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28 August 2002

Highways Department Technical Circular No. 7/2002

Administration of Design and Build Contracts

Introduction

1. This circular contains guidelines on how to administer design and build contracts so as to avoid disputes after commencement of the contract and to ensure that adequate financial control is exercised, particularly when handling variations during the currency of a contract. This circular requires that contract payments will be made by reference to cost centres for the principal items of work and an interim payment schedule with milestones in accordance with the standard Special Conditions of Contract Clause 28 given in Appendix H of the Administrative Procedures in paragraph 2 below. The use of any other payment method shall require the approval of a D2 officer or above.

2. This circular should be read in conjunction with:-

(a) Works Bureau Technical Circular No. 31/99 - The Government of the Hong Kong Special Administrative Region General Conditions of Contract for Design and Build Contracts 1999 Edition (GCC);

(b) Administrative Procedures for Use with the Government of the Hong Kong Special Administrative Region General Conditions of Contract for Design and Build Contracts 1999 Edition (Administrative Procedures);

(c) Chapter 7, Project Administration Handbook; and

(d) relevant Environment, Transport and Works Bureau (Works)'s technical circulars and Highways Department's technical circulars

### Design and Build (D&B) Contracts

3. The rationale for procuring project delivery by means of a D&B contract is contained in the above Administrative Procedures.

4. For conventional contracts the design is carried out by using in-house resources or by employing the services of a consultant. For a D&B contract the design is carried out by a designer appointed by the Contractor.

5. At pre-tender stage the project office in conjunction with other offices and departments, if the project involves other engineering disciplines, has to draw up a series of specifications. These will incorporate all the elements and requirements that the end user or the client wants included in the project. The series of specifications is called the Employer's Requirements (ER's). The ER's should clearly specify the scope and function of the works, minimum acceptable design standards and construction specifications, and any requirements related to the design checking process and the management of submissions. Subject to paragraph 21 below, the project office in the Highways Department that coordinates the drafting of the ER's shall as far as possible and just before calling tenders obtain an assurance from other client offices that the latest requirements have been given full consideration in order that no changes will be made to the ER's during the currency of a contract.

6. When drafting the ER's, it is important to make them as clear and precise as possible. The use of words such as "etc." shall not be permitted. A well drafted set of ER's will not only assist tenderers in pricing the work to be done under the contract but will also reduce the chances of disputes arising from ambiguities and different interpretations of the contract requirements at the construction stage. The project office should ensure that the relevant offices/departments have checked and confirmed the adequacy and correctness of those sections of the ER's within their purview. Also, the project office should carry out a comprehensive check for inconsistencies or conflicts between the sub-sections of the ER's that have been prepared by other offices or departments.

7. A realistic construction programme/completion dates of key activities should be given in the ER's. Attention should be paid to setting out realistic targets for sectional completions. Great care should be exercised when deciding on the time allowed for design submissions and design approvals, particularly where other Government departments or authorities are involved.

8. Under the GCC's, powers in relation to programme control are limited, principally due to the fact that the details of the design programme are decided by the Contractor. In order to exercise greater control over the design process, the project office shall at the same time as drafting the ER's specify milestones in the design Cost Centre to cover the principal and critical activities. At the tender stage, each tenderer will be required to enter a minimum percentage of the total tender sum against the design Cost Centre thereby giving the successful tenderer a financial incentive to complete the design process in accordance with the time laid down in the ER's. The design cost will depend on the complexity of the

project. As a general guideline, the value should range between 3% and 7% of the total tender sum. A sample pricing document is given in Appendix A.

9. Depending on the nature of the D&B contract, disputes may arise at the design stage with respect to different interpretations of which design parameters and codes are applicable. In order to resolve disputes quickly and to avoid the lengthy process of mediation/arbitration, the services of an assessor/Dispute Resolution Adviser jointly appointed by the Contractor and the Employer could be used. An informal list of Dispute Resolution Advisers is currently managed jointly by the HKCA and Arch S D. At present, Environment, Transport and Works Bureau (ETWB) is considering the details of Dispute Resolution Adviser selection and appointment procedures. Standard Special Conditions of Tender and Special Conditions of Contract will be drafted by the Legal Advisory Division, ETWB. Meanwhile, for urgent cases, the project office should consult ETWB and the Contract Adviser in selection and appointment of the Dispute Resolution Adviser.

10. The use of an assessor/Dispute Resolution Adviser may not be necessary for all D&B contracts. It is up to the project office to decide on whether an assessor/Dispute Resolution Adviser is needed.

11. At the tender stage, the tenderer is normally required to carry out design work together with any specifications to a pre-determined extent, which should be in compliance with the ER's, and to submit a tender based on his design. The tender is called the Contractor's Proposals.

12. The ER's and the Contractor's Proposals form part of the contract. After contract award the Contractor is entirely responsible for developing his design and obtaining any

necessary approvals before construction proceeds, all in accordance with the ER's. In theory, there should be no conflict between the ER's and the Contractor's Proposals. However, there may be circumstances where this turns out to be not the case. GCC Clause 5 provides the order of precedence for documents contained in the contract. In the case of the ER's, they have precedence over the Contractor's Proposals.

