/u apparatus were presently unsatisfactory, the opportunities presented to upgrade information by radio-location and GIS systems should be explored.

These recommendations were supported by a majority of the UWG. However one of the HKG representatives objected to most of the recommendations suggesting that the case had not been made out and objecting to the very great risk which would fall on HKG if the recommendations were accepted.'

## **The Jesse B Grove III Report**

11. Partly as a consequence of the UWG report, HKG appointed Jesse B Grove III to report on the HKG General Conditions of Contract with reference to international practice. The UWG report was provided to Mr. Grove for his consideration and as supporting evidence of the then current practice in Hong Kong civil engineering procurement. The 2000 paper commented in the following terms in respect of Mr. Grove's report:

'...a major aspect of the report concerns the contractual position of u/u apparatus and any interference dealing with them may have on the progress of the contract. The [JBGIII] report notes that international practice usually provides that unforeseen interference from artificial obstructions allows EoT and delay cost to the contractor. If the interference is foreseen there is no settled practice, although force majeure clauses and failure to provide site because a third party is lawfully occupying it, usually allow an EoT.

**The report recommends, and ACEHK supports this recommendation, that HKG should accept the risk of lawful third party interference including interference by u/us' apparatus.'**

[My **Emphasis**]

12. As reported in the 2000 paper, HKG stated that, relying on lack of settled international practice, it rejected this proposal and declined to accept the risk of lawful interference by u/us' apparatus. HKG proposed that the present balance of risk should remain unaltered. HKG accepted that it should carry out a review of the problems arising from u/u apparatus interference and develop administrative procedures for identification of existing u/u apparatus, proposed utility works including any temporary works, land requirements and the possibility of any advance diversion.

13. The 2000 paper concluded thus:

- The UWG considered that risk should be borne by the party best able to control, manage or deal with the risk. In the event that no party can control the risk, then it would seem appropriate that the promoter should take the risk in so far as it is not a readily predictable or manageable risk.
- Modern methods of investigation can significantly reduce the risk. However, these surveys are expensive.

- It is my view that the risk of interference from u/u apparatus is, on the basis of current practice, largely unmanageable by the contractor. As such it is a risk which ought to lie with the promoter of any scheme. It is the promoter who stands to gain the long-term benefit of the construction and it is the promoter who ought to take such risks that cannot be managed or insured against.
- It is the recommendation of ACEHK that HKG should follow best practice and define and schedule u/u apparatus in its tender documents. Changes from the tender information and interference from unscheduled u/u apparatus is a risk that should be borne by HKG.

## The ‘Tang Report’

14. A short time after the Nov 2000 conference, the eagerly-awaited Tang Report <sup>5</sup> was published. Several paragraphs <sup>6</sup> relate to the problems of risk allocation and the extracts below refer to the risk allocation for unforeseen natural and artificial ground conditions.
15. In the first relevant paragraph, the report considers the general allocation of risk in construction contracts. The sentiments expressed here are ones which both the UWG and the Jesse B Grove III reports had espoused:

*‘5.55 Onerous or unfair allocation of risks can also give rise to claims and disputes which are non-productive and could be costly to both parties. In spite of allocation of risks through the contract, any significant default by the contractor remains the client’s risk. It is, therefore, in the interest of both parties to adopt contracts based on an equitable allocation of risks, having regard to the following principles\* –*

- (a) Which party can best control the events that may lead to the risk occurring?*
- (b) Which party can best manage the risk if it occurs?*
- (c) Whether or not it is preferable for the employer to retain an involvement in the management of the risk?*
- (d) Which party should carry the risk if it cannot be controlled?*
- (e) Whether the premium charged by the transferee is likely to be reasonable and acceptable?*
- (f) Whether the transferee is likely to be able to sustain the consequences if the risk occurs?*
- (g) Whether, if the risk is transferred, it leads to the possibility of risks of different nature being transferred back to the employer?*

*\*Source : Chapter 6, Report on Engineering Construction Risks, published by the Science and Engineering Research Council, UK<sup>5</sup>*

16. In the following paragraph, the Tang Report notes and comments on previous reports on the topic prepared for HKG:

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<sup>6</sup> Paras. 5.53 to 5.59

