



Multi-Purpose Terminal  
Port of Batumi  
**Draft Tender Documents**

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**Multi-Purpose Terminal Port of Batumi**  
**Project No.** \_\_\_\_\_

**INVITATION TO TENDER NO.** \_\_\_\_\_ **ISSUED BY**

\_\_\_\_\_  
(Name of Employer)

FOR A PROJECT FINANCED BY \_\_\_\_\_ (Name of Finance Institute)

The \_\_\_\_\_ [Name of Employer] (hereinafter referred to as Employer and Recipient) now invites sealed tenders from prequalified contractors for the following contract:

Design and construction of civil and building works in connection with:

- Development of a Multi-Purpose Terminal

Tendering for the contract is open to all eligible and qualified natural and legal persons of the Member States of the European Community or of the beneficiary countries of the Takis Programme and the goods must originate in one of these countries.

The following documents are issued to enable you to tender:

- Part A: The Tender
  - A.1: Instruction to Tenderers
  - A.2: Tender Data
  - A.3: Tender Form
  - A.4: Appendix to Tender
  
- Part B: The Contract
  - B.1: Agreement
  - B.2: Conditions of Contract
  - B.3: Annex A: Performance Security Form
  - Annex B: Advance Payment Guarantee
  
- Part C: Employer's Requirements
  - C.1: General
  - C.2: Design Requirements
  - C.3: Technical Specifications
  - C.4: The Drawings

Tenders must be delivered to the office at the address below on or before \_\_\_\_\_ [specify time and date of deadline for submission], at which time they will be opened in the presence of those tenderers' representatives who choose to attend.

Prospective tenderers may obtain further information from:

[Name of Employer]  
[Address & Tel / Fax ]

Part A:

The Tender

## Section 1

### Instructions to Tenderers

# Instructions to Tenderers

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## General

### 1. Scope of Tender

- 1.1 The Employer, as defined in the **Tender Data**, invites tenders for the construction of the Works, described in these tender documents and summarised in the **Tender Data**, in accordance with the procedures, conditions and contract terms prescribed in the tender documents.
- 1.2 The successful tenderer will be expected to complete the Works within the period stated in the **Tender Data** from the date of the commencement of the works.
- 1.3 Throughout these tender documents the definitions in the Conditions of Contract shall apply.
- 1.4 Throughout these tender documents Schedule of Works refers to:
  - (i) the Bill of Quantities, if the Contract is a unit price (rate) contract,
  - (ii) the Activity Schedule, if the Contract is a lump sum contract.

### 2. Source of funds

- 2.1 The Employer shall finance the investments out of own equity and funds.

### 3. Eligibility and qualifications

- 3.1 Subject to paragraph 2.1 above, this invitation to Tenders is open to contractors from any country unless specified otherwise in the Tender Data.
- 3.2 No affiliate of the Employer shall be eligible to tender or participate in a tender in any capacity whatsoever unless it can be demonstrated that there is not a significant degree of common ownership, influence or control amongst the Employer and the affiliate.
- 3.3 Where a firm, its affiliates or parent company, in addition to consulting also has the capability to manufacture or supply goods or to construct works, that firm, its affiliates or parent company normally cannot be a supplier of goods or works on a project for which it provides consulting services, unless it can be demonstrated that there is not a significant degree of common ownership, influence or control.
- 3.4 A tenderer may submit or participate in any capacity whatsoever in only one tender for each contract. Submission or participation by a tenderer in more than one tender for a contract (other than alternatives which have been permitted or requested) will result in the disqualification of all tenders for that contract in which the party is involved. However, this does not limit the inclusion of the same subcontractor in more than one tender.
- 3.5 In the event that prequalification of potential tenderers has been undertaken, only tenders from prequalified tenderers will be considered for award of the Contract. A prequalified tenderer should submit



with its tender any information updating its original prequalification application and confirm in its tender that the other original prequalification information submitted, remains essentially correct as of the date of tender submission.

- 3.6 If the Employer has not undertaken prequalification of potential tenderers, to qualify for award of the Contract, the tenderer shall meet the qualifying criteria specified in the Tender Data.
- 3.7 The tenderer shall submit the documentary evidence specified in the Tender Data, establishing that it satisfies the qualifying criteria referred to in paragraphs 3.5 or 3.6 above.

#### 4. Cost of tendering

- 4.1 The tenderer shall bear all costs associated with the preparation and submission of its tender, and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the tendering process.

#### 5. Pre-tender meeting or site visit

- 5.1 The tenderer is advised to attend any pre-tender meeting or site visit schedule in the **Tender Data**.
- 5.2 The tenderer is advised to visit and examine the site of works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the tender and entering into a contract for construction of the works. The cost of visiting the site shall be at the tenderer's expense.
- 5.3 The tenderer and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the tenderer, its personnel and agents, will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other losses damage, costs, and expenses incurred as a result of the inspection.

## Tender Documents

### 6. Contents of tender documents

- 6.1 The tender documents comprise the documents listed below, other documentation or drawings specified in the **Tender Data** and addenda issued in accordance with paragraph 8.

#### Invitation for Tenders

- Part A: The Tender
  - A.1: Instructions to Tenderers
  - A.2: Tender Data
  - A.3: Tender Form
  
- Part B: The Contract
  - B.1: Agreement
  - B.2: Conditions of Contract
  - B.3: Performance Security Form  
Advance Payment Security Form
  
- Part C: Employer's Requirements
  - C.1: General
  - C.2: Design Requirements
  - C.3: Technical Specifications
  - C.4: Drawings

- 6.2 The tenderer is expected to examine the tender documents, including all instructions, forms, contract terms and specifications. Failure to furnish all information required by the tender documents, or submission of a tender not substantially responsive to the documents in every respect, will be at the tenderer's risk and may result in the rejection of its tender.

### 7. Clarification of tender documents

- 7.1 A prospective tenderer requiring any clarification of the tender documents may notify the Employer in writing or by fax (hereinafter "fax" includes cable and telex) at the Employer's mailing address indicated in the **Tender Data**. All requests for clarification must be received by the Employer no later than twenty-eight (28) days prior to the deadline for the submission of tenders. The Employer will respond in writing to such requests for clarification of the tender documents which it receives. Copies of the Employer's response (including a description of the enquiry but without identifying its source) will be sent to all prospective tenderers that have received the tender documents.

### 8. Amendment of tender documents

- 8.1 At any time prior to the deadline for submission of tenders, the Employer may amend the tender documents by issuing addenda.

- 8.2 Any addendum thus issued shall be part of the tender documents and shall be communicated in writing or by fax to all prospective tenderers that have received the tender documents. Prospective tenderers shall promptly acknowledge receipt of each addendum by fax to the Employer.
- 8.3 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer may, at its discretion, extend the deadline for submission of tenders, in accordance with paragraph 17.2.

## Preparation of Tenders

### 9. Language of tender

- 9.1 The tender and all documents and correspondence relating to the tender exchanged by the tenderer and the Employer shall be written in the language of the tender specified in the **Tender Data**. Supporting documents and printed literature furnished by the tenderer may be in another language provided they are accompanied by an accurate translation of its pertinent passages in the language of the tender, in which case, for purposes of interpretation of the tender, the translation shall govern.

### 10. Documents comprising the tender

- 10.1 The tender submitted by the tenderer shall comprise the following:

- (a) a Tender Form [in the format indicated in Vol. I(iii)] completed in the manner and detail indicated therein and signed by the tenderer;
- (b) a Power of Attorney, duly authorised by a Notary Public, indicating that the person(s) signing the tender have the authority to sign the tender and thus the tender is binding upon the tenderer;
- (c) a Tender Security furnished in accordance with paragraph 14.
- (d) Price Schedules in accordance with paragraphs 11 and 12.;
- (e) documentary evidence in accordance with paragraph 3.7 establishing that the tenderer is qualified to perform the Contract if its tender is accepted; and
- (f) any information or other materials required to be completed and submitted by the tenderers in accordance with these tender documents and specified in the **Tender Data**.

- 10.2 The tenderer shall submit offers which comply with the requirements of the tender documents, including the basic technical requirements as indicated in the drawings and specifications. The attention of tenderers is drawn to the provision of paragraph 6.2 regarding the rejection of tenders which are not substantially responsive to the requirements of the tender documents. Alternatives will not be considered unless permitted in paragraph 10.3 below.

- 10.3 When alternatives are explicitly invited or permitted, a statement to that effect will be included in the **Tender Data** as will the submission requirements and the methods for evaluating such alternatives.

### 11. Tender prices

- 11.1 Unless specified otherwise in the **Tender Data**, the Contract shall be for the whole Works referred to in paragraph 1.1, based on the Price Schedules submitted by the tenderer.

- 11.2 The tenderer shall fill in prices for all items of the Works described in the drawings and specifications and listed in the Schedule of Works. Items against which no price is entered by the tenderer will not be paid for by the Employer when executed and shall be deemed covered by the prices for other items in the Schedule of Works.
- 11.3 All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date twenty-eight (28) days prior to the deadline for submission of tenders, shall be included in the prices and the total tender price submitted by the tenderer.
- 11.4 Unless specified otherwise in the **Tender Data**, the prices quoted by the tenderer are subject to adjustment during the performance of the contract in accordance with the relevant provision of the Conditions of Contract specified in the **Tender Data**. The tenderer shall submit with its tender all the information required under the relevant provision of the Conditions of Contract and specified in the **Tender Data**.
- 11.5 If so indicated in the **Tender Data**, a tenderer tendering for this contract, together with other contracts to form a package, will so indicate in the tender, together with any discounts offered for the award of more than one contract.

## 12. Currencies of tender and payments

- 12.1 The prices shall be quoted by the tenderer entirely in the currency specified in the **Tender Data**. A tenderer expecting to incur expenditures in other currencies for inputs to the Works, supplied from outside the Employer's country (referred to as "the foreign currency requirements") shall indicate its expected foreign currency requirements (excluding provisional sums) in the Tender Form and Price Schedules, in the manner and detail indicated therein. Foreign currency requirements can be quoted in any convertible currency or currencies (including ECU) or combination of these.
- 12.2 The rates of exchange to be used by the tenderer in arriving at the tender currency equivalent and the percentage(s) mentioned in paragraph 12.1 above shall be the selling rates for similar transactions established by the authority specified in the **Tender Data** prevailing on the date twenty-eight (28) days prior to the latest deadline for submission of tenders. These rates shall be listed by the tenderer in the Price Schedules and shall apply for all payments under the Contract so that no exchange risk will be borne by the successful tenderer. If the tenderer uses other rates of exchange, the provision of paragraph 24.1 shall apply for the purpose of evaluation of tenders. However, payments under the Contract will be computed, using the rates of exchange quoted in the tender.
- 12.3 A tenderer may be required by the Employer to clarify its foreign currency requirements and to substantiate that the amounts included in the prices, and shown in the Price Schedules, are reasonable and responsive to paragraph 12.1, in which case, a detailed breakdown of its foreign currency requirements shall be provided by the tenderer.

## 13. Tender validity

- 13.1 Tenders shall remain valid for the period specified in the **Tender Data**. A tender valid for a shorter period shall be rejected by the Employer as non-responsive.

- 13.2 In exceptional circumstances, the Employer may request that the tenderers extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing or by fax. A tenderer may refuse the request without forfeiting the tender security. A tenderer agreeing to the request will not be required or permitted to modify its tender, except as provided in paragraph 13.3 below. The Tender Security provided under paragraph 14 shall also be suitably extended.
- 13.3 Where the tender is for a fixed price contract (not subject to price adjustment), if the period of tender validity is so extended, the tender price of the successful tenderer will be adjusted up to the date of award of the contract, as provided for in the **Tender Data**, to arrive at the contract price. Tender evaluation will be based on the tender prices without taking into consideration the above adjustment.

## 14. Tender Security

- 14.1 If required in the **Tender Data**, the tenderer shall furnish, as part of its tender, a Tender Security in the amount specified therein.
- 14.2 The Tender Security is required to protect the Employer against the risk of the tenderer's conduct which would warrant the forfeiture of the security, pursuant to paragraph 14.7.
- 14.3 The Tender Security shall be denominated in the currency of the tender or other freely convertible currency and shall be, at the tenderer's option, in the form of a cashier's or certified cheque, bank draft, stand-by letter of credit, or bank guarantee issued by a reputable bank located abroad or is in the country of the Employer. The format of the bank guarantee shall be in accordance with the sample form of Tender Security included in Volume I.iv or in another form acceptable to the Employer. The Tender Security shall be valid for twenty-eight (28) days beyond the validity of the tender.
- 14.4 Any tender not accompanied by an acceptable Tender Security shall be rejected by the Employer as non-responsive pursuant to paragraph 23.4.
- 14.5 The Tender Security of unsuccessful tenderers will be return within twenty-eight (28) days of the expiration of the tender validity period.
- 14.6 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the Agreement and furnished the Performance Security, pursuant to paragraph 31.
- 14.7 The Tender Security may be forfeited:
- (a) if a tenderer:
    - (i) withdraws its tender during the period of tender validity, or
    - (ii) invalidates its tender pursuant to paragraph 21.3 or paragraph 23.6;
  - (b) in the case of a successful tenderer, if the tenderer fails to:
    - (i) sign the Agreement pursuant to paragraph 30, or
    - (ii) furnish the required Performance Security within the time limits specified in paragraph 31.

## 15. Format and signing of tender

- 15.1 The tenderer shall prepare one original of the documents comprising the tender as described in paragraph 10 of these Instructions to Tenderers, bound with the section containing the Form of Tender, and clearly marked "ORIGINAL". In addition, the tenderer shall submit copies of the tender, in the number specified in the **Tender Data**, and clearly marked "COPIES" In the event of a discrepancy between them, the original shall prevail.
- 15.2 The original and all copies of the tender shall be typed or written in indelible ink (in the case of copies, photocopies are also acceptable) and shall be signed by a person or persons duly authorised to sign on behalf of the tenderer, pursuant to paragraph 10.1(b), as the case may be. All pages of the tender where entries or amendments have been made shall be initialled by the person or persons signing the tender.
- 15.3 The tender shall contain no alternations, omissions, or additions, except those to comply with instructions issued by the Employer or, as necessary, to correct errors made by the tenderer. Any such correction shall be valid only if it is initialled by the person or persons signing the tender.

