Ref: BD _____

Address: _____

Appendix _____ to approval dated _____

Anchorage System for Flexible Barrier Works

In giving this approval of plans, I hereby impose the following conditions under item 6 in section 17(1) of the Buildings Ordinance (BO).

(a) Sampling and testing of steel reinforcing bars used in the anchorage system for flexible barrier works should be carried out in accordance with CS2:2012. Testing should be carried out by a laboratory* accredited under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for the particular test concerned. Test results[@] should be reported on a HOKLAS Endorsed Certificate and submitted within 60 days of the delivery of the steel reinforcing bars to the site. The test reports should be appended with a statement signed by the registered structural engineer (RSE) to confirm the following:

(i) All steel reinforcing bars used in the anchorage system for flexible barrier works and the test specimens covered by the test reports are in accordance with the types and grades of steel shown in the approved plans.

(ii) Sampling and testing of steel reinforcing bars used have been carried out in accordance with CS2:2012.

(iii) The acceptance criteria appropriate to each type and grade of steel reinforcing bars used have been complied with.

(iv) Testing of steel reinforcing bars has been carried out by a laboratory* accredited under HOKLAS.

(b) The requirements of sampling and testing of grout are as follows:

(i) For each grout mix one sample of grout shall be provided from each ten batches of grout, or every 10 m^3 from the amount of grout produced in a day, whichever is the lesser, and at least one sample shall be taken from each grout mix produced on any one day to determine the crushing strength of the grout. Samples shall be provided not more than one hour after the grout has been mixed and shall be protected from weather before test cubes are made.

(ii) Compression testing of grout test cubes should be carried out in accordance with the methods specified in CS1:2010 using 100 mm size cubes. Testing should be carried out by a laboratory* accredited under HOKLAS for the particular test concerned. Test results[@] should be reported on a HOKLAS Endorsed Certificate and appended with a statement signed by the RSE to confirm that the acceptance criteria set

out in clause 10.3.4.2(b) of the Code of Practice (CoP) for Structural Use of Concrete 2013 have been complied with, and should be submitted within 21 days after testing.

(c) Qualified site supervision of the sampling of cement grout and making and curing of test cubes by experienced and competent persons should be provided to ensure that the works are carried out in accordance with the plans approved and that the required standards are complied with.

#(d) Sampling of concrete and compression testing of concrete test cubes should be carried out in accordance with the methods specified in CS1:2010. Testing should be carried out by a laboratory* accredited under the HOKLAS for the particular test concerned. Test results@ should be submitted within 21 days after testing. The test reports should be appended with a summary which contains information on locations of concerned structural elements, concrete grades and dates of cast. The summary should also include previous summary information of concrete cube test reports in chronological order. The test reports should also be appended with a statement signed by the RSE to confirm the following:

(i) All concrete used for the construction and concrete cubes covered by the test reports are in accordance with the concrete grades shown in the approved plans.

(ii) Concrete cube sizes, rates of sampling fresh concrete for testing and acceptance criteria for compressive strength set out in clause 10.3.4.2 of the CoP for Structural Use of Concrete 2013 have been complied with.

(iii) All concrete cube tests have been carried out by a laboratory* accredited under the HOKLAS and in accordance with the methods specified in CS1:2010.

#(e) Concrete should be obtained from concrete suppliers certified under the Quality Scheme for the Production and Supply of Concrete except for those exceptional projects permitted under clause 11.7.1 of the CoP for Structural Use of Concrete 2013 where documents should be submitted by the RSE at least one week prior to commencement of the works to prove that the concrete supplier is operating under an approved quality system.

#2. Under regulation 10 of the B(A)R, where wire ropes# and terminations components are adopted for the anchors, the following documents shall be submitted prior to the application of occupation permit or the submission of Form BA14 as appropriate:

(a) Type test report* by the manufacturer or purchaser test report* to justify the minimum breaking force of the wire rope. Testing of wire ropes shall make reference to relevant international standard compatible with the design principle, such as BS EN 12385-1.