*'5.56 The Works Bureau engaged a consultant<sup>7</sup> in March 1998 to carry out a review of the General Conditions of Contract for Public Works Projects, with particular regard to the allocation and management of risks, and to make recommendations on any necessary modifications in the interests of public finance and based on international best practice. The consultant recommends, among others, that the Government should accept the risks associated with unforeseen ground conditions and third party's lawful interference. These two recommendations are of considerable interest and concern to the construction industry. The Government rejects both recommendations. On unforeseen ground conditions, the Government's stance is different from international practice, but the Government expects that by procedural means it could reduce the exposure to the risk substantially. With respect to third party interference, the problem primarily arises from excavation works which always encounter delays because of the numerous buried utility services. A current practice, where justified, is to award the contractor extension of time but not money. The contractor is required to liaise with the utility company to co-ordinate utility diversion within his construction programme. The Government takes the view that in such situations the contractor would have no incentive to mitigate delays if the Government were to accept the risk. Since the consultancy report and the Government's initial response to the consultants' recommendations were released in May 2000, there has been much discussion within the industry on the subject. The Contracts Committee<sup>8</sup> under the Construction Advisory Board is now studying the matter.'*<sup>5</sup>

[My *Emphasis*]

17. The next two paragraphs relate to private building contracts carried forward under the *Agreement and Schedule of Conditions of Building Contract (Standard Form of Building Contract, Private Edition)*. As noted above (para. 4), problems with u/u apparatus do not usually have such a significant effect on private (or any) building contracts as they do in civil engineering contracts.

18. The Tang Report concludes its analysis of risk allocation in relation to unforeseen events thus:

*'5.59 Equitable allocation of risks between the employer and the contractor is critical to successful project implementation. In view of the concerns of industry participants about the current risk allocation under the General Conditions of Contract for Public Works Projects, we recommend that the Government should seriously reconsider the consultant's<sup>6</sup> recommendations in the light of the principles of risk allocation discussed in paragraph 5.55 above, with the objective of achieving a more equitable allocation of risks between the contracting parties and of arriving at a contract document that –*

- (a) carries clear definition of risks and their allocations;*
- (b) is designed for effective contract management of time, cost, safety and quality;*
- (c) is designed to be simpler to read and understand; and*
- (d) contains an effective means to settle disputes as risks materialise.*

*Similarly, we recommend that the industry coordinating body proposed to be set up in Chapter 9 should, in consultation with concerned stakeholders, lead a review on the*

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<sup>7</sup> Jesse B Grove III

<sup>8</sup> Now defunct.

*Standard Form of Building Contract, Private Edition with a view to achieving the same objectives.'*<sup>5</sup>

[My *Emphasis*]

In the light of these clear and positive recommendations in relation to risk allocation in respect of unforeseen ground conditions and third party's lawful interference (predominantly u/u apparatus), I review below what major changes have occurred in HKG procurement of civil engineering since the Tang Report.

19. In relation to unforeseen physical conditions it should be pointed out that the 1999 edition of the Design and Build GCC, HKG included options for GCC Clause 13(2) <sup>v</sup>. The first option was to include a version of the 'unforeseen ground conditions' clause which required the contractor to bid a Method Statement which included a 'Sub-surface assessment' as a baseline geological interpretation. At the commencement of the contract investigations are undertaken to validate the contractor's assessment or establish to what extent actual conditions varied. If the actual conditions encountered were significantly better or worse than the assessment and the contractor's design, methods or temporary works needed to be changed, then adjustments to prices and/or time for completion could be established by the SO after consultation. The second option was for the existing clause as quoted in the End Notes below <sup>v</sup>. I am not aware that the first alternative clause has ever been used.

## **Utility Risks Today**

20. In a decade where much in the world has changed irrevocably (and not necessarily for the better) it is interesting to chart changes to the placement of u/u risks in the HKG civil engineering standard forms. How many of the u/u risks identified in the UWG Report and recommended to be abolished or transferred back to the Employer by all three reports still remain? Have the promised administrative procedures made the situation any better?
21. Firstly, identification of the risks. When the UWG report was published, more accurate non-invasive techniques for identifying u/us began to become available. Ground radar, inductive metal detectors and the like were becoming available and useful to identify the depth and location of u/us. They could sometimes, though not always, identify abandoned u/us. At the same time GIS & GPS techniques were improving dramatically and u/us were beginning to make systematic data-bases of their new or revised services to a level of accuracy previously not possible, or at least attempted. However, it will be a fair time before all records are so held. Paper will still need to be consulted – time will be spent so doing. The problem of abandoned services will remain for many years. Further, the non-invasive techniques do not always identify the full plan extent of services – thrust blocks, for example, may not be fully identified.