## Submission of tenders

### 16. Sealing and marking of tenders

- 16.1 The tenderer shall seal the original and each copy of the tender in separate envelopes, duly marking the envelopes as "ORIGINAL" and "COPIES". The envelopes shall then be sealed in an outer envelope.
- 16.2 The inner and outer envelopes shall:
- (a) be addressed to the Employer at the address provided in the **tender data**;
  - (b) bear the name and identification of the contract as defined in the **Tender Data**; and
  - (c) provide a warning not to open before the specified time and date for tender opening.
- 16.3 In addition to the identification required above, the inner envelopes shall indicate the name and address of the tenderer to enable the tender to be returned unopened in case it is declared "late" pursuant to paragraph 18, and for matching purposes under paragraph 19.
- 16.4 If the outer envelope is not sealed and marked as required above, the Employer will assume no responsibility for the misplacement or premature opening of the tender. If the outer envelope discloses the tenderer's identity, the Employer will not guarantee the anonymity of the tender submission, but this shall not constitute grounds for rejection of the tender

### 17. Deadline for submission of tenders

- 17.1 Tenders must be received by the Employer at the address specified in paragraph 16.2(a) no later than the time and date specified in the **Tender Data**.
- 17.2 The Employer may extend the deadline for submission of tenders by amending the tender documents in accordance with paragraph 8, in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will thereafter be subject to the deadline as extended.

### 18. Late tenders

- 18.1 Any tender received by the Employer after the deadline prescribed in paragraph 17 will be returned unopened to the tenderer.

### 19. Modification and withdrawal of tenders

- 19.1 The tenderer may modify, substitute, or withdraw its tender by giving notice in writing to the Employer before the deadline prescribed in paragraph 17.



- 19.2 The tenderer's modification, substitution, or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with paragraph 16, with the outer and inner envelopes additionally marked "MODIFICATION" , "SUBSTITUTION" or "WITHDRAWAL", as appropriate.
- 19.3 No tender may be modified by the tenderer after the deadline for submission of tenders.
- 19.4 Withdrawal of a tender between the deadline for submission of tenders and the expiration of the period of tender validity may result in the forfeiture of the tender security pursuant to paragraph 14.7.

## Tender opening and evaluation

### 20. Opening of tenders

- 20.1 The Employer will open the tenders, including withdrawals, substitutions and modifications submitted pursuant to paragraph 19, in the presence of the tenderers' representatives who choose to attend, at the time and in the place specified in the **Tender Data**. The tenderer's representatives who are present shall sign a register evidencing their attendance.
- 20.2 No tender shall be rejected at tender opening, except for late tenders, which shall be returned unopened to the tenderer pursuant to paragraph 18.
- 20.3 Withdrawal, substitution and modification notices shall be opened and announced first. Tenders for which a notice of withdrawal has been submitted pursuant to paragraph 19 shall not be opened, but will be returned to the tenderers.
- 20.4 The tenderers' names, the tender prices, the prices of any alternative (if alternatives have been requested or permitted) any discounts, tender deviations, the presence or absence of tender security and any such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Subsequently, all modifications shall be opened and the submission therein read out in appropriate detail. Tenders (and modification submitted pursuant to paragraph 19) that are not opened and read out at tender opening will not be considered further for evaluation, irrespective of the circumstances.
- 20.5 The Employer shall prepare minutes of the tender opening, including the information disclosed to those present, in accordance with paragraph 20.4.

### 21. Process to be confidential

- 21.1 The tender evaluation process up to the award of a contract is confidential.
- 21.2 Information relating to the examination, clarification, evaluation and comparison of tenders, and recommendation for the award of a contract, shall not be disclosed to tenderers or any other persons not officially concerned with such process until the award to the successful tenderer has been announced.
- 21.3 Any effort by a tenderer or its agents to influence the Employer's evaluation of tenders or award decision, including the offering or giving of bribes, gifts, or other inducement, may result in the invalidation of its tender and the forfeiture of its tender security, pursuant to paragraph 14.7.

### 22. Clarification of tenders

- 22.1 To assist in the examination, evaluation, and comparison of tenders, the Employer may, at its discretion, ask any tenderer for clarification of its tender, including breakdowns of its prices. Such clarification may be requested at any stage up to the contract award decision. Requests for clarification and the responses shall be in writing or by fax and no change in the price or substance of the tender shall

be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the tenders in accordance with paragraph 23.

## 23. Examination of Tenders

23.1 Prior to the detailed evaluation of tenders, the Employer will examine the tenders to determine for each tenderer whether:

- (a) it is complete;
- (b) the documents have been properly signed;
- (c) it is accompanied by the required tender securities; and
- (d) it is substantially responsive to the requirements of the tender documents.

The Employer may require the tenderer to provide any clarification and/or substantiation to determine responsiveness pursuant to paragraph 23.2

23.2 A substantially responsive tender is one which conforms to all the terms, conditions, and specifications of the tender documents without material deviation or reservation. A material deviation or reservation is one:

- (a) which affects in any substantial way the scope, quality, or performance of the works;
- (b) which limits in any substantial way, inconsistent with the tender documents, the Employer's rights or the tenderers' obligations under the contract; or
- (c) the rectification of which would affect unfairly the competitive position of other tenderers presenting substantially responsive tenders.

23.3 The Employer may waive any minor informality, non-conformity or irregularity in a tender which does not constitute a material deviation, provided that such waiver does not prejudice or affect the relative ranking of any tenderer. Wherever practicable and appropriate, the tender price will be adjusted for such deviations in accordance with paragraph 25.2(d) for evaluation purposes only.

23.4 If a tender is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the nonconformity.

23.5 Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:

- (a) where there is a discrepancy between the amounts in figures and in words, the amount in words will govern; and
- (b) other arithmetic errors will be dealt with in the manner specified in the **Tender Data**.

23.6 The amount stated in the tender will be adjusted by the Employer in accordance with the above procedure for the correction of errors and, with the concurrence of the tenderer shall be considered as binding upon the tenderer. If the tenderer does not accept the correct amount, the tenders will be rejected, and the Tender Security may be forfeited, in accordance with paragraph 14.7.

## 24. Currency for tender evaluation

- 24.1 Unless specified otherwise in the **Tender Data**, tenders will be evaluated as quoted in the currency of the tender specified in paragraph 12.1. If a tenderer has used different exchange rates from those prescribed in paragraph 12.2, the tender will be first converted into the amounts payable in different currencies, using the rates quoted in the tender, and then reconverted to the currency of the tender using the exchange rates prescribed in paragraph 12.2.

## 25. Evaluation and comparison of tenders

- 25.1 The Employer will evaluate and compare only the tenders determined to be substantially responsive in accordance with paragraph 23.
- 25.2 In evaluating the tenders, the Employer will determine for each tender, the evaluated tender price by adjusting the tender price as follows:
- (a) making any correction for errors pursuant to paragraph 23;
  - (b) excluding provisional sums and the provision, if any, for contingencies in the Price Schedules, but including Daywork, where priced competitively;
  - (c) converting the amount resulting from applying (a) and (b) above to a single currency in accordance with paragraph 24;
  - (d) making an appropriate adjustment for any other acceptable variations, deviations or alternative offers submitted in accordance with paragraph 10.3;
  - (e) making appropriate adjustments to reflect discounts or other price modifications offered in accordance with paragraph 19; and
  - (f) making appropriate adjustments to reflect additional factors in the manner and to the extent indicated in the **Tender Data**.
- 25.3 The Employer reserves the right to accept or reject any variation, deviation, or alternative offer which are not submitted in accordance with the tender documents. Variations, deviations, alternative offers, and other factors that are in excess of the requirements of the tender documents or which otherwise result in unsolicited benefits for the Employer, shall not be taken into account in tender evaluation.
- 25.4 The estimated effect of any price adjustment provisions under the Conditions of Contract, applied over the period of execution of the contract, shall not be taken into account in tender evaluation.
- 25.5 If the tender, which results in the lowest evaluated tender price, is seriously unbalanced or front loaded in relation to the Employer's estimate of the items of work to be performed under the contract, the Employer may require the tenderer to produce detailed price analyses for any or all items of the Schedule of Works, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated contract payments, the Employer may require that the amount of the performance security set forth in paragraph 31, be increased at the expense of the tenderer to a level suffi-

cient to protect the Employer against financial loss in the event of default of the successful tenderer under the Contract.

## 26. Postqualification

- 26.1 The Employer will determine to its satisfaction whether the tenderer selected as having submitted the lowest evaluated responsive tender meets the minimum qualifying criteria specified in paragraph 3.6 and on the basis of the tender submitted has demonstrated that it is capable of performing the contract satisfactorily.
- 26.2 The determination will be based upon an examination of the documentary evidence of the tenderer's qualifications submitted by the tenderer in its tender, as well as other information such as the tenderer's work methods, schedule, plant, etc., as the Employer deems necessary and appropriate.
- 26.3 An affirmative determination will be a prerequisite for award of the contract to the tenderer. A negative determination will result in rejection of the tenderer's tender, in which event, the Employer will proceed to the next lowest evaluated tender to make a similar determination of that tenderer's capabilities to perform satisfactorily.
- 26.4 The capabilities of the subcontractors proposed in the tender to be used by the lowest evaluated tenderer will also be evaluated for acceptability. Their participation should be confirmed with a letter of intent, as needed. Should a subcontractor be determined to be unacceptable, the tender will not be rejected, but the tenderer will be required to substitute an acceptable subcontractor without any change to the tender price.

## 27. Employer's right to accept any tender and to reject any or all tenders

- 27.1 Notwithstanding paragraph 28, the Employer reserves the right to accept or reject any tender, and to cancel the tender process and reject all tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected tenderer or tenderers, or any obligation to inform the affected tenderer or tenderers of the grounds for the Employer's action.

## Award of Contract

### 28. Award criteria

- 28.1 Subject to paragraph 27, the Employer will award the Contract to the tenderer whose tender has been determined to be substantially responsive to the tender documents and who has offered the lowest evaluated tender price, provided that such tenderer has been determined to be qualified to perform the contract satisfactorily in accordance with the provisions in paragraph 26.

### 29. Notification of award

- 29.1 Prior to expiration of the period of tender validity, the Employer will notify the successful tenderer by fax, confirmed by registered letter, that its tender has been accepted. The notification of award shall specify the sum which the Employer will pay the Contractor in consideration of the execution and completion of the works and the remedying of any defects therein by the Contractor as prescribed in the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").
- 29.2 The notification of award (hereinafter and in the Conditions of Contract called "the Letter of Acceptance") will constitute the formation of the Contract.

### 30. Signing of contract agreement

- 30.1 At the same time that the Employer notifies the successful tenderer that its tender has been accepted, the Employer will send the tenderer the Agreement in the form provided in the tender documents, incorporating all understandings between the parties.
- 30.2 Within twenty-eight (28) days of receipt of the Agreement, the successful tenderer shall sign the Agreement and return it to the Employer, together with the required Performance Security.
- 30.3 Upon fulfilment of paragraph 30.2, the Employer will promptly notify the other tenderers that their tenders have been unsuccessful and their Tender Security will be returned as promptly as possible, in accordance with paragraph 14.5.

### 31. Performance security

- 31.1 Within twenty-eight (28) days of receipt of the Letter of Acceptance from the Employer, the successful tenderer shall furnish to the employer a Performance Security in accordance with the Conditions of Contract and in the form stipulated in the tender documents, or in another form acceptable to the Employer.
- 31.2 Failure of the successful tenderer to comply with the requirements of paragraphs 30 or 31 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Tender Security, in which event the Employer may make the award to the next lowest evaluated tenderer or call for new tenders..

## 32. Alternative dispute resolution procedure

32.1 The method of dispute resolution is as indicated in the **Tender Data** and the Conditions of Contract.



## Section 2

### Tender Data



# Tender Data

**Instructions to tenderers -**  
para. ref.

**para. 1.1:**      **Name of Employer**  
                          [Name of Employer]

**Name of Recipient**  
                          [Name of Recipient]

**para. 1.1**      **Description of the Works**

The works concern the design and construction of civil and building works for the Development of a Multi-Purpose Terminal in the Port of Batumi:

- (a) Demolition of buildings, sheds, pavement, foundations and utilities.
- (b) Construction of new quay wall.
- (c) Extension of terminal area in eastern direction, including storage areas and driving lanes.
- (d) Construction of facilities, such as terminal gate.
- (e) Installation of utilities, such as water supply, electricity, communications, sewerage.

**para. 1.2**      **Completion of the Works**

Time for Completion of the whole works is 630 days.

**para. 3.1:**      **Eligibility**

1. Participation in the invitations to tender and in the award of contracts shall be open on equal terms only to natural and legal persons of the Member States of the European Community or of one of the beneficiary countries of the Tacis<sup>1</sup> programme.
2. These terms refer to all nationals of said states and to all legal entities, constituted under and governed by civil, commercial or public law, formed in accordance with the law of any one of said States and having their statutory office, central administration or principal place of business in one of these States; however a legal entity, company or partnership having only its statutory office there must be engaged in an activity which has an effective and continuous link with the economy of the respective State.
3. This rule applies to:
  - (a) all individual Tenderers
  - (b) all members of a consortium taking part in a joint tender
  - (c) subcontractors eventually to be associated in the performance of the contract.
4. Tenderers shall certify that they meet these conditions and prove their eligibility by a document, dated less than 90 days previously, drawn up in accordance with their national law or practice, or copies of the original documents defining the constitution and/or legal status and establishing the place of registration and/or statutory seat and, if it is different,

the place of central administration. The Employer may accept other satisfactory evidence that these conditions are met.

5. Tenderers shall not be eligible for the award of contracts and the Employer may exclude them from (further) participation in the invitation to tender, without compensation, as of right and without recourse to prior legal proceedings where:
  - (a) they are bankrupt;
  - (b) payments to them have been suspended in accordance with the judgment of a court or a judgment declaring bankruptcy and resulting, in accordance with their national laws, in the total or partial loss of the right to administer and dispose of their property;
  - (c) legal proceedings have been instituted against them involving an order suspending payments and which may result, in accordance with their national laws, in a declaration of bankruptcy or in any other situation entailing the total or partial loss of the right to administer and dispose of their property;
  - (d) they are guilty of serious misrepresentation with regard to information required for participation in an invitation to tender;
  - (e) they are in breach of contract or another contract with the Employer.

Tenderers shall certify and, upon request, provide evidence satisfactory to the Employer that none of these situations applies to them.