#(b) Type test report* by the manufacturer or purchaser test report* to confirm the structural integrity of the terminations with respect to the acceptance criteria as specified in the corresponding standard compatible to the design, such as

BS EN 13411, of the terminations.

(c) Material certificate of the wire rope produced by the supplier including information, such as certificate number and date of issue, name of manufacturer or his authorized representative, quantity and length of rope, standard to which the rope conforms, rope designation and minimum breaking force etc.

#(d) A quality assurance and control plan from the fabricator of the terminations for record purpose. The quality plan shall include sufficient information related to the entire fabrication process, such as manufacturer's details, fabrication method statement and procedures, adopted conforming standards, type testing and material used, etc.

3. Your attention is drawn to the following conditions:

(a) Site supervision of the anchorage system for flexible barrier works by a team of supervisors shall be provided each by the authorized person, registered geotechnical engineer (RGE) and registered specialist contractor in accordance with the soil nail works in the Technical Memorandum for Supervision Plans 2009 and the CoP for Site Supervision 2009 to ensure that the quality of the works is up to standard and that the works are carried out in accordance with the plans approved and in such a manner as not to render inadequate the margin of safety of, or impair the stability of, or cause danger to any building, structure, land, street or services. The extent of supervision to be provided for different stages of the anchorage system for flexible barrier works should be made reference to the soil nailing works as provided in the CoP for Site Supervision 2009.

#(b) The technically competent person (TCP) T5 under the RGE's stream shall submit regular reports of his/her findings and recommendations to the RGE. The RGE shall formally submit these reports to the BD and copy them to the Geotechnical Engineering Office (GEO) at _____ intervals or more frequently.

#(c) In addition to the TCPs T3 and T5 under the RGE's stream as required in paragraph 3(a) above, a directorate site supervisor (DSS) shall be provided for the anchorage system for flexible barrier works. The name of the DSS shall also be given in the site supervision plan. The DSS shall submit regular reports of his/her findings and recommendations to the RGE. The RGE shall formally submit these reports to the BD and copy them to the GEO at _____ intervals or more frequently.

4. In connection with paragraph 3(a) above, details of site supervision of the works and of the quality of the anchorage system for flexible barrier works shall be included in the supervision plan and submitted prior to or at the time of application for consent to the commencement of the works.

#5. A report containing results of the site trials with clear statements on buildability and whether special methods of construction need to be adopted (and if so the details) should be submitted to the BD at least one week prior to the commencement of construction of the

working anchors.

6. The pull-out test report for the test anchor(s), records of installation and non-destructive test report (if any) for the working anchors should be submitted to and found satisfactory by the BD within 21 days after testing.

7. The TCPs of grade T3 shall carry out site inspection of the works and prepare and certify the key records on supervision of anchorage system for flexible barrier works in accordance with the soil nailing works of the CoP for Site Supervision 2009.

8. Prior notice should be given to the GEO of the date of commencement of site trials for anchors works/non-destructive tests for installed anchors in order to facilitate GEO to carry out site inspection and field checks.

9. All significant signs of distress and/or notable landslides during the construction works should be reported promptly to the BD and the GEO.

Delete wherever inapplicable.

* A Directory of Accredited Laboratories in Hong Kong is obtainable from the Hong Kong Accreditation Service (HKAS) Executive, Innovation and Technology Commission.

A laboratory's accreditation for an individual test or calibration may be granted, modified or withdrawn at any time. Up-to-date information on accredited laboratories and their scopes of accreditation are available on the internet at the HKAS website at http://www.itc.gov.hk/hkas/.

@ The test carried out by an accredited laboratory should be within its scope of accreditation. To ensure this, test results should be reported on a HOKLAS Endorsed Certificate or equivalent Certificate/Report issued from other laboratory accreditation bodies which have reached mutual recognition agreements/arrangements with the HOKLAS.

Laboratory/Organisation/Testing Agency for carrying out the test(s) should be independent of the Registered General Building Contractor (RGBC)/Registered Specialist Contractor (RSC).