#### The Supervising Officer (SO)

13. For D&B contracts the term Supervising Officer (SO) replaces the Engineer as used in conventional contracts. The duties of the SO are essentially the same as the Engineer, particularly in respect of construction supervision.

#### Duties of the Supervising Officer

14. The specific duties of the SO in the checking of the Contractor's design depend on how the design checking procedures have been set out in the ER's. If these require that the Contractor appoint a Design Checker, then the SO has to satisfy himself as to the adequacy of the design check before giving consent to proceed to construction. The granting of consent by the SO is essentially a technical audit that the design check has been properly carried out. It is important to note that the GCC's do not empower the SO to approve the Contractor's design; they only empower him to give consent to proceed to construction. If the ER's do not require that the Contractor appoint a Design Checker, then the SO will carry out the design checking. For the case of in-house managed D&B contract and depending on the complexity of a project, the level of design checking required and the availability of staff resources, the Employer may appoint a design checking engineer through the usual consultant selection procedures to assist the SO in checking the Contractor's design. Caution

should be exercised if the latter option is adopted due to possible conflicts of interpretation of design codes and good practice between the Contractor and the SO. Such potential conflicts should be eliminated if the ER's are clearly stated in the contract. Also, conflicts may arise if design submissions are not submitted in accordance with the Contractor's works programme and there is no timely response from the SO. Reasonable time for response from the SO upon receipt of the Contractor's design submissions, say within 3 weeks or a longer time as determined by the project office, should be spelt out in the ER's.

15. The SO's construction supervision duties under a D&B contract with a Quality Assurance (QA) system are essentially those of a compliance check. The SO should satisfy himself that appropriate levels of supervision are being provided by the Contractor, that tests are being carried out according to relevant standards, and that they are sufficiently timely and sufficiently frequent. In general, the SO will be carrying out ad-hoc monitoring, auditing and verification of the QA system.

16. According to HyD's experience in D&B contracts, the duties of the SO in the supervision of construction of critical works and site safety should not be significantly different from those for the Engineer supervising a conventional contract. The GCC's require the Contractor to provide supervision to undertake testing and commissioning of any part of the contract works. The SO may or may not witness any testing or commissioning but in any case, the Contractor is required to give details in writing of the results of the testing and commissioning. In general, all material compliance testing must be done through the Public Works Laboratory unless otherwise agreed by CGE/M in accordance with WBTC No. 14/2000.

17. The GCC clauses on the checking of materials and workmanship are analogous to those general conditions in conventional contracts. Notwithstanding the fact that D&B contracts invariably require the Contractor to implement a QA system through the ER's, the degree of checking by the SO on the Contractor's materials and workmanship should not be lower than that in conventional contracts. The SO should carry out checks on critical activities such as piling, prestressing, roadside slopeworks, especially, but not exhaustively, compaction of fill in major fill slopes, soil nailing and rock anchor works.

18. The responsibilities of the SO for site safety supervision duties are the same as a conventional Engineer's design contract incorporating the provisions of WBTC 14/98 - Construction Site Safety Manual Chapter 3 Sections 4 to 11 and as amended by WBTC No. 30/2000 and TCW No. 30/2002.

#### Ordering Variations

19. In theory, variations for D&B contracts should not be required. However, in practice variations are required usually as a result of changing circumstances during the currency of the contract.

20. Variations are ordered by the SO and may be proposed by the Contractor. Variations shall only be ordered by the SO who shall satisfy himself that such variation orders are for the satisfactory completion of the Works or desirable for the functioning of the Works. A variation inadvertently instructed by the Employer or other Government departments or authorities must be immediately ratified or clarified by the SO in order to avoid unnecessary disputes. A D&B contract requires a wholly different approach to variations than the conventional

reactive role of the Engineer for a conventional contract. A more proactive role is necessary to distinguish changes from design development, decide what are variations, decide if they are extras or savings and to elicit a fair and reasonable valuation where applicable. It should be remembered that a variation is basically a change to the ER's and as such places the Employer at a higher level of risk compared with the situation where a Contractor's variation is instructed. In certain situations, the SO will be required to obtain the Employer's view before instructing a variation. Approval requirements for variations laid down in HyDTC No. 6/2002 should be followed.

21. There may be situations, for example, for time critical projects or those having complicated interfaces with adjacent projects, where the Employer may need to change the ER's. For these types of project, the ER's should be constantly reviewed by the project office in conjunction with developments on site so that any changes, such as design modifications, are handled in a proactive manner thereby enabling changes to be made in an efficient and effective manner. Where such changes to the ER's do not fall within the provision of GCC Clause 60, they shall be implemented only upon the Employer entering into a supplementary agreement. LAD/WB's legal vetting of the draft supplementary agreement should be sought.