**para. 3.6: Qualifying requirement**

1. To be qualified for award of the Contract, tenderers shall provide evidence satisfactory to the Employer of their capability and adequacy of resources to carry out the Contract effectively. Tenders shall include the following information:
  - (a) total annual turnover expressed as total volume of construction work performed in each of the last five years;
  - (b) performance as prime contractor on works of similar nature and volume over the last five years, and details of other work in hand and contractual commitments;
  - (c) major items of construction equipment proposed for carrying out the Contract;
  - (d) the qualifications and experience of key personnel proposed for administration and execution of the Contract, both on and off site;
  - (e) proposals for subcontracting elements of the Works amounting to more than 10 percent of the Tender Price for each element;
  - (f) reports on the financial standing of the tenderer including profit and loss statements, balance sheets and auditor's reports for the past five years, and an estimated financial projection for the next two years;
  - (g) evidence of access to lines of credit, and availability of other financial resources;

- (h) authority to seek references from the tenderer's bankers;
  - (i) information regarding any current litigation in which the tenderer is involved, the parties concerned, and disputed amount; and
  - (j) proposal of work methods and schedule, in sufficient detail to demonstrate the adequacy of the tenderer's proposals to meet the technical specifications and the completion time referred to in Sub-Clause 1.2 above.
2. Tenders submitted by a joint venture of two or more firms as partners shall comply with the following requirements:
- (a) the tender shall include all information listed in Sub-clause 1 (a) to (i) above for each joint venture partner and 1 (j) for the joint venture;
  - (b) the tender and in case of a successful bid, the Form of Agreement, shall be signed so as to be legally binding on all partners;
  - (c) one of the partners shall be nominated as being in charge; and this authorisation shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners;
  - (d) the partner in charge shall be authorized to incur liabilities and receive instructions for and on behalf of any and all partners of the joint venture and the entire execution of the Contract including payment shall be done exclusively with the partner in charge;
  - (e) all partners of the joint venture shall be liable jointly and severally for the execution of the Contract in accordance with the Contract terms, and a statement to this effect shall be included in the authorisation mentioned under (c) above as well as in the Tender Form and in the Form of Agreement (in case of a successful bid); and
  - (f) a copy of the agreement entered into by the joint venture partners shall be submitted with the tender.

**para. 5.1: Pre-tender meeting or site visit**  
*[specify date and location of pre-tender meeting or site visit, if any]*

**para. 7.1: Employer's mailing address**  
*[Name of Employer]*  
*[Address & Tel/Fax]*

**para. 9.1: Language of tender**  
English

**para. 10.3 Alternatives**  
Alternatives are permitted, provided an offer for the tendered project is given

- para. 11.4: Tender Prices**  
The price quoted is fixed except for adjustments according to clauses 13 and 14 of Conditions of Contract
- para. 12.1: Tender currencies**  
Prices must be expressed in European Currency Units (ECU). Tenders in any other currency shall be rejected.
- para. 13.1: Period of tender validity**  
90 days
- para. 14.0 Tender security**  
No tender security is required
- para. 15.1: Number of copies of tender**  
One original and two copies
- para. 16.2(a): Address of Employer**  
*[Name of Employer]*  
*[Address & Tel/Fax]*
- para. 17.1: Deadline for submission of tenders**  
*[specify time and date of tender submission]*
- para. 20.1: Opening of tenders by Employer**  
*[specify time, date and place of tender opening]*
- para. 23.5(b): Correction of other arithmetic errors**  
Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern, unless in the opinion of the Employer there is an obviously gross misplacement of the decimal point in the unit rate, in which case the line item total as quoted will govern and the unit rate will be corrected.
- para. 25.2: Tender Evaluation Factors**  
Factors which are relevant for the evaluation of the tender are:
- suitability of technology;
  - life cycle costs of construction
  - environmental impact during the lifetime of the project
  - operation and maintenance costs.
- The Employer reserves the right to deal with any Tenderer of its choice for any or more parts of the tender and is not bound either to accept the lowest or any offer or to award any contract.
- para. 32.1 Alternative dispute resolution procedure**
1. In the case of a dispute between the Employer and a Contractor, which is a national of the recipient State, the dispute shall be referred to the competent tribunals of this State.

2. Where disagreement arises in the course of performance of the contract between the Employer and a foreign Contractor, all disputes shall be finally settled under the rules of Conciliation and Arbitration of the International Chamber of Commerce (PARIS) by one or more arbitrators appointed in accordance with the said Rules. The venue and the language of such arbitration or the arbitrators shall be determined in the Contract Form.
3. No request for settlement shall be submitted to the arbitrator unless an attempt has first been made to settle the dispute amiably within 120 days as from the notification of the complaints or any other period the parties agree upon. The request for arbitration must be submitted within 60 days as from the end of said period of conciliation.
4. All disputes arising out of Contracts concluded with the Commission on its own behalf shall be referred to the exclusive jurisdiction of the Brussels Courts.

## Section 3

# Tender Form



# TENDER FORM

Date: \_\_\_\_\_

TO: [Name of Employer]

ADDRESS: [Address & Tel/Fax]

We offer to execute the contract : Multi-Purpose Terminal Port of Batumi, Contract No. \_\_\_\_\_ in accordance with the Conditions of Contract accompanying this Tender for the Contract Price of:

ECU  
\_\_\_\_\_ [amount in numbers]

\_\_\_\_\_ [amount in words]

\_\_\_\_\_ [name of currency]

The Contract shall be paid in the following currencies:

Currency	Percentage payable in currency	Rate of Exchange	Inputs for which foreign currency are required
(a)			
(b)			

This Tender and your written acceptance of it shall constitute a binding Contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We hereby confirm that this Tender complies with the Tender Validity required by the Tender Documents and specified in the Tender Data.



Authorised Signature \_\_\_\_\_

Name and Title of Signatory \_\_\_\_\_

Name of Tenderer \_\_\_\_\_

Address \_\_\_\_\_  
\_\_\_\_\_

**ATTACHMENTS TO TENDER**

- (a) Appendix to Tender
- (b) Documentary Evidence of Tenderer's Eligibility and Qualifications
- (c) Power of Attorney
- (d) Priced Schedules
- (e) Others:
  - Work Programme and Schedule
  - List of Subcontractors
  - Design Drawings and Calculations
  - Technical Alternatives
  - Contract Data



## Section 4

### Appendix to Tender

## Appendix to Tender

Sub-Clauses refer to "Conditions of Contract for Design-Build and Turnkey", First Edition 1995, prepared by the Fédération Internationale des Ingenieurs-Conseils (FIDIC).

	Sub-Clause	
Employer's name and address	1.1.2.1 & 1.8	_____
Contractor's name and address	1.1.2.2 & 1.8	_____
Name and address of the Employer's Representative	1.1.2.3 & 1.8	_____
Time for notice to commence engineering	8.1	14 days
Time for Completion of the Works	1.1.3.4	630 days
<i>If Sub-Clause 13.15 does not apply</i> Foreign Currency/Currencies	1.1.5.3	as named in the TENDER
Law of the Contract	1.4	English
Ruling language	1.4	English
Language for communication	1.4	English
Electronic transmission systems	1.8	n. a.
Confidential details	1.12	n. a.
Time for access to the Site for surveying purposes	2.2	14 days after the Commencement Date
Amount of performance security	4.2	4 % of the Contract Price, and in the proportions of currencies in which the Contract Price is payable
Time for submission of programme	4.14	30 days after the Effective Date
Normal working hours	6.5	n. a.
Liquidated damages for the works	8.6	0.05 % of the Contract Price, and in the proportions of currencies in which the Contract Price is available

Limit of all liquidated damages for delay	8.6	10 % of the Contract Price
Bonus for early completion	8.12	0.05 % of the Contract Price per day, with a maximum of 5 %.
Total amount of advance payments	13.2	10 % of the Contract Price
Number and timing of instalments	13.2	1
Start repayment of advance payment	13.2 (a)	when payments are 10 % of the Contract Price
Repayment amortisation of advance payment	13.2 (b)	25 %
Percentage of retenteion	13.3	5 %
Limit of Retention Money	13.3	5 % of the Contract Price
Minimum of amount of Interim Payment Certificates	13.6	10 % of the Contract Price
<i>If there are Provisional Sums:</i>		
Percentage for adjustments of Provisional Sums	14.5 (b)	n. a.
Amount of insurance for design	18.1	n. a.
Amount of third party insurance	18.3	n. a.
Periods for submission of insurance	18.5	
(a) evidence of insurance		30 days
(b) relevant policies		60 days
Number of members of Dispute Adjudication Board	20.3	3
Member of Dispute Adjudication Board (if not agreed) to be nominated by	20.6	Secretary, ICC, Paris
Arbitration rules	20.6	Rules of Conciliation and Arbitration, ICC, Paris
Number of arbitrators	20.6	3
Language of arbitration	20.6	English
Place of arbitration	20.6	Geneva

If ICC rules are NOT to apply - Either:

Arbitration rules to be administered by 20.6 n. a.

Or: Arbitrator (if not agreed) to be nominated by \_\_\_\_\_

If there are Section:

Definition of Sections

Description (Sub-Clause 1.1.6.9)	Value (percentage of Contract Price) *	Time for Completion (Sub-Clause 1.1.3.4)	Liquidated Damages (Sub-Clause 8.6)
Design	10 %	210 d	0.05 %
Construction	90 %	420 d	0.05 %

\* These percentages shall also be applied to the first half of the Retention Money under Sub-Clause 13.9

Initial of signatory of Tender \_\_\_\_\_

## Part B:

## The Contract

## Section 1

# Agreement

## AGREEMENT

This Agreement is made on the \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_  
between \_\_\_\_\_ of \_\_\_\_\_ (hereinafter called "the Employer") of the one part,  
and \_\_\_\_\_ of \_\_\_\_\_ (hereinafter called "the Contractor") of the other part.

**Whereas** the Employer desires that the Works known as Multi-Purpose Terminal Port of Batumi should be designed and executed by the Contractor, and has accepted a Tender by the Contractor for the design, execution and completion of such Works and the remedying of any defects therein,

**The Employer and the Contractor agree** as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of contract hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this agreement:
  - (a) The Letter of Acceptance dated \_\_\_\_\_
  - (b) The employer's requirements
  - (c) The Tender dated \_\_\_\_\_
  - (d) The Conditions of Contract (Parts I and II)
  - (e) The Addenda nos \_\_\_\_\_
  - (f) The completed Schedules, and
  - (g) The Contractor's Proposal.
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to design, execute and complete the Works and remedy and defects therein, fit form purpose in conformity with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, in consideration of the design, execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the Contract.

**In Witness** whereof the parties hereto have caused this Agreement to be executed the day and year first before written in accordance with their respective laws.

Authorised signature of Employer

Authorised signature of Contractor

\_\_\_\_\_

\_\_\_\_\_

in the presence of:

in the presence of:

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Signature: \_\_\_\_\_

Address: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

## Section 2

# Conditions of Contract



# 1. General Conditions

The Conditions of Contract Part I – General Conditions – shall be those forming Part I of the "Conditions of Contract for Design-Build and Turnkey", First Edition 1995 (so-called Orange Book), prepared by the Federation Internationale des Ingenieurs-Conseils (FIDIC), and shall be amended and added to in accordance with the following Part II entitled "Conditions of Particular Application"

# 2. Conditions of Particular Application

## *Sub-Clause 4.2 – Performance Security:*

After the second sentence of Sub-Clause 4.2, add:

If the performance security is in the form of a bank guarantee, it shall be issued either (a) by a bank located in the Country, or (b) directly by a foreign bank acceptable to the Employer. If the performance security is not in the form of a bank guarantee, it shall be furnished by an institution registered, or licensed to do business, in the Georgia.

## *Sub-Clause 4.3 – Contractor's Representative:*

At the end of Sub-Clause 4.3, add:

The Contractor's Representative and such persons shall also be fluent in Russian and/or Georgian. If the Contractor's Representative, or such persons, is not fluent in Russian and/or Georgian the Contractor shall make a competent interpreter available during all working hours.

## *Sub-Clause 4.8 – Quality Assurance:*

Delete Sub-Clause 4.8.

## *Sub-Clause 4.17 – Safety Precautions:*

Replace Sub-Clause 4.17 by:

The Contractor shall comply with all applicable safety regulations in his design, access arrangements and operations on Site. The Contractor shall, from the commencement of work on Site until taking-over by the Employer, provide:

- a) fencing, lighting, guarding and watching of the Works, as far as not provided by the port, and
- b) temporary roadways, footways, guards and fences which may be necessary for the protection of workers and port personnel.

## *Sub-Clause 4.19 – Electricity, Water and Gas:*

At the end of Sub-Clause 4.19, add:

The Employer can not guarantee permanent power and water supply, and therefore the use of these utilities is on the Contractor's own risk. Application for extension of time, as stated in Sub-Clause 8.3, for delays caused by power cuts and water shut offs are not accepted.

*Sub-Clause 5.2 – Construction Documents:*

In Sub-Clause 5.2, delete sub-paragraph (a) and substitute:

- a) construction shall not commence until the Contractor receives the Employer's Representative's approval of the Construction Documents which are relevant to the design and construction of such part;

*Sub-Clause 5.4 – Technical Standards and Regulations:*

Delete first part of Sub-Clause 5.4:

The design, the Construction Documents, .....  
..... Contractor's Proposal and Schedules, or defined by law.

and substitute:

The design, the Construction Documents, the execution and the completed Works shall comply with relevant British Standards and Codes of Practice and relevant European Standards specified in the Employer's Requirements, applicable to the Contractor's Proposal and Schedules, or defined by law. National standards, norms and codes and codes of the former Soviet Union, may be used as an alternative to the British Standards and Codes of Practice as mentioned in the Employer's Requirements, if applicable and so agreed with the Employer's Representative.

*Sub-Clause 6.5 – Working Hours*

Delete Sub-Clause 6.5.

*Sub-Clause 6.6 – Facilities for Staff and Labour:*

At the end of Sub-Clause 6.6, add:

The Employer shall provide an office room at the port area for up to 4 staff personnel of the Contractor during the period of contract.

*Sub-Clause 6.8 – Contractor's Superintendence:*

At the end of Sub-Clause 6.8, add:

A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of Russian and/or Georgian, or the Contractor shall have sufficient competent interpreters available on Site during all working hours.

*Sub-Clause 6.11 – Foreign Staff and Labour:*

Add additional Sub-Clause:

The Contractor may import such staff, artisans, and labourers as are required in order to execute the Works. The Contractor must ensure that all such staff and labour are provided with the required residence visas and work permits. The Contractor shall be responsible for the return to the place where they were recruited or to their domicile of all persons whom the Contractor recruited and employed for the purposes of or in connection with the Contract. The Contractor shall be responsible for such persons as are to be recruited until they shall have left the Site or, in the case of foreign nationals who have been recruited outside the Country, shall have left it.