22. There is now in place for contracts over a certain size a provision for Systematic Management of Risks <sup>9</sup>. This places on the designer and the contractor an obligation to identify, avoid or where avoidance is not possible, mitigate and manage all residual risks to project completion, time and budget. I would be interested to hear feedback from participants whether SMR has reduced the risk of u/u delays.
23. HKG has also implemented the Construction Design and Management system <sup>10</sup> (based on the UK CDM system) for selected contracts which requires, initially the designer and then the contractor to identify and address risks to health and safety and to prepare appropriate plans to avoid or mitigate the identified risks.
24. HKG has now recognised that the existing GCC Cl. 50(1)(b)(xi) <sup>i</sup>, limiting as it did EOT entitlement to situations where a u/us have failed to comply with their programme agreed with the contractor (post contract), was potentially very unfair in the type of situation where a contract was made impossible or nearly impossible by virtue of u/us inability to make diversions within the contract period – perhaps long lead-time cables might be needed. A contractor could become liable for a fundamental breach of contract and liquidated damages unless a claim under the impossibility provisions was to succeed. ETWB TCW 17/2004 promulgates a new entitlement for EOT ( but not Cost) in clause sub-clause 50(1)(b)(ixa) <sup>11</sup>:
- “(ixa). Any utility work directly connected with but not forming part of the Works and which in the opinion of the Engineer/Architect/Supervising Officer could not have been foreseen by an experienced contractor based on the information available as at the tender closing date, or”*
25. ETWB TCW 17/2004 goes a long way to addressing the u/u issues identified as problematic in all three of the reports <sup>vi</sup>. Project officers are encouraged to prepare the best possible information to satisfy themselves that there is a possible and workable solution to the problem including identification of major u/u problem areas or uncertainties in the contract documents. I am also pleased to see that project officers are encouraged to consider alternative proposals put forward by contractors to reduce their costs and delays <sup>vii</sup>.
26. Finally, I note that a ‘change of laws’ clause has been incorporated <sup>12</sup>.
27. In reviewing the steps taken by HKG since the Tang Report, I am impressed to see that many of the recommendations of all three reports have been actioned. The net effect of all the changes mentioned ought to be to reduce the risk of unforeseen u/u events and to give greater certainty to completion times. It is too early to say with any confidence yet whether the overall incidence of u/u problems has reduced.

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<sup>9</sup> ETWB TCW No. 6/2005

<sup>10</sup> Published by ETWB [2006]

<sup>11</sup> ‘Impossibility/Unforeseen Ground Conditions/Utility Interference’ ETWB TCW 17/2004 See extracts at End Notes

<sup>12</sup> ETWB TCW No. 23/2004

## However...

28. GCC Cl. 63(d) remains unaltered and, since it is the only contractual provision available to the Engineer/Architect/SO against which he could certify payment for delay caused by u/us, the position of HKG in respect of Costs incurred by contractors in accommodating u/u delays has not changed. In effect, HKG is requiring the construction industry to act as its insurer in respect of delays caused by u/us, notwithstanding that it recognises, in its excellent 'Impossibility/Unforeseen Ground Conditions/Utility Interference' paper (TCW 23/2004 see extracts at <sup>vi</sup> ), that it picks up the bill in the long term.
29. For the reasons excellently explained by the Tang Report at paras 5.53 to 5.59, and as recommended in the Jesse B Grove Report and the UWG Report, I think that HKG has got this wrong. I do not think that HKG's stance follows the principles set out in Tang §5.55(a) to (g) (See para. 15 above). I really do not believe that payment for u/u delays would remove the incentive for contractors to complete within the contract period (Tang §5.56: '*...the contractor would have no incentive to mitigate delays if the Government were to accept the risk...*'). I would be astonished if a contractor were to prefer to sit on a u/u delayed site being paid Cost for his plant and man-power resources rather than be employing them on a different site and having the potential of earning a profit.
30. In my view there is a simple solution: prepare the best possible u/u drawings using all the up-to-date techniques; schedule all necessary u/u movements to accommodate the permanent works, and if necessary complex temporary works; provide duration to complete; notice to commence; and any necessary timing of conflicting or different u/us works; all pre-agreed with the u/us; and include these drawings and schedules in the contract. All changes from these drawings and schedules (including the discovery of uncharted u/us) are variations of the works. Simple – nothing else needs to be done – if delays arise as a result of such variations, then delay costs are payable under Cl.63!