#### Variations Ordered by the SO

22. Under GCC Clause 60(1), the SO may order in writing a variation that is necessary for completion of the works or is in his opinion desirable for or to achieve the satisfactory completion and functioning of the works. The Contractor is obliged to carry out the variation in accordance with the SO's instruction. However, if the variation involves a significant alteration or modification to a design already checked, then



the Contractor's consent is required. Such consent may not be unreasonably delayed or withheld. In this type of situation, particular care should be exercised by the SO in the issuing of a variation. Previous design work may well be abortive and additional designs will almost certainly have a knock-on effect on the Contractor's design programme. The time and cost implications must be thoroughly assessed before issuing a variation in these circumstances. The opportunity for claims and disputes increases a great deal if this is not done. In any case, necessary approval for ordering the variations shall be sought pursuant to the Stores and Procurement Regulations.

23. Under GCC Clause 60(3) the SO may include in the variation a requirement that the Contractor submit within 14 days of receiving a variation order a lump sum quotation for complying with the order. The use of this clause shall be discouraged as it could lead to disputes. The preferred way is to ask the Contractor under GCC Clause 60(4) to submit a lump sum quotation for complying with the variation prior to it being issued. This permits negotiations to take place to agree the final cost of the variation. If no agreement can be reached and a variation is not ordered, the Contractor is entitled to the cost of preparing the lump sum quotation, the cost being determined by the SO. The lump sum quotation should include any prolongation cost arising out of the variation. The extension of time should also be agreed by the Contractor before issuing of the variation order. Failure to secure written agreement to terms and conditions attached to the issue of a variation can lead to serious consequences (even a minor variation in terms of perceived work value can lead to substantial contractual implications of delay and prolongation). Unless for urgent works, unequivocal agreement to the terms and conditions of a variation shall be reached prior to issuing the variation. Where the estimated value of

the variation exceeds the limit vested in the SO, the necessary approval from the relevant authority shall be sought.

24. While the SO should use his best endeavour to agree the value of the variation with the Contractor prior to issuing the variation order, it may not always be possible to do so. In that case, the SO shall determine the value of the variation in accordance with GCC Clause 61(4) if such variation is desirable for the satisfactory completion or functioning of the Works.

#### Variations Proposed by the Contractor

25. GCC Clause 60(5) allows the Contractor to propose a variation. However, his proposal must contain sufficient detail to show that he can fulfil the criteria laid down in GCC sub-clauses 60(5)(a)(i) to (v). Under GCC sub-clause 60(5)(b) the SO is required to respond to the proposal within 14 days or within a time period agreed with the Contractor. There is no contractual requirement for the Employer to accept a Contractor proposed variation, although the Employer/SO shall carefully consider any such proposals. If he considers the Contractor's proposed variation is acceptable, then the SO issues a formal instruction to order the variation. Under GCC sub-clause 60(5) if the variation is accepted a reduction of the contract sum is allowed, an increase is not.

26. On conclusion of the assessment of the Contractor's proposed variation, the SO may recommend to the Employer acceptance of the variation provided that the variation :-

- (a) is cost effective on a whole-life basis;
- (b) is aesthetically and technically acceptable;
- (c) offers acceptable standards for future maintenance;

- (d) is designed in accordance with appropriate Codes of Practice; and
- (e) is not of a lower standard by design specification or construction than that laid down in the ER's and the Contractor's Proposals.

### Valuing Variations

27. Variations, excluding those proposed by the Contractor, are valued in accordance with GCC Clause 61. Recourse to this clause is required in cases where the SO is unable to accept or agree with the Contractor's lump sum quotation. GCC Clause 61(2) requires the SO to take into account the cost, if any, of any disturbance to or prolongation of varied or unvaried work. It is very important that the SO thoroughly assesses this element of the valuation so as to avoid claims by the Contractor later on. A critical examination of the effect of the variation on the Contractor's latest programme will be required.

28. For lump sum quotations the Contractor is required under GCC Clause 61(5) to give a breakdown of, inter alia, the cost (if any) of any disturbance to or prolongation to varied or unvaried works as a consequence of complying with the variation order. The SO should obtain an unambiguous undertaking from the Contractor that in the event that a variation is issued, the Contractor will not submit any subsequent claims for disturbance to or prolongation to varied or unvaried work, whether design or construction related.

29. When assessing a Contractor's proposed variation, the SO in addition to the criteria laid down in GCC sub-clauses 60(5)(a)(i) to (v) shall also consider the variation in the light of the ER's and the Contractor's proposals. Attention should be paid to the following aspects:-

- (a) the price to complete the Works and savings to the Employer;
- (b) feasibility of the proposed variation;
- (c) engineering merit of the proposed variation vis-à-vis the Contractor's Proposals;
- (d) assessment of future maintenance costs vis-à-vis the Contractor's Proposals;
- (e) assessment of the appearance vis-à-vis the Contractor's Proposals (in the case of highway structures, the appearance of the structure is required to be considered by the Advisory Committee on the Appearance of Bridges and Associated Structures - ACABAS);
- (f) whether the Employer might incur additional expense in the event that the Supervising Officer needs to vary adjacent works during the Contract;
- (g) assessment of the risk of the Contractor's failure to perform;
- (h) estimation of additional cost or savings of supervising the Works, and
- (i) adherence to the design criteria and particular requirements and planning constraints.

(Original signed)

( R. H. Lloyd )

Ag. Director of Highways