*Sub-Clause 6.12 – Burial of the Dead:*

Add additional Sub-Clause:

The Contractor shall make all necessary arrangements for the transport, to any place as required for burial, of any of his expatriate employees or members of their families who may die in the Country. The Contractor shall also be responsible, to the extent required by local regulations, for making any arrangements with regard to burial of any of his local employees who may die while engaged upon the Works.

*Sub-Clause 6.13 – Alcoholic Liquor or Drugs:*

Add additional Sub-Clause:

The Contractor shall not, otherwise than in accordance with the statutes, ordinances and government regulations or orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Subcontractors, agents, staff or labour.

*Sub-Clause 6.14 – Arms and Ammunition:*

Add additional Sub-Clause:

The Contractor shall not give, barter or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

*Sub-Clause 8.12 – Accelerated Completion:*

Add additional Sub-Clause:

If the Contractor achieves completion of the Works, or Section (if any), prior to the Time for Completion, the Employer shall pay to the Contractor the relevant sum stated in the Appendix to Tender (as bonus for early completion) for every calendar day which shall elapse between the date stated in the relevant Taking-Over Certificate and the relevant time prescribed in Sub-Clause 8.2. The bonus for early completion applies only to the final completion date.

*Sub-Clause 10.2 – Use by the Employer:*

At the end of Sub-Clause 10.2, add:

The Contractor shall during execution of the Works provide the Employer sufficient access to port areas as specified in the Employer's Requirements.

*Sub-Clause 13.5 – Plant and Materials for the Permanent Works*

Delete Sub-Clause 13.5.

*Sub-Clause 13.15 – Calculation of Payments in Foreign Currency*

Delete Sub-Clause 13.15.

## Section 3

### Annexes

Annex A: Form of Performance Guarantee

Annex B: Form of Guarantee for Advance Payment

## Annex A: FORM OF PERFORMANCE GUARANTEE

**THIS AGREEMENT** is made on the \_\_\_\_\_ day of \_\_\_\_\_ 19 \_\_\_\_

**BETWEEN :** (1) \_\_\_\_\_ [name of bank surety or insurance company]  
of \_\_\_\_\_ [address] (hereinafter called "the Guarantor"); and  
  
(2) \_\_\_\_\_ [name of employer]  
of \_\_\_\_\_ [address] (hereinafter called "the Employer").

### **WHEREAS:**

- A This agreement is supplemental to a contract (hereinafter called "the Contract") made between (1) the Employer and (2) [name of Contractor] of \_\_\_\_\_ [address of Contractor] (hereinafter called "the Contractor") whereby the Contractor agreed and undertook to design and execute and complete and remedy any defects in the Works of Multi-Purpose Terminal Port of Batumi for the sum of \_\_\_\_\_ [amount in Contract currency] being the Contract Price; and
- B The guarantor has agreed to guarantee the due performance of the Contract in the manner hereinafter appearing.

### **IT IS HEREBY AGREED** as follows:

1. Subject to Clause 2 if the Contractor (unless relieved from the performance by any clause of the contract or by statute or by the decisions of a tribunal of competent jurisdiction) shall in any respect fail to execute the Contract or commit any breach of his obligations thereunder then the Guarantor will indemnify and pay the employer the damages sustained by him as a consequence of such failure or breach not exceeding the aggregate sum of \_\_\_\_\_ [amount of guarantee] \_\_\_\_\_ [in words], such sums being payable in the types in the types and proportions of currencies in which the Contract Price is payable.
2. The payment by the Guarantor will only be made if, prior to the earlier of the date of issue of the Performance certificate or \_\_\_\_\_ ("the End Date"), the Guarantor has received:
  - (a) written notice from both the Employer and the Contractor that the amount of damages payable to the Employer is agreed between the Employer and the Contractor; or
  - (b) a copy of a notice of arbitration issued by either the Employer or the Contractor under the Contract which is subsequently followed (whether before or after the End date) by a legally certified copy of an award issued in arbitration proceedings carried out in conformity with the Contract that the amount of the damages is payable to the Employer; or
  - (c) a legally certified copy of a decision of the Dispute Adjudication Board under the Contract in respect of which no notice of dissatisfaction has been given by either the Employer or the Contractor within twenty eight days of the decision under the Contract stating an amount due to the Employer.
3. The Guarantor shall not be discharged or released from his Guarantee by an arrangement between the contractor and the Employer, with or without the consent of the Guarantor, or by any forbearance on the

part of the Employer, whether as to payment, time, performance or otherwise, and notice to the guarantor of any such arrangement, alteration or forbearance is hereby expressly waived.

4. This Guarantee shall not be assignable by the Employer and upon it ceasing to be in full force and effect the employer shall return the same to the guarantor within 14 days.
5. Words and expressions defined in the Contract shall so far as the context admits bear the same meaning in this Guarantee.
6. This Guarantee shall be governed by the laws of \_\_\_\_\_

Signed by \_\_\_\_\_

for and on behalf of \_\_\_\_\_

on (date) \_\_\_\_\_

in the capacity \_\_\_\_\_

and in the presence of \_\_\_\_\_

Seal (where applicable)

Signed by \_\_\_\_\_

for and on behalf of \_\_\_\_\_

on (date) \_\_\_\_\_

in the capacity \_\_\_\_\_

and in the presence of \_\_\_\_\_

Seal (where applicable)

## Annex B: FORM OF GUARANTEE FOR ADVANCE PAYMENT

To: \_\_\_\_\_ [ *name of Employer* ]

\_\_\_\_\_ [ *address of Employer* ]

Multi-Purpose Terminal Port of Batumi

Gentlemen:

In accordance with the provisions of the Conditions of contract, sub-Clause 13.2 ("Advance Payments") of the above-mentioned Contract, \_\_\_\_\_ [ *name and address of Contractor* ] (hereinafter called "the Contractor" ) shall deposit with \_\_\_\_\_ [ *name of Employer* ] a bank guarantee to guarantee his proper and faithful performance under the said clause of the contract in an amount of \_\_\_\_\_ [ *amount of guarantee* ] \_\_\_\_\_ [ *in words* ].

We, the \_\_\_\_\_ [ *bank or financial institution* ], as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligor and not as Surety merely, the payment to \_\_\_\_\_ [ *Name of Employer* ] on his first demand without whatsoever right of objections on our part and without his claim to the Contractor, in the amount not exceeding \_\_\_\_\_ [ *amount of guarantee* ] \_\_\_\_\_ [ *in words* ].

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed thereunder or of any of the Contract documents which may be made between \_\_\_\_\_ [ *name of Employer* ] and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

No claim may be made by you under this guarantee until we have received notice in writing from you specifying the amount of each advance payment which has been paid to the Contractor pursuant to the Contract.

Our outstanding liability under this guarantee will reduce by such amounts as may be notified to us in your authorised writing and stated to be the reduction of this guarantee required to be made in accordance with the Contract by reason of the requirements made by the Contractor.

This guarantee shall remain valid and in full effect from the date of the first advance payment under the Contract until \_\_\_\_\_ [ *name of Employer* ] receives full repayment of the same amount from the Contractor.

Yours truly,

Signature and seal: \_\_\_\_\_

Name of Bank: \_\_\_\_\_

Address: \_\_\_\_\_

Date: \_\_\_\_\_

## Part C:

# Employer's Requirements



## Section 1

### General

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# 1 Introduction

The Tender Documents for the civil and building works for Multi Purpose Terminal Port of Batumi comprise the following documents:

- Part A: The Tender
- A.1: Instruction to Tenderers
  - A.2: Tender Data
  - A.3: Tender Form
  - A.4: Appendix to Tender
- Part B: The Contract
- B.1: Agreement
  - B.2: Conditions of Contract
  - B.3: Annex A: Performance Security Form
  - Annex B: Advance Payment Guarantee
- Part C: Employer's Requirements
- C.1: General
  - C.2: Design Requirements
  - C.3: Technical Specifications
  - C.4: The Drawings

The present volume of the Tender Documents (Part C: Employer's Requirements) comprises a general description of the site of the project and the works to be executed as well as the technical specifications for the design, execution of the works and the drawings.

The present document is available both in English and in Russian

The English shall be the contract language.

In case of any discrepancy between the English version and the Russian version, the English version prevails.

## 2 Background

### 2.1 Description of the Project

- The future development of the Port of Batumi has been described in the master plan as presented in the Phase 3 report of the Feasibility Study of New Terminal Facilities in the Georgian Ports, submitted May 1998. The main investment to be developed shortly is the "Multi Purpose Terminal" at Berth no. 5.

The multi purpose terminal is designed to handle:

- Self-sustaining container vessels
- General cargo vessels
- Ro-Ro vessels (road and rail)

In the master plan a Ro-Ro ramp for road trailers is planned. Prior to the presentation of the results of the study, the Port of Batumi decided to construct a Ro-Ro ramp suitable to handle both, railway wagons and road trailers. The construction of this ramp is due to be finalised by the end of 1998. The latest plans of the port have been included within the preliminary design. However, at the moment of writing, detailed design drawings are not yet finalised.

The Multi Purpose Terminal is located at the area behind Berth 5. The Ro-Ro ramp is being constructed in the corner of Berth 5 (stern) and Berth 6 (side).

## 2.2 The Employer

*[Name of Employer]*

*[Address & Tel/Fax]*

## 2.3 The Employer's representative

*[Name of Engineering Consultancy]*

*[Address & Tel/Fax]*

# 3 General Description of the Site

## 3.1 Location of Terminal

The Port of Batumi (founded in 1878) is located in the bay at the northern side of the city. This bay provides the port with a natural protection to western winds and waves. The port has one basin with 11 berths and one off-shore buoy mooring facility. The total port area encloses 13,7 ha. The layout of the port is presented in Drawing 4.2.1.

The exact location is 41°37' North and 40°52' East.

## 3.2 Site of Works

The site boundaries are shown on the drawings attached to this document.

The Contractor may utilise other port areas (on land or water) after approval of the Employer's representative.

The Contractor shall be responsible for any hampering of port operations caused by the construction activities.

The Contractor shall be responsible for security of the site.

## 3.3 Site Constraints

Principle constraints to the works are outlined as follows:

- Unless approved by the Employer, permanent or temporary limitation on (navigational) access to the berths shall be maintained at all times with no restriction on the existing access width.
- Each stage of construction shall be handed over to the satisfaction of the Employer prior to commencement of the next construction stage.
- The Contractor shall be responsible for the rectification of any defects or signs of structural distress brought about by the Contractor's site activities.

### 3.4 Access to the Site

The main vehicle gate for the Port of Poti is located opposite of Berth no. 7. It is a one-lane gate. Another access to the port area could be created at the eastern side of the port at the location of the new Multi Purpose Terminal.

Access to the site shall be confined to designated access routes, to be indicated by the Employer.

The speed limit on the port area is 30 km/h on all roads.

### 3.5 Auxiliary Facilities and Utilities

#### 3.5.1 Electrical Supply

Electric power for the port is normally provided from the city network. To overcome the problems of power cuts the port has three diesel generator sets available with a total capacity of 4 MW. After a power cut it takes 40 minutes to start the power generators.

#### 3.5.2 Fresh Water Supply

The port's water supply system is connected to the city system. Sometimes there is a cut in water supply. This is a problem for toilets and washing rooms, but does not significantly affect port operations. At part of the berths a water line for ship supply is installed.

#### 3.5.3 Sewage Water Treatment

The waste water system is connected to the town system.

#### 3.5.4 Safety Installations

The port has the following safety facilities:

- 1 Fire fighting vessel.
- 3 Tugboats with fire fighting equipment.
- Fire fighting equipment on each oil berth.

The nearest city fire fighting station is 300 m outside the port. This station has 2 fire fighting cars.

### 3.6 Geology of Area

At the location of the breakwater boreholes up to 17 m have been taken, which indicates silted sand with layers of gravel and sand. At the location of berth 6 the soil beneath 5 - 6 m consists of sand with layers of gravel. Some boreholes have been taken of the site area. CPT's (Cone Penetration Tests) are not available.

## 4 The Works

### 4.1 Scope of Works

The present area of the planned Multi-Purpose Terminal is located at Berth no. 5. At present this area is not being used for port operations. The area encloses the area of Berth no. 5, adjacent port area behind the fence farther east and some area not owned by the port (see Drawing 4.2.2).

The existing quay structure shall be replaced by a new quay structure. The two existing warehouses shall be reconstructed, however this reconstruction is not within the scope of works of this project. A number of buildings shall be demolished to enable construction of storage areas. Utilities such as electricity, water supply and sewerage shall be constructed and relocated. The existing oil interceptor shall be demolished and replaced.

At the present a new Ro-Ro ramp (road and rail) is under construction. To enable rail connections to the hinterland the road bridge shall be reconstructed. These construction works are not within the scope of works of this project.

The Scope of Works for the Multi-Purpose Terminal at Port of Batumi include:

- a) Demolition of buildings, sheds, pavement, foundations and utilities.
- b) Construction of new quay wall.
- c) Extension of terminal area in eastern direction, including storage areas and driving lanes.
- d) Construction of facilities, such as terminal gate.
- e) Installation of utilities, such as water supply, electricity, communications, sewerage.

The construction works shall be executed in one phase.

### 4.2 Execution of Works

Execution methods shall be approved by the Employer's representative and must in no way cause any damage or risks to persons or property on or off the site. Utmost care shall be taken when demolition or excavation takes place close to electricity distribution cables, telephone cables, sewerage, oil pipes, water supply pipes, etc. The execution methods and the execution including the necessary safe precaution remain the sole responsibility of the Contractor and any damage to property not to be demolished or persons shall be fully repaired by him and on his account.

Competent workmen under skilled and experienced supervision shall carry the work out corresponding to the best international standards. The Employer's representative shall have the authority to have any part of the work taken down or changed, which is executed in a manner unsatisfactory of the Employer.

The Contractor will be entirely responsible for all materials, equipment, etc. furnished by him in connection with his work, and shall take all special care to protect all parts of finished work from damage until handing over has taken place.

### 4.3 Works By Others

The Contractor shall be responsible for the whole of the works as described in the Tender Documentation.

It is envisaged that works by other parties will be undertaken at the same time and on the same site as the works required by this project, details of which are provided elsewhere in this specification.