John P Elsdon

October 2009

## END NOTES

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### <sup>i</sup> **HKG GCCs**

- Cl. 16 – the Contractor is to provide a programme including allowance for u/u apparatus within 14 days of commencement;
- Cl. 34(1) - afford reasonable facilities to a u/u carrying out work not included in the contract but required by the employer;
- Cl. 50(1)(b)(ix) - provides for the Contractor to receive EoT if a u/u “...fail[s] to commence or to carry out in due time...” any work directly affecting the Works “...provided that the Contractor has taken all practical steps to cause the u/u...to commence or proceed with such work...”;
- Cl. 63(d) allows the Contractor to receive delay cost if “...the delay [is] caused by any person or company, not being a [u/u], engaged by the Employer in supplying materials or executing works directly connected with but not forming part of the Works.”...

### <sup>ii</sup> **HKG GS [Note: This document now superseded by 2005 edition.]**

- GS1.08(3)(e) Contractor to provide 3-month rolling programme including details of u/u’s works within 14 days of commencement;
- GS1.08(4) Contractor to be responsible for arranging, coordinating and agreeing a programme for u/u works making full allowance for time and provision of facilities for u/u work in his programme;
- GS1.22(1) Contractor to advise Engineer if any u/u apparatus which is not scheduled to be diverted does require diversion to enable works to be executed;
- GS1.24(1) Information given in contract about existing u/u services is not warranted. The Contractor is to make his own enquiries and investigate and locate services
- GS1.24(2) requires the contractor to provide temporary support to u/u apparatus;
- GS1.24(3)(c) requires to Contractor to advise the Engineer if utilities are discovered not on the Drawings; and (d) if diversion of them is required;
- GS1.24(4) requires the Contractor to take all steps necessary for the u/us to proceed with the works agrees in the GS1.08 programme; to maintain close liaison and to inform Engineer of any delays.

### <sup>iii</sup> **Best Practice**

- Detailed design including an assumed method of construction should be discussed with utilities prior to tender and included in tender information at employer’s risk;
- Latest information on utilities should be included;
- Utilities should be diverted in advance of main contract works (MTRC practice) - heed to be given to minimise public inconvenience due to repeated road openings;
- If advance diversion is not possible, land resumption should allow sufficient land to place temporary diversions on the basis of the assumed method;
- Designers should recognise that u/us have different needs for site occupation - electrical cables should be laid in long lengths to avoid jointing losses, gas/water pipes can be laid in much shorter lengths.

### <sup>iv</sup> **Legal Background**

- Utility undertakers (“u/u”) occupy land either through their enabling Ordinance or through their individual Block Grants of land from the Government (“HKG”);
- The Ordinances and the Block Grants oblige u/u to move, divert, replace or otherwise amend their services, when required by HKG at their own expense;
- U/u defray the expense of this obligation by charging the cost through to their customers.

### <sup>v</sup> **HKGCC Clause 13(2)**

“No claim by the Contractor for additional payment shall be allowed on the ground of any misunderstanding in respect of the matters referred to in sub-clause (1) [deeming clause similar to ICE4 12(1)] of this clause or otherwise or on the ground of any allegation or fact that incorrect or insufficient information was given to him by any person...or of the failure of the Contractor to obtain correct and sufficient information, nor shall the Contractor be relieved from any risk or obligation imposed on or undertaken by him under the Contract on any such ground or on the ground that he did not or could not foresee any matter which may in fact affect or have affected the execution of the Works.”

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<sup>vi</sup> **Extracts from ETWB TCW 17/2004:**

**'Basic Principles**

4. The current standard forms of public works contracts place the risks of unforeseen ground conditions and interference by utility work on the contractors. It is acknowledged that the Government, being a long term employer in the construction and maintenance of major infrastructures, will in the long run bear all the costs of the works, including the cost of the risks, either under the same contract or in subsequent contracts as these risks and the associated costs are inevitably reflected in the tender price. It is therefore in the interest of the Government to reduce these risks or to minimize the overall cost of the risks wherever practicable.

5. As to utility interference, the existing GCC has already dealt with delays due to unreasonable working period caused by utility undertakings but it falls short of a provision to address the delay caused by unforeseen utility work. To alleviate these risks which are now presently placed on the contractors, a SCC is promulgated to allow extensions of time to be granted to the contractor for these events.

6. In accordance with GCC 15, the contractor is excused from performance if strict compliance with the terms of the contract is physically or legally impossible. There is therefore a need for the Employer to check that the works to be carried out under the contract are feasible. If a contract anticipates extreme difficulties in the execution of the works contained therein and these difficulties cannot be accurately ascertained in the design stage, these risks should be explicitly spelt out during the tender stage for the tenderers' consideration.