### 4.4 Co-ordination of Mechanical and Electrical Services

It shall be the Contractors responsibility to carry out all necessary co-ordination works with other parties, statutory undertakings etc. during both removal of existing utilities and installation and commissioning of new utilities. The Contractor is required to liaise with the Employer's representative with regard to proposed interconnections and/or blanking off of existing services. Cables and equipment shall not be removed without a current permit or certificate of isolation from the Employer's representative.

### 4.5 Materials

All materials, equipment and accessories are to be new and of the highest quality; uniformity of type and manufacture of equipment or accessories is to be preserved as far as practicable throughout the whole work.

The Contractor shall, if required by the Employer's representative, submit samples of materials to the Employer's representative for approval before placing an order.

All equipment and materials supplied shall be suitable for continuous use in Georgia and the particular climatic conditions specified elsewhere in the Tender Documents.

### 4.6 Planning of Works

The construction works shall be planned in such a way that the port remains operational.

The Contractor shall prepare a planning corresponding with the planning attached to Section 2 of this Volume.

The Contractor shall provide the Employer's representative a detailed planning for each construction activity, which has to be approved by the Employer's representative prior to execution of the works.

## 5 Surveys

### 5.1 Existing Surveys

A topographical survey of the Port has been prepared by others (updated in 1996) and registered on 1:500 scale survey drawings. These survey drawings have been used as basis for the preliminary design drawings,

which are attached to the Tender Documents. Survey drawings can be inspected at the Employer's office by arrangement.

The Contractor shall be responsible for the identification of asbestos on site and all available records will be made available to the Contractor in order to facilitate his review during the planning processes.

The Contractor will be responsible for the verification of all survey drawings, which will include the position, size and capacity of all existing services, and for undertaking further survey work as may be deemed necessary to identify all existing information.

## 5.2 Surveys to be undertaken by Contractor

### 5.2.1 Geotechnical Investigations

The Contractor shall fulfil a geotechnical investigation of the total area prior to commencement of the design.

The geological / geotechnical investigation shall comprise:

- A desk study of the geology in the Terminal area.
- Geotechnical borings.
- Laboratory tests.

### 5.2.2 Bathymetric Surveys

The Contractor shall undertake a bathymetric seabed survey prior to commencement of any work on site and shall be agreed by the Employer's representative. The survey shall extend for the full length of Berth no. 5 to a distance of 50 m from the berths.

A second bathymetric seabed survey shall be undertaken on completion of each respective stage of the Works within the same area. Following this, the Contractor shall undertake any dredging of the seabed adjacent to the Works to ensure water depths as specified on the drawings.

### 5.2.3 Condition Survey

The Employer will be undertaking a Pre Condition Survey of the existing infrastructure and buildings within the Port. The Contractor will be invited to witness this survey and agree the results of that survey, a copy of which will be provided to the Contractor.

## 5.3 Monitoring Existing Structures

Prior to commencement of any demolition or piling works, the Contractor shall establish a series of monitoring points on structures adjacent to the existing container terminal area. These shall be used to monitor for movement in vertical and horizontal directions, and vibration, throughout the contract duration. Monitoring shall be undertaken on a daily basis (at the same time each day) and tide level, temperature and weather conditions shall be recorded.

The Contractor shall submit his proposals for the establishment, location and monitoring of these points. Work shall not commence on site until the Employer's Representative has approved these proposals and all monitoring points have been installed.



If during the course of the Contractor's works it is found that significant or continuing movement of any existing structure is occurring, the Contractor shall cease all construction activities which are deemed to be causing the movement. The Contractor shall rectify any areas of damage where reasonably practicable, and shall revise his method of working to eliminate further movement.

Where excessive vibrations are occurring in any existing structure which are a result of the Contractor's construction activities, the Contractor shall cease these activities immediately. All further working shall be undertaken so as to reduce vibration of any of the existing structure to within an acceptable limit.

As a general guide, a peak particle velocity of 2 mm/s shall be considered to be a reasonable maximum limit of vibration in the existing structures.

## 6 Environmental Constraints

### 6.1 Noise and Vibration

There are no specific noise limits for daytime working (0800 to 1700 hrs). However, it is recognised that noise levels may be locally problematic when the ambient noise conditions are relatively quiet, such as during night hours. Night working (1700 to 0800 hrs) will not therefore be permitted without approval by the Employer's representative.

Noise emitting sources could include demolition, drilling, concrete making, welding and fabrication and the operation of plant and machinery. The Contractor shall mitigate noise effects as far as practicable by the use of appropriate noise attenuation equipment.

Vibration effects due to construction activities shall be sufficiently small as to cause no damage or distress to other buildings and structures.

### 6.2 Pollution

Air quality is likely to be affected by the generation of dust and other particles from the construction activities and exhausts emitted from vehicles, plant and machinery. The Contractor shall take all reasonable measures to mitigate any adverse effects to the air quality and utilise appropriate suppression equipment on site.

The Contractor is responsible for any pollution to cargo, handled or stored at the port area, caused by construction works.

The Contractor has a statutory and contractual obligation to establish effective mitigation measures such as safe storage and containment against spills of chemicals, oils etc., these measures must be designed into both the construction and operational stages of the Project.

The Contractor shall not deposit construction materials, debris etc. in the harbour or foreshore area.

### 6.3 Environmental Nuisance

Site lighting is to face into the port area or downwards. The intensity and direction of site lighting is not to effect seaman's night vision.

### 6.4 Materials

Recycled or recyclable products are preferred whenever they are available and competitive in terms of specification and cost. The design should minimise the consumption of energy, minimise the consumption of products associated with the destruction of tropical rain forests or threatened animal species, eliminate the emission of pollutants, harmful radiation or ozone layer depleting chemicals and avoid the use of noxious substances, especially "DOE RED LIST" and "EU LISTING 1" Substances:

#### DOE RED LIST

- Mercury and its compounds
- Cadmium and its compounds
- Gamma-Hexachlorocyclohexane
- DDT
- Pentachlorophenol
- Hexachlorobutadiene
- Aldrin
- Dieldrin
- Endrin
- Polychlorinated Biphenyls
- Dichlorvos
- 1, 2-Dichloroethane
- Trichlorobenzene
- Atrazine
- Simazine
- Tributyltin compounds
- Triphenyltin compounds
- Trifluralin
- Fenitrothion
- Azinphos-methyl
- Malathion
- Endosulfan

#### EU LIST 1 (substances additional to above)

- Carbon Tetrachloride
- Chloroform
- Trichloroethylene
- Per (or Tatra) chloroethylene

In addition the following list of materials must not be used or incorporated into the works:

- High Alumina cement or concrete
- Woodwool slabs
- Calcium Chloride
- Asbestos

- Urea Formaldehyde
- Calcium silicate bricks or tiles
- Crocidolite
- Spanish slates (unless complying with British Standards and Codes of Practice at the time of incorporation into the project)
- Any other substances not in accordance with British Standards and Codes of Practice at the time of incorporation into the project.

## 6.5 Burning on Site

Burning of materials on site will not be permitted unless approved by the Employer's representative.

## Section 2

# Design Requirements

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# 1 General Design Requirements

## 1.1 General

In this section the design criteria for the works, the local site conditions, the works to be executed and the corresponding general planning and time schedule are presented.

### 1.1.1 Design

An outline design for the extension of the container facilities has been prepared by the TACIS Project Team of the "Feasibility Study of New Terminal Facilities in the Georgian Ports". This design is illustrated on drawings as scheduled in Section 4 of this volume. The Contractor is required to develop this outline design to produce a detailed design, hereinafter referred to as the "Design". The Design shall comply with the Employer's Requirements. The Contractor shall obtain the Employer's Representative's approval of the Design (including undertaking any modifications to the Design to obtain approval) and consent to proceed to construction. The Contractor shall construct the works in accordance with the Design to the satisfaction of the Employer's Representative.

The Contractor may propose modifications to the Outline design as illustrated to suit specific construction methods or practice. Such modifications will be subject to approval by the Employer's Representative and the Employer.

### 1.1.2 Outline Design Drawings

The Design shall be based on the Outline Design drawings, hereafter referred to as the "Drawings", which are issued with this Specification and scheduled in Section 4 of this volume.

The accuracy of the drawings can not be guaranteed and the Contractor shall verify such information where it might be relevant to the design of the Works.

### 1.1.3 Existing Record Drawings

The outline design drawings are based on existing record drawings provided by the Port Authority. Relevant drawings have been taken over and are issued with this Specification. Other record drawings, which are not included with the Tender Documents, are available for viewing.

The accuracy of the record drawings can not be guaranteed and the Contractor shall verify such information where it might be relevant to the design of the Works.

## 1.2 Design Criteria

### 1.2.1 Standards and Codes of Practice

The Design shall be in accordance with the latest editions of the relevant British Standards and Codes of Practice and relevant European Standards. National standards, norms and codes and codes of the former Soviet Union, may be used as an alternative if applicable and so agreed with the Employer's Representative.

The principal technical standards and codes, which are applicable to this project, without being completely, are:

BS 594	Hot rolled asphalt for roads and other paved areas
BS 1377	Methods of test for soils for civil engineering purposes
BS 3690	Bitumens for building and civil engineering
BS 5328	Concrete
BS 5493	Code of practice for protection coating of iron and steel structures against corrosion
BS 5628	Code of practise using masonry
BS 6031	Code of practice for earthworks
BS 6044	Pavement marking paints
BS 6187	Code of practice for demolition
BS 6349	Code of practice for maritime structures
BS 6367	Code of practice for drainage
BS 6399	Loading for buildings
BS 7533	Pavement
BS 7542	Method of test of curing compounds
BS 8000	Code of practice for concrete work
BS 8004	Code of practice for foundations
BS 8005	Sewerage
BS 8110	Structural use of concrete
BS 8301	Code of practice for building drainage

Other standards and codes of practice are listed elsewhere.

Section 3 of this document provides the Technical Specifications to be applied to all materials and workmanship throughout the construction of the works.

The design is to comply with the lay out and orientation shown on the drawings. If a conflict is identified, refer to the Employer's Representative.

The structures and buildings are to comply with all current standards, Health and Safety Directives and Regulations as regards to fire safety and means of escape and statutory service Regulations in respect of water, fuel and electrical supplies.

The design shall take into full consideration the exposed nature of the site particularly in respect of the effects of wind, waves, driving rain, salt laden atmosphere and the regular saline wetting and drying of elements by the sea.

### 1.2.2 Design Life and Maintenance

The whole of the Works shall be designed to have a Design Life of 50 years, with minimum maintenance.

Materials must be selected to ensure low maintenance to give a "Minimum Whole Life Cost" of the facilities. The design shall take account of availability of replacement materials and ease of repair if required. Materials shall be readily available from normal trade sources.

All finishes and materials shall be suitable for easy cleaning, re-decoration and maintenance so that the life spans can be achieved and extended.



### 1.2.3 Design Loads

General:

- Buildings : 2.0 kN/m<sup>2</sup>
- Traffic areas road traffic : equal to storage areas (10 mt/m<sup>2</sup>)
- Storage areas : 10 mt/m<sup>2</sup>

The berths shall handle vessels with the following characteristics:

	Berth 5
Cargo Type	Containers General Cargo Ro-Ro*
Dead weight	15.000 mt
Length o.a.	180 m
Draught	9.0 m

\* Using the ramp at Berth no. 5 the vessel is moored along Berth no. 6.

Berthing loads:

- Fender energy and forces : 540 kN/m (berthing speed 0.3 m/s)
- Bolder forces : 750 kN

### 1.2.4 Natural Design Conditions

Extreme air temperatures	: Max. 40°C Min. -15°C
Average relative humidity	: 68 %
Average yearly precipitation	: 2418 mm
Design rainfall for surface drainage	: 60 l/sec/ha
Wind pressure	: 0.55 kN/m <sup>2</sup>
Snow pressure	: 0.5 kN/m <sup>2</sup>
Ice loads	: considered of minor importance
Seismic loads	: force 8 (scale of Richter)

### 1.2.5 Soil Conditions

Reports of previous soil investigations are available for information purposes only. The Contractor shall confirm and take into account the ground conditions described in these reports and as outlined in Section 1 of this document.

The Contractor shall undertake further exploratory testing of existing ground conditions as may be required. It is the responsibility of the Contractor to provide a design, which will accommodate the ground conditions as encountered during construction.

#### 1.2.6 Site Level Datum

The levels shown on the Drawings relate to BSL. This datum shall be used throughout the design and construction of the Works. A permanent Bench Mark for the Works relating to BSL shall be established by the Contractor.

#### 1.2.7 Water Levels

Tides in the Black Sea are negligible.

The water levels mentioned in the Tender Documents are referred to Baltic Sea Level (BSL).

The Mean Sea Level (MSL) at the port of Batumi is reported to be  $-0.40$  m BSL. The minimum sea level (98% chance of exceedence) is  $-0.60$  m BSL.

#### 1.2.8 Ground Water Level

The natural ground water level shall be assumed to be Mean Sea Level for the purpose of design.

## 2 Development Multi-Purpose Terminal

### 2.1 Demolition

#### 2.1.1 General

To accommodate the new lay out of the Multi-Purpose Terminal various existing building works and structures not fitting into the new lay out shall be demolished and the demolished material shall be removed from the site.

The demolition works will have to be planned in accordance with the construction of the replacement building works and structures foreseen.

The works comprise demolition of buildings, pavements, fences, utilities, etc. and also a full cleaning and removal of equipment and debris in the boundaries of specified territories and on the whole site, if it is required for the work execution, and in general the works shall be performed by the Contractor as prescribed by the Employer's Representative.

#### 2.1.2 Buildings to be Demolished

The buildings to be demolished are indicated on Drawing 4.2.5. The approximate dimensions are:

- Demolition buildings: 6400 m<sup>2</sup>

### 2.1.3 Pavement to be Demolished

The Contractor shall remove existing asphalt and concrete pavement of the terminal roads, storage and operational areas in compliance with the specifications and as shown on Drawing 4.2.5.

Pavements shall be demolished to the extent necessary for the execution of foundations, floors, pipes, etc. and for the renewal and remodelling of pavements.

Approximate Dimensions:

- Terminal roads: 290 m
- Foundation: 2650 m<sup>2</sup>
- Concrete pipe supports: 13 no.

### 2.1.4 Mechanical and Electrical Utilities to be Demolished

Certain mechanical and electrical utilities serving the port area are to be demolished. The Contractor shall survey and check the presence of all utilities prior to commencing demolition and shall cap-off and strip out as appropriate. The Contractor shall notify the Employer's Representative of all utilities encountered.

The oil interceptor and connected waste water pipes shall be demolished as indicated on Drawing 4.2.5.

Detailed planning for demolition, removal and installation of utilities shall be provided by the Contractor and has to be approved by relevant authorities and the Employer's Representative prior to commencement of the works.

### 2.1.5 Drawings

Drawing 4.2.2 Existing Layout Container Terminal

Drawing 4.2.5 Demolition Works

## 2.2 Earthworks

### 2.2.1 Setting Out and Measurement:

Before starting up any site works, the Contractor shall prepare a new topographic / bathymetric survey of the site in the presence of the Employer's Representative and to be approved by the Employer's Representative.

The Contractor shall establish all setting out for these works. The setting out shall be approved by the Employer's Representative but the Contractor remains the only responsible for the correctness.

At the completion of each construction stage the Contractor shall carry out necessary site surveys to document the completion, before payments can be effectuated.

### 2.2.2 Site Clearance:

The Contractor shall clear all areas of the site for grass, bushes, rubbish, topsoil if any, etc., where works shall be executed and where required by the Employer's Representative.

He shall remove all debris to approved dumping sites and no debris shall be deposited except on such sites.

### 2.2.3 Extent of Works

The appropriate dimensions of the areas are:

- Berth no. 5: 42000 m<sup>2</sup>

### 2.2.4 Drawings:

Drawing 4.2.2 Existing Layout

Drawing 4.2.4 New Layout

## 2.3 Construction of Quay Structure

### 2.3.1 Extent of Works

The Contractor shall prepare a design for the construction of a new quay at Berth no. 5.

The existing quay is constructed of a blockwall designed for a water depth of 5.00 m. A new quay shall be constructed in front of the existing blockwall as indicated in Drawing 4.2.3. The distance between the new and the existing quays varies between 0 to 12 m. The space between the two quays shall be filled up.

### 2.3.2 Execution of Works

The Contractor shall plan construction works in such a way that hampering of port operations shall be minimised. During planned construction period Berth no.6 and the Ro-Ro ramp, presently under construction, shall remain operational for ship handling.

### 2.3.3 Functional Requirements

Requirements berth:

- Length : 225 m
- Ground level apron : 2.10 m above sea level
- Water depth : Based on the maximum expected vessel of 15.000 DWT, the draft of this vessel will be 9.00 m and therefore design water depth of the quay should be 10.50 m.
- Filling up of the area between new and old quay construction.

The quay shall be designed for handling of self-sustaining vessels. However, mobile cranes shall be used when needed.

In the future rail mounted cranes may be used as handling equipment. Therefore, the construction shall be designed in such a way, that installation of this equipment can be realised by minor reconstruction of the quay.

Vehicle access to the quay apron is required along the full length of the quay structure. Therefore the pavement shall smoothly be connected to adjacent areas.

A utility tunnel shall be provided for the full length of the quay, located between the quay structure and adjacent new storage area.

Rainwater will be drained via the new drainage system of adjacent new storage area.

The quay apron area is basically used for the movement of vehicles and railway wagons, operational area for loading and unloading, and the temporary storage of cargo during loading or unloading. The apron shall be 25 m wide.

Along the quay bolders shall be provided at maximum distance of 30 m. New fenders shall be installed along the quay structures every 15 m. The fenders have to withstand forces from 15.000 DWT vessels. The minimum diameter is 1 m.

### 2.3.4 Drawings

Drawing 4.2.2 Existing Layout

Drawing 4.2.3 Cross Sections Existing and New Situation

Drawing 4.2.4 New Layout

## 2.4 Construction of New Pavement

### 2.4.1 Extent of Work

The entire Multi-Purpose Terminal area shall be paved. The works comprise:

- Pavement of storage area and quay apron (41000 m<sup>2</sup>)
- Pavement between rail tracks (1250 m<sup>2</sup>)
- Pavement near gate (1300 m<sup>2</sup>)

### 2.4.2 Execution of Works

During construction access to all port areas and the breakwater has to remain operational, unless requested by the Contractor and approved by the Employer's Representative.

### 2.4.3 Functional Requirements

The pavement at the quay apron shall be made out of concrete, resistant against saline water attack.

The pavement of storage areas and driving lanes at storage areas shall be constructed with concrete or concrete paving blocks. In case of paving blocks the foundation shall consist of sand and a sand/cement mixture.

To maximise flexibility, the pavement of all operational areas (storage areas, driving lanes, parking areas) shall be designed uniformly. Areas that in future will not be used for storage (areas near the gate) may be constructed out of asphalt.

Design loads caused by cargo and equipment are based on the use of reachstackers and storage of full containers up to 3 high. The design load for the entire area is 10 t/m<sup>2</sup>.

The layout and design of the storage areas shall be based on storage of containers and can also be used as open storage area for general cargo.

For drainage the new pavement shall comply with the following requirements for the slopes:

- Minimum slope: 0.5 %
- Cross-section driving lanes: 2.0 % (+/- 0.5 %)
- Cross-section storage area: 1.0 % (+/- 0.25 %)
- Longitudinal-section driving lanes and storage areas: 0.5 %
- Maximum slope: 4.0 %

The storage areas and driving lanes shall be clearly indicated by painted lines, which enables adjusting of the layout to new requirements in the future.

The new railway tracks shall be paved in to enable access / crossing by rolling equipment.

The minimum width of the driving lanes shall be 15 m. To maximise the flexibility of the terminal for future development, the pavement of the driving lanes at the terminal shall be equal to the pavement of the storage areas and parking areas.

#### 2.4.4 Drawings

Drawing 4.2.2 Existing Layout

Drawing 4.2.3 Cross Sections Existing and New Situation

Drawing 4.2.4 New Layout

## 2.5 Construction of Rail Tracks

### 2.5.1 Extent of Work

A new rail track shall be constructed behind the existing warehouses. The length of this track is approximately 250 m.

Reconstruction of the road bridge is considered to be a part of the construction works for the Ro-Ro ramp and therefore it is not within the scope of works of this project.

### 2.5.2 Execution of Works

This rail track shall be connected to the new rail track of the Ro-Ro ramp presently under construction..

### 2.5.3 Functional Requirements

The level shall be equal to the pavement of adjacent areas.

The new lines shall be paved in with concrete as indicated on the drawings to enable access by rolling equipment.

The railway tracks shall withstand railway wagons with a maximum axle load of 25 t.

#### 2.5.4 Drawings

Drawing 4.2.2 Existing Layout

Drawing 4.2.4 New Layout

### 2.6 Utilities

#### 2.6.1 Extent of Work

For the new terminal utilities (such as water supply, electricity, sewerage and drainage, etc.) shall be installed. Presently hardly utilities are available in the ground at this part of the port.

The works comprise:

- Construction of new utility ducts:  
All new utility cables and pipes shall be put in concrete utility ducts to enable easy access.
- Installation of hydrants:  
Water hydrants shall be installed at the storage area and near buildings.
- Installation of terminal lighting:  
The container terminal area shall be lighted by new lighting poles.
- Construction of drainage and sewerage system:  
The new terminal area shall be drained and new buildings shall be connected to the sewerage system.
- Removal Oil Interceptor  
The existing oil interceptor shall be demolished and the waste water pipe line (coming from the rail wagon cleaning) shall be connected to the oil interceptor located north of the Multi-Purpose Terminal area.
- New utility connections:  
New buildings shall be provided with new utilities conform requirements as mentioned in 2.7.

#### 2.6.2 Execution of Works

The execution of these works shall be planned in accordance with the demolition of existing utilities, earthworks and construction of pavement.

All works shall be planned and co-ordinated with responsible authorities well in advance to commencement of works. All activities have to be approved by responsible authorities and the Employer's Representative.

Interruption of utility supply shall be kept as minimal as possible. The Contractor shall make written application for interruption of utility supply, which has to be approved by the Employer's Representative prior to cut of the utility supply.

#### 2.6.3 Functional Requirements

New utilities shall be laid in concrete ducts as much as possible.

The ducts shall be covered with concrete slabs. Access holes shall be provided every 30 m.

Utility ducts shall be provided with steel bars to keep cables above the bottom of the duct.

Fire hydrants shall be installed above ground level for easy identification. Hydrants shall be located next to permanent fixtures such as lighting poles.

The drainage system shall be sufficient to prevent flooding. The drainage network shall be based on the design rainfall of 60 l/sec/ha. During normal showers drained water is collected in a sedimentation basin / oil interceptor, with an outflow to the sea.

In case of severe rainfall, the rainwater will flow via the overflow directly into the port basin. This is required to avoid high currents within the sedimentation basin / oil interceptor. The water flowing out via the overflow will not be harmful to the environment, since almost all waste at the terminal area shall be collected in the sedimentation basin / oil interceptor at the beginning of a rain-shower. High currents within the sedimentation basin / oil interceptor shall be realised by the construction of an outlet with limited diameter. It is of utmost importance to keep to the diameter and length of the pipes as indicated on Drawing 4.2.6.

The provision of drinking water and water for washing shall have a minimum pressure of 2.5 kg/cm<sup>2</sup> and a minimum flow of 50 l/sec. For fire fighting, the pressure must be increased to 7 kg/cm<sup>2</sup> and the flow to 80 l/sec and hydrants of suitable height installed at intervals of not more than 100m.

To operate the terminal by day and night, the lighting shall meet the following requirements:

- Use as few lampposts as possible. Posts should be high to provide ample clearance.
- For operation en storage areas: 80 lux
- Other areas and areas not in operation: 50 lux
- Illumination at ground level should be at least : 25 lux
- The average level should be 50 lux where required to ensure the safety of workers or cargo.

A communication system is required, which shall link the operating areas, entrances and exits, and the control centre.

An alarm system shall be installed, which shall meet the following requirements:

- The alarm system shall be based on video camera controlling.
- The central controlling room shall be integrated with the gate security.
- The installation of fire alarms, with at least a manually operated system connected to the terminal control centre and automatic sound and visual signalling.

## 2.6.4 Drawings

Drawing 4.2.2 Existing Layout

Drawing 4.2.4 New Layout

Drawing 4.2.6 New Utilities

## 2.7 Gate

### 2.7.1 Extent of Works

A new gate shall be constructed at the eastern side of the terminal near the main access road of Batumi.



### 2.7.2 Execution of Works

The new gate shall not be used for port operations until construction is finalised.

### 2.7.3 Functional Requirements

The gate shall be provided with 3 lanes (2 in – 1 out) to handle 3 trucks simultaneously. Each lane shall be 4.5 m wide. Electrically operated barriers shall be installed. The gate shall be covered by a roof as indicated in the drawings. The height of the roof shall be minimal 4.65m above groundlevel.

A small gatehouse shall be constructed as indicated on the drawings.

The gatehouse shall be foreseen with the following utilities:

- Electricity
- Water supply
- Telephone
- Alarm system
- Sewerage system

### 2.7.4 Drawings

Drawing 4.2.4 New Layout

Drawing 4.2.7 Gate and Sewerage Details

## 3 Planning

The works to be executed are scheduled in attached planning.



## Section 3

# Technical Specifications

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# 1 Demolition

## 1.1 Demolition of Existing Works

The Contractor shall be deemed to have taken into account all local conditions encountered during the course of demolition.

The Contractor shall undertake demolition work only after receiving the Employer's Representative's approval of the Contractor's Method Statements. These shall state clearly the proposed method of excavation and sequence of working. They shall include a description of methods of determining the presence of all utilities above and below ground level and structures and methods of capping-off all utilities as necessary. The Contractor shall liaise with the Employer's Representative regarding all utilities prior to capping them off.

Utmost care shall be taken, when demolition or excavation takes place close to electricity distribution cables, telephone cables, sewerage, oil pipes, water supply pipes, etc. The Contractor shall co-ordinate the removal of existing utilities and shall undertake all necessary investigatory works prior to demolishing any services or buildings. The execution methods and the execution including the necessary safe precaution remain the sole responsibility of the Contractor and any damage to property not to be demolished or persons shall be fully repaired by him and on his account.

The Contractor shall remove existing structures in compliance with the specifications and as shown on the drawings.

The Contractor shall demolish or remove all concrete and other materials in superstructure, foundations, etc. at least to a level of 0.80 m below ground level and to a level without interference with new structures and installations or existing structures and installations to be maintained.

No plantation is to be removed or damaged without prior approval from the Employer's Representative.

Unless otherwise stated all demolished structures shall belong to the Contractor and shall be removed from the site on his expense. No dropping of demolished structures into the water is allowed. Selection of dumping site, work arrangements and approvals required for disposal of waste materials remain the sole responsibility of the Contractor and all costs in this connection shall be carried by him.

Planning of the demolition works shall ensure that proper substitution building works and facilities are completed and made operational before demolition of works to be substituted is executed.

Demolition works shall be undertaken with due regard to safety at all times.

Utmost care shall be taken during demolition of buildings containing asbestos. The Contractor shall comply with international health and safety regulations in this respect. Buildings containing asbestos are indicated on the drawings for the Contractor's information. The Contractor remain responsible for the identification of asbestos on site and all available records will be made available to the Contractor in order to facilitate his review during the planning processes.



## 2 Earthworks

### 2.1 General Excavation and Filling

#### 2.1.1 Excavation

The Contractor shall prior to the commencement of excavations provide a plan for the execution of the work for the approval by the Employer's Representative.

Utmost care shall be taken when excavation is close to permanent structures like oil pipes, sewage systems etc. Precautions taken, in order to safeguard all permanent structures and all repair of damages on these, shall be the sole responsibility of the Contractor and hence be on his account.

The safety of the excavation is the sole responsibility of the Contractor and the Contractor shall assure himself of the adequacy of temporary supports.

Any excess excavation shall be made good by backfilling with suitable material compacted in accordance with the specifications for overlaying layer. All excavations shall be inspected and approved by the Employer's Representative prior to commencement of any permanent work.

#### 2.1.2 Stability of Structures

All excavation shall be carried out in such a way as not to endanger the stability or safety of any part of the permanent or temporary works or existing structures or personnel.

#### 2.1.3 Disposal of Excavated Materials

Suitable excavated material shall be set aside as required for re-use as filling. Surplus excavated material shall be removed from the Site.

Where the excavation reveals a combination of suitable and unsuitable materials, the Contractor shall, unless otherwise agreed by the Employer's Representative, carry out the excavation in such a manner that the suitable materials are excavated separately for use in the works without contamination by the unsuitable materials. All suitable material from cuttings shall be used as far as possible as fill in backfillings.