**Guidelines**

7. Works departments should observe the following guidelines on risk management with respect to physical and legal impossibilities, unforeseen ground conditions and interference by utility work in carrying out the design and in preparing the tender documents. Although the guidelines are meant to be for capital works and term contracts, the same principle is equally applicable to design and build contracts.

(a) Project officers should arrange to carry out all necessary site investigations and satisfy themselves that sufficient ground information has been made available prior to commencement and during the detailed design. The extent of ground investigation and/or geotechnical analysis should be adequate for estimating construction cost and duration to an acceptable degree of accuracy.

(b) Before the completion of the detailed design, project officers should satisfy themselves that the utility records obtained from utility undertakings or other sources are reasonably accurate. Depending on the scale and nature of the contract, the project officers should conduct desk search and, if necessary, site inspection for the purpose of verifying the utility records. For example, check against other available records and check on site that the manholes do exist at the locations indicated on the utility records. In areas of potential conflicts between the utilities and the permanent works which might have serious impact on the works, project officers should consider carrying out inspection pit excavation to verify the exact locations of these utilities. At the design stage, project officers should investigate the existence of any buried underground structures such as abandoned old seawalls, pile caps, etc. within or in the vicinity of the works site and should verify the accuracy of the records of these buried structures. Should there be uncertainties about the effect of any underground structures on the design and cost of the temporary works and/or permanent works, such uncertainties should be explicitly mentioned in the tender documents so that the associated risk can be priced in the relevant BQ items by the tenderers.

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(c) For practical reason such as works site not yet cleared or not available during the design stage, it may be desirable for the project officers to have more site investigation data or utility search after the occupation of the works site with a view to verifying the ground condition and hence confirming the design prior to tender. Following contract commencement, such investigation work should be kept to a minimum, preferably confined to those needed to confirm a design, by providing appropriate provisional items in the BQ stated for such a purpose, or to cater for changes and variations to a design by issuing variation orders for the investigation works. The contract documents should state clearly that the contractor would be responsible for any investigation works necessary to carry out his obligations under the contract, such as temporary works, by way of the inclusion of a Particular Specification clause.

(d) Whilst it is the policy to adopt lump sum contract as far as practicable in order to have certainty on contract cost, project officers should consider to adopt remeasurement approach for underground works such as excavation in roads, disposal of unsuitable materials, imported fill and pile foundations all of which may have a significant bearing on the cost of the contract. Where unforeseen ground conditions might have a substantial impact on the required temporary works, consideration may be given to providing separate items in the BQ for these temporary works. For example, temporary works for tunnelling under soft ground condition with high ground water table may warrant a separate item in the BQ rather than having them included in the tunnel lining items.

(e) For multi-disciplinary projects involving a close link among the contractors of different trades, adequate contract provisions should be put in place to control interfacing issues to minimize potential conflicts and delays. For example, sectional completions of the works should be defined in the contract documents as far as practicable to tie in with the required sequence of handing over of sites between contractors. The party responsible for the delays would bear the consequential loss of the affected parties, probably by way of inserting measurable items for delayed handing over of site to compensate the delayed contractor and the application of liquidated damages on the contractor causing the delay.

(f) The best way to minimize the risks of a contract is to ensure that there exists a reasonably workable solution in compliance with the contract requirements. Typical issues requiring special attention are availability of suitable dump site or imported fill material, adequate time and room for all utility installations and diversions including temporary diversions during all stages of the works, safety issues and maintenance of the traffic flow. Project officers should take due consideration of possible changes, favourable or unfavourable, during the design stage when a workable solution within the proposed construction period is drawn up. For this purpose, project officers should draw up a construction programme for contracts valued at \$200M or above together with all necessary construction methods and temporary works arrangement, traffic diversion arrangement, safety measures etc. for the critical activities with a view to demonstrating that there exists at least one workable solution in fulfilling all the contractual requirements. The workable solution, programme etc should be kept for internal use and assessment only.'

vii **Extracts from ETWB TCW 17/2004:**

8. 'If during the course of a contract, the contractor encounters unforeseen adverse ground conditions or disturbance by unforeseen utility work, the Engineer/Architect/Supervising Officer should consider alternative solutions to the issue whenever possible, having considered all relevant circumstances including possible liquidated damages the Employer can recover; total cost of the works and the period of construction involved. Sometimes an

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alternative solution which is not favoured by the Employer due to additional cost and risk may be favourable to the contractor. In that case, the contractor may propose the alternative solution with the appropriate terms for consideration by the Employer. Project officers should seriously consider the alternative solution in order to reduce the contractor's exposure to risk while safeguarding the Employer's interest to achieve a win-win result.'