Disposal of excess fill and unsuitable fill shall be out of the Port area as directed by the authorities and approved by the Employer's Representative.

#### 2.1.4 Control of Water

Excavation for foundations of structures shall be carried out generally "in the dry". Water shall not be allowed to accumulate in excavations and the Contractor shall install and maintain such pumping or other water control measures as necessary.

#### 2.1.5 Removal of Unsuitable Material

Where necessary the Contractor shall remove and dispose of any unsuitable material below foundation levels and replace with suitable material.

### 2.1.6 Compaction of Excavated Surfaces

Where necessary the bottom of excavations shall be recompacted to achieve at least 95% of the maximum dry density determines in accordance with BS 1377: Part 4 test procedures.

### 2.1.7 Backfilling Around Structures

Backfilling shall be carried out using approved selected excavated, or imported, materials and these shall be placed and compacted evenly in layers not exceeding 300 mm in depth. The compaction shall be arranged to achieve at least 95% of the maximum dry density determined in accordance with BS 1377: Part 4 test procedures.

Prior to any backfilling the Employer's Representative shall be informed in due time for inspection of the area meant for the backfilling.

For sand filling behind sheet piles only clean sand are allowed. If suitable the sand can be delivered from the sea bottom.

If the material deposited as fill subsequently reaches a condition such that is can not be compacted in accordance with the requirements of the Contract, the Contractor shall either:

- Make good by removing the material until it is in a suitable physical condition for re-use, and replacing it with suitable material.
- Make good the material by mechanical or chemical means to improve its stability.
- Cease work on the material, until its physical condition is again such that is can be compacted as described.

The Contractor is to take particular care in placing and compacting filling around pipes, cables, structures and the like and is to take such steps as may be necessary to prevent damages to these.

## 3 Dredging

### 3.1 General

#### 3.1.1 Excavation by Dredging

Any dredging required to provide the minimum dredge level specified shall be carried out in any material and finished to the widths, and lengths required in the specification or on the Drawings.

The Contractor shall ascertain the requirements for approvals from Statutory Authorities and shall submit and obtain such approvals and comply with any requirements of the Statutory Authorities.

All necessary precautions shall be taken to ensure that the dredging works does not adversely affect adjacent dredged areas.

### 3.1.2 Tolerances in Excavation

No part of the dredged excavation within 20 m of the quay structures at any time be dredged to a depth exceeding 500 mm below the lines indicated.

### 3.1.3 Surveys and Soundings

A sounding survey of the area to be dredged and of the adjacent areas as shown on the drawings shall be carried out by the Contractor before the commencement of dredging.

The origins of the survey shall be fully co-ordinated with the main survey setting-out points.

The method of sounding shall be agreed with the Employer's Representative and shall remain consistent unless otherwise agreed with the Employer's Representative. The distance between rows of soundings shall not exceed 5 metres and the distance between soundings in any row shall not exceed 2.5 metres.

Further joint sounding surveys of the dredged areas shall be carried out on completion of dredging. If necessary the Contractor shall return and remove all high spots or trim unstable slopes and repeat; the soundings until the Employer's Representative is satisfied.

The survey results shall be submitted as a drawing.

### 3.1.4 Disposal of Excavated Materials

The Contractor shall obtain necessary approvals for the disposal of dredged material.

### 3.1.5 Dredging Datum

The level for dredging work shall be Chart Datum.

### 3.1.6 Signals and Lights

The Contractor shall display on all his dredging craft signals and lights in accordance with present local and where appropriate the International Regulations for the Prevention of Collision at Sea.

## 4 Piling

### 4.1 General

#### 4.1.1 Stability and Safety

The Contractor shall be wholly responsible for the stability of piling and shall take every precaution to prevent deflection of piles or movement of driven piles and shall provide whatever temporary works are necessary to maintain piles in their correct position until permanently secured in the Works. Piles that have been installed outside the specified tolerances shall be corrected or extracted and re-driven within tolerance.

The Contractor shall observe the safety precautions required by BS 5573 and BS 8004 as appropriate during all piling operations.

#### 4.1.2 Piling Method

The Contractor shall provide suitable piling plant for each type of pile to be driven or formed in situ.

The Contractor shall supply for approval all relevant details of the method of piling and the plant he proposes to use at least 4 weeks prior to the date he expects to commence piling.

#### 4.1.3 Piling Programme

The Contractor shall inform the Employer's Representative each day of the intended programme of piling for the following day and shall give adequate notice of this intention to work outside normal hours and at weekends.

#### 4.1.4 Nuisance and Damage

1. Noise and disturbance:

The Contractor shall carry out the work in such a manner and at such times as to minimise noise, vibration and other disturbance.

2. Damage to adjacent structures:

If in opinion of the Contractor damage will be, or is likely to be, caused to mains, services or adjacent structures, he shall submit to the Employer's Representative his proposals for making surveys, monitoring movement or vibrations, and minimising or avoiding such damage.

3. Damage to piles:

The Contractor shall ensure that during the course of the work, displacement or damage that would impair either performance or durability does not occur to completed piles.

4. Temporary support:

The Contractor shall ensure that where required, any permanently free-standing piles are temporarily braced or stayed immediately after driving to prevent loosening of the piles in the ground and to ensure that no damage resulting from oscillation, vibration or movement can occur.

#### 4.1.5 Tolerances

1. Setting-out:

All piles shall be set-out carefully from the main grid lines. On land, pins or pegs shall mark pile positions.

2. Position:

When measured at the specified pile cut-off level, the maximum permitted deviation of the pile centre from the centre-point shown on the drawings shall be 75 mm in any direction.

3. Vertically:

At the commencement of installation, the pile and its driving equipment shall be made vertical to a tolerance of within 1 in 100. The maximum permitted deviation of the finished pile from the vertical is 1 in 75.

4. Rake:

At the commencement of installation of a raking pile, the pile, its driving equipment and any other equipment governing the direction and rake shall be set up to the required direction and rake to within a tolerance of 1 in 50. The equipment shall be maintained in position throughout driving so as to attain the

required rake. The maximum permitted deviation of the finished pile from the specified rake is 1 in 25 for piles raking up to 1:6 and 1 in 15 for piles raking more than 1:6.

5. Forcible corrections to piles:

Forcible corrections to piles to overcome errors of positions or alignment which may damage the pile or surrounding structure shall not be permitted.

#### 4.1.6 Records of Piling Operations

The Contractor shall keep piling record sheets and shall submit two signed copies of these to the Employer's Representative.

## 4.2 Steel Sheet Piles

### 4.2.1 Materials:

Steel sheet piling shall be of approved manufacture and of the sections and in lengths as shown on the working drawings. The steel shall be Grade 43 or 50 to BS 4360 unless noted otherwise. The rolling or manufacturing tolerances shall be such that the actual weight of any steel sheet pile section does not differ from the manufacturers published weights by more than -2.5% to + 5%.

### 4.2.2 Tolerances

Steel sheet piling, including all junctions, bends and special piles shall be straight and true to the Manufacturer's published dimensions and shall be delivered to the site in the lengths shown on the drawings with a tolerance of  $\pm 75$  mm.

### 4.2.3 Handling

All steel sheet piling shall be stacked on approved supports.

Offloading, handling, transporting, interlocking & pitching shall be carried out carefully and without damage to the piles.

### 4.2.4 Driving Steel Sheet Piling

Steel sheet piling shall be pitched and accurately driven plumb and true to line and toe level as shown on the drawings and be closely interlocked throughout their length. They shall generally be driven in panels or as recommended by the manufacturer with a suitable helmet and by a hammer of suitable weight and approved design.

Sheet piles driven to a level shall have a tolerance of -0 / +100 mm at their top level.

### 4.2.5 Tie Rods

Tie rods for sheet piled walls shall be manufactured from steel grade 43 or 50 to BS 4360 with a minimum yield strength of 450 N/mm<sup>2</sup>. Tie rods shall have rolled ISO Metric threads to BS 3643.

Tie rods shall be supplied in the maximum lengths available to minimise couplings. All couplings shall have a 10 mm. diameter central inspection hole and each tie rod shall have one turnbuckle at about mid-length unless ordered otherwise.

#### 4.2.6 Placing Tie Rods

Corrosion protection shall be a coating paste, wrapping with marine piling tape with minimum 55% overlap and with a second layer wrapping of marine piling tape also with minimum 55% overlapping. Couplers and turnbuckles shall be similarly wrapped after tightening is completed, care being taken to ensure a good overlap of the protective tape on each side of the units.

Placed tie rods shall be adequately protected and supported to prevent sag during backfilling operations. Supports shall be provided at each coupling. Particular care shall be taken not to allow damage to tie rod protective coatings at any time during placing / backfilling.

#### 4.2.7 Holes for Tie Rods

Holes cut in sheet piling for tie rods shall not be larger than 10 mm greater than the nominal tie rod diameter. Holes cut beyond this tolerance shall be plated to strengthen the pile.

#### 4.2.8 Wrapping Rods and Bolts

Where necessary, tie rods, anchor bolts shall be locally wrapped on the inside with tape to prevent loss, or leaching out of fines through rod/bolt holes.

#### 4.2.9 Cleaning

The tops or faces of steel side piling are to be thoroughly cleaned prior to the concrete, in which they are to be encased or which the abut, is placed.

### 4.3 Load Testing of Land

#### 4.3.1 Load Testing

Tests shall be carried out on piles by the Employer's Representative as and when he requires.

Tests shall be carried out using a hydraulic jack. The Contractor shall provide all equipment and labour to carry out the tests and shall provide a detailed record of every test.

Jacks shall be calibrated by an Independent Testing Laboratory immediate before the test.

A suitable system of measuring deflections and settlements of the pile shall be installed. Particular care shall be taken to ensure that the measuring apparatus is kept remote from the possibility of being affected by ground movements, etc.

The tests shall be carried out in the following manner:

- The load shall be applied in increments of 5 tonnes every 5 minutes and measurements taken at each increment.

- When the applied load reached the working load no further load shall be applied for a minimum of 24 hours, but hourly measurements are to be taken during this period.
- Further loads shall then be applied in 5 tonnes increments until the applied load is 1.5 times the working load. This load shall be maintained for 12 hours, measurements being taken hourly.
- When movement has ceased the load shall then be removed in 5 tonne stages and measurements taken at each stage until all loading has been removed. A full record shall be kept of all deflections and settlements throughout the period of testing.

#### 4.3.2 Failure of Pile Under Test Load

Any pile exhibiting a permanent settlement exceeding 5 mm shall be deemed to have failed.

The Employer's Representative may require the Contractor to modify subsequent piles and to carry out a further pile test(s) until a satisfactory result is achieved.

Should the Contractor continue to install piles pending the result of a pile test, he shall do so at his own risk. The Employer's Representative may require any pile so installed and represented by a pile, which has failed under test loading to be replaced, or additional piles installed at the Contractor's expense.

## 5 Concrete

### 5.1 Standards

The works shall be executed in accordance with the relevant European Standards.

National standards, norms and codes and codes of the former Soviet Union, may be used as an alternative if applicable and so agreed with the Employer's Representative.

Basis for the Contract shall be British Standard:

- BS 6349 Code of practice for maritime structures
- BS 8110 Structural use of concrete

Other relevant standards are:

- |  |                              |
|--|------------------------------|
| • Cement                               | BS 12                        |
| • Aggregates                           | BS 882                       |
| • Water                                | BS 5328                      |
| • Admixtures                           | BS 5075                      |
| • Steel reinforcement                  | BS 4449, BS 4482 and BS 4483 |
| • Compressive strength                 | BS 1881                      |
| • Cutting and bending of reinforcement | BS 4466                      |

Appendices, guidance and recommendation clauses shall be valid to the extent they are applicable.

## 5.2 Materials

### 5.2.1 Cement

Portland Cement (as specified in BS 12) shall be used, unless agreed otherwise with the Employer's Representative.

Before placing orders for cement the Contractor shall submit the name of the proposed supplier.

Rapid hardening or early strength cement shall not be used unless specifically approved by the Employer's Representative.

All cements shall be certified by the manufacturers as complying with the requirements of the appropriate specification. Before orders are placed, the Contractor shall submit information on the proposed methods of transport, storage and certification so that the Employer's Representative may satisfy himself that the quantity and quality required can be supplied and maintained throughout the construction period. Where necessary, the Employer's Representative may require further representative samples of the proposed cement to be taken and forwarded to a laboratory approved by him for analysis and testing, before the source is approved.

In addition to the routine test certificates, which are to be supplied by the manufacturer to show the results of sample tests made on batches of cement produced for the works, each consignment despatched to the Site is to be sampled and tested by the manufacturer, and the results of the standard 3 – day and 28-day tests are to be submitted promptly to the Employer's Representative. The data of manufacture of the consignment is to be stated on the test certificate.

The Employer's Representative may also make any further tests, which he may consider necessary or advisable to satisfy himself that the cement on site complies with the specification and has not suffered deterioration in any manner during transport or storage.

The cement delivered to the Site must be protected from the weather by effective coverings. Immediately after delivery at the Works the cement is to be placed in these covers and it shall be used in the order, in which it has been delivered.

All cement shall be used within two months of the date of manufacture.

### 5.2.2 Aggregates

Aggregate shall conform to BS 882 and shall be tested in accordance with BS 812. The Contractor shall select suitable aggregate and samples of sand and stone for specified testing before obtaining aggregate. The aggregate supplier shall carry out laboratory tests in conformity with this specification to confirm the suitability and consistency of aggregate.

The sand shall be from approved sources and sand, which in the opinion of the Employer's Representative is not clean, shall be washed clear with fresh water before use.

Crushed sand may be added to natural sand in order to achieve the required grading. Crushed sand alone may only be used with the approval of the Employer's Representative.

Coarse aggregate may be either natural gravel or stone broken to the desired size and shall be obtained from quarries, pits, or other sources approved by the Employer's Representative.



Gravel and ballast shall be approved by the Employer's Representative. Any sand that may be amongst it shall, unless otherwise directed, be removed by screening and kept apart. Should the sand thus obtained be suitable for use in concrete, it may be used for that purpose provided that it complies with the conditions specified for the sand.

The source of broken stone shall be approved by the Employer's Representative and notwithstanding this, the stone as delivered to the Works will be subject to rejection on the Works, if for any reason the Employer's Representative considers it unsatisfactory. The stone must be broken in a stone crusher of approved type to the sizes hereinafter specified, and any dust or fine material below 5 mm in size made in the stone crusher is to be removed by screening or washing if so required by the Employer's Representative.

The grading of aggregate by analysis shall be within the limits given below. Should an analysis of the grain size of the material show a deficiency in any particular size such as to affect the density of the concrete, the Employer's Representative may require the Contractor to add such quantity of aggregate of any particular size that he may deem advisable. In every case the material shall produce a well-graded mixture from the largest to the smallest size specified to ensure that concrete of high density is produced.

The fine and coarse aggregate shall when composed and delivered to the mixer be well graded within the following limits.

Sieve Size (in mm)	% Weight Passing (max. 32 mm)	% Weight Passing (max. 19 mm)
32	100 - 100	
25	85 - 95	
19	73 - 85	100 - 100
9.5	55 - 65	68 - 88
4.75	42 - 51	55 - 65
2.36	32 - 41	40 - 52
1.18	27 - 37	34 - 45
0.6	18 - 28	27 - 37
0.3	5 - 15	15 - 25
0.15	1 - 4	1 - 5

Further, the fineness modulus of at least 9 out of 10 samples of aggregate shall not vary more than 0.20 from the average fineness modulus of all samples taken during the preceding 30 days period.

The aggregate shall be free of organic and chemical impurities and the content of chloride salt in the aggregate, expressed as the equivalent anhydrous calcium chloride percentage by weight of the cement to be used in the concrete shall not exceed 0.4 percent. No chloride will be allowed in aggregates to be used in concrete for Marine Works.

For the purpose of calculation, the anhydrous calcium chloride content may be taken as equal to the sodium chloride content or to 1.6 times the chloride ion content as appropriate.

The total sulphate content shall not exceed 4.0% by weight of cement including the sulphate present in the cement.

The Contractor shall keep records in duplicate of all control tests. These records shall be available to the Employer's Representative for inspection at all times and they shall become the property of the Employer.

### 5.2.3 Water

Water to be used for mixing and curing concrete and mortar shall be fresh and free from sediment and dissolved or suspended matter which may be harmful and shall comply with the requirements of BS 3148. Water samples from the intended source of supply shall be taken for analysis before any concrete work is commenced, and at intervals throughout the duration of the Contract. If the samples are unacceptable the Contractor shall either change to a new supply or take steps to improve the existing source.

The acid-soluble sulphate ( $\text{SO}_3$ ) content shall not exceed 500 mg/l, and the acid-soluble chloride ion content shall not exceed 350 mg/l. Tests to establish the contents shall be carried out at monthly intervals.

These limits shall be subject to the overall limit given for the concrete as mixed.

The Contractor shall install standby fresh water tanks of sufficient capacity to ensure continuation of concreting for sections of work being cast should water supplies be disrupted.

### 5.2.4 Admixtures

Admixtures shall be one of those permitted by BS 5328.

The use of chloride free additives or admixtures in concrete may be ordered or approved by the Employer's Representative in accordance with BS 5075. Such approval will only be given, when the Contractor has demonstrated to the satisfaction of the Employer's Representative that the resulting concrete is no less strong, dense and durable than that obtainable without the use of additives.

No admixtures will be considered for approval that is not being commercially used with satisfactory service records. All requests for approval of admixtures shall be submitted to the Employer's Representative at least 30 days before it is intended to use the admixture. The Contractor shall submit with his request independent test data and adequate samples of the proposed admixture.

Air-entraining admixture shall be added during mixing in proper amount to give the specified air content. The air-entraining admixture shall be subject to approval by the Employer's Representative.

Calcium chloride or admixtures containing chloride shall not be used.

## 5.3 Production of Concrete

### 5.3.1 Mix Schedules

The following mix schedules represent typical concrete mixes for use in the works. Should the Contractor wish to use other grades of concrete, appropriate mix schedules shall be submitted and approved by the Employer's Representative.

Type of concrete		Blinding Concrete	Mass Concrete	Structural Concrete
Concrete grade		C15	C25	C40
Type of cement		PC	PC	PC
Nominal max. aggregate size	mm	19	19	32
Concrete characteristic strength	N/mm <sup>2</sup>	15	25	40
Minimum cement concrete	kg/m <sup>3</sup>	220	325	375
Maximum water / cement ratio		0.6	0.6	0.48

Concrete shall consist of cement, graded aggregate, water and approved admixtures thoroughly mixed, placed and compacted as specified in the following subsections.

At least 30 days before any concrete is placed in the Works the Contractor shall submit to the Employer's Representative for his approval full details of the mixes he proposes to use for each class of concrete together with their anticipated average strength. These mixes shall be based on the results of trial mixes.

The mixes shall be designed by the Contractor with due regard to the workability necessary to allow the Contractor to place and compact the concrete with the equipment he proposes to use in any particular situation.

### 5.3.2 Production

The concrete shall be produced in a modern and reliable plant for batching and mixing the concrete. The mixer shall be capable of thoroughly mixing the aggregates, cement and water into a uniform mass within appropriate time and of discharging the mix without segregation.

Before concrete production starts and at least once every month after that, or whenever required by the Employer's Representative, the Contractor shall check and recalibrate each scale and other measuring devices from zero to full capacity of the scale.

The Contractor shall notify the Employer's Representative at least 2 working days in advance of his intention to perform these tests.

Daily, the Contractor shall check the accuracy of each scale at its zero and at least one other suitable point.

The preparation of the concrete and test specimens is to be carried out under the supervision of a suitably qualified expert foreman, primarily assigned to this work.

In addition to the proving tests stipulated for aggregates, the Contractor shall at intervals test the gradation of fine and coarse aggregates used in the mix. Once a week he shall test the aggregate for impurities and materials finer than sieve size 0.075 mm.

The concrete shall be mixed in the mixer until the materials are uniformly distributed and shall be discharged completely before the mixer is recharged.

### 5.3.3 Testing and Control

Control tests on the concrete shall be carried out using testing equipment conforming to British Standards and approved by the Employer's Representative. The Contractor shall for the purpose of testing - and at his own account - provide on site equipment for making and curing test specimens, carrying out compression tests, slump tests, unit weight measurements, sieve analyses and tests for checking air content in the concrete, moisture content of aggregates as well as organic impurities in the aggregates.

The Employer's Representative may, at his discretion, introduce other tests at the Employer's expense although no separate payment will be made for normal assistance provided by the Contractor for obtaining any samples required for such tests. The compressive strength shall be determined in accordance with BS 1881 under good control conditions at 7 days and 28 days from specimens obtained, prepared and stored in accordance with BS 1881.

For each 40 cubic meters two specimens for the 28th day test and one specimen for the 7th day shall be prepared unless otherwise directed by the Employer's Representative.

The Contractor shall keep records of all operations of the batching plant and of all tests he performs. These records shall include the daily volume of production, type of concrete produced, mix size and weights of the various ingredients, moisture content of aggregate, temperature of concrete, source of materials with cross references to the applicable cement and aggregate tests and where the concrete is placed. These records shall also include general information about the weather, about the progress in placing the concrete and about any difficulties in producing or placing concrete whether due to breakdown of equipment or any other cause. The Contractor shall furnish to the Employer's Representative one copy of all these records not later than one week after the event took place.

### 5.3.4 Concrete Deemed not to Comply with Requirements

Whenever the test results for strength do not comply with the requirements, the Contractor shall immediately take steps to modify his operations to the satisfaction of the Employer's Representative. Any remedial work or demolition and reconstruction of rejected work shall be carried out on the Contractor's own account.

## 5.4 Placing of Concrete

### 5.4.1 Placing

Concrete shall be deposited as early as possible in its final position and shall be placed in such a manner as to avoid segregation of the materials and displacement of formwork, reinforcement and other embedded items. The manner of placing shall be to the approval of the Employer's Representative.

Placing shall be continuous between construction joints.

If, for any reason, the placing of concrete is discontinued, the Contractor shall form a construction joint.

Concrete shall not be placed in running water and any water standing on areas to receive concrete shall be removed before concrete is deposited.

#### 5.4.2 Cleaning Concrete Delivery Trucks

Arrangements shall be made for the disposal of washings and wash water from the concrete delivery trucks. On no account shall washing be allowed to mix with the concrete being placed.

#### 5.4.3 Workability

The Contractor shall specify the workability of the concrete. The workability of the concrete being placed shall be checked regularly by means of slump tests. Samples shall be taken and tested in accordance with, and compliance assessed against BS 5328: Part 4 Clause 3.5. When the measured slump is outside the specified limits, the concrete shall not be used in the Works.

#### 5.4.4 Rainfall

The Contractor shall provide adequate cover as necessary to protect concrete whilst being placed against damage from rainfall.

#### 5.4.5 Compaction

The concrete shall be fully compacted throughout the full extent of the layer. It shall be thoroughly worked against formwork and around reinforcement or embedded items without displacing them. Successive layers of the same lift shall be thoroughly worked together.

Care shall be taken to prevent the information of air bubbles against vertical or sloping formwork.

Approved power driven poker vibrators shall be used to ensure that the concrete is satisfactorily and uniformly compacted.

Surface vibrations of approved type, capacity and frequency shall be used to compact thin slabs, pavements and road slabs.

#### 5.4.6 Joints

Construction joints, the position and arrangement of which shall be approved by the Employer's Representative and shall be in accordance with BS 8110.

The Contractor is to allow for working beyond the ordinary working hours where necessary in order that each section of concrete between joints may be completed without any lapse while the work is in hand, and at no additional cost for the Employer.

Contraction joints, where specified, shall be formed as deliberate planes of discontinuities in the concrete structure. To form such a joint, either the face of the concrete slab or block first formed shall be painted with two coats of approved rubber bitumen paint, before the adjoining slab or block is concreted, or the joint may be sawn in the concrete slab and subsequently filled with a sealing compound.

Expansion joints shall be formed in the same way as contraction joints but, in addition, an approved compressible sheet or filler shall be supplied and placed in the joint to provide freedom for two adjacent concrete slabs or blocks to expand. In certain situations highly compressible joint filler of foam rubber or other approved material shall be used as directed by the Employer's Representative. The exposed edges of the joints shall be sealed with an approved synthetic rubber or similar resilient sealing compound.

#### 5.4.7 Water Bars

Water bars or water stops shall be inserted in joints where appropriate. Care shall be taken to ensure that the concrete is well compacted against them and that they are not damaged or displaced during placing operations. Joints in water shall be made as directed by the Manufacturers.

#### 5.4.8 Damaged Concrete to be Cut Out

Any concrete found to have been damaged shall be cut out and replaced with satisfactory concrete.

#### 5.4.9 Concreting in Very Hot Weather

Specific arrangements shall be made for any concreting which has to be carried out in ambient temperatures higher than 32°C. These may include early morning working, prior cooling and/or shading of the batching plant, aggregates, reinforcement, formwork and the shading of freshly deposited concrete from direct sunlight.

The times quoted in this specification for mixing and placing and the frequency of cleaning of equipment may have to be modified in very hot conditions. Covering or other protection of concrete during transport may also be required.

Chillers or crushed ice shall be used to cool the mixing water in very hot weather. Ice shall be completely melted in the water before adding to the mix. The temperature differential between water and cement shall not exceed 40 degrees Centigrade.

The Contractor's attention is drawn to the American Concrete Institute (ACI) Standard 305R-91 "Recommended Practice for Hot Weather Concreting".

If water spraying of aggregates is adopted, fresh water of mixing quality only shall be used and due provision shall be made for drainage of aggregate bins. Where water cooling of aggregates is adopted, the water content of aggregates added to the mix shall be checked constantly and the water cement ratio adjusted to suit.

### 5.5 Curing

#### 5.5.1 General Requirements

The Contractor shall ensure that curing is carried out such that thermal and plastic cracking of the concrete does not occur.

For a minimum period of 7 days after placing the concrete it shall be kept protected against loss of moisture, rapid temperature change, rain and flowing water, mechanical injury, contamination by airborne dust and sand, drying winds and surface heating by the sun's rays.

Following the completion of the above period a further period of controlled drying out may require that covers, sand layers and the like be kept in place for longer than the 7 day minimum curing period otherwise specified.

The Contractor's attention is particularly drawn to the importance of starting curing as early as possible after placing concrete and maintaining full during procedures throughout, as specified and directed.

#### 5.5.2 Curing Methods

The Contractor's attention is drawn to the recommendations of the American Concrete Institute (ACI) Standard 308-92, "Standard Practice for Curing Concrete".

The Contractor shall provide the necessary climate measuring equipment and check for conditions in which plastic cracking is likely to occur.

#### 5.5.3 Curing Membrane

Where used, curing membranes shall be of resin based white reflective type and shall be sprayed on the surface of the concrete as soon as all free water has evaporated from the surface, except where provided for below.

It shall be of a film type, which fully degrades by exposure to UV light without leaving detrimental residue on the surface. In case of formed surfaces, where formwork has been eased or struck before 7 days have elapsed from the date of placing concrete within them, the curing membranes shall be applied immediately after the formwork has been removed. In every case the rate of coverage and method of application shall be according to the manufacturer's instructions.

Where a surface treatment is to be applied to the concrete (e.g. a surface hardener) a curing membrane shall only be used if it is compatible with the surface treatment.

#### 5.5.4 Water Curing

The water used for curing shall be fresh water of mixing quality, the concrete shall be covered with sacking, or other absorbent material, or a 75 mm layer of sand, kept constantly wet for 7 days and, also covered with plastic sheeting to reduce loss by evaporation. Care shall be taken to ensure that the temperature of the water used at all stages of the curing process is as close as possible to that of the concrete being cured. Under no circumstances shall seawater be used for curing of concrete.

#### 5.5.5 Use of Covers

Curing of concrete surfaces may be carried out by sealing with opaque, reflective plastic sheeting held in close contact with the surface of the concrete and forming an airtight fit around the element being cured.

The sheeting shall form a continuous seal and be without tears or holes.

If necessary, the Contractor shall provide frames for the plastic sheeting so that the covers can be placed over deck slab pours immediately after the concrete has been floated off and before the brush finish is applied.

### 5.5.6 Wetting of Formed Surfaces

Formed surfaces shall, to compensate for any surface drying that has occurred and as soon as the form is removed, be sprayed with water and allowed to reach a uniformly damp appearance before continuing with curing.

### 5.5.7 Curing of Concrete in Hot Weather

When the daytime ambient temperature is greater than 25°C or when there is a hot dry wind or low relative humidity, curing shall proceed as follows:

- a) Large flat areas:
  - Immediately after trowel finish, cover the concrete surface with polythene/wooden frames to minimise evaporation. All gaps at sides and ends must be filled in to avoid wind-tunnel effects.
  - When the surface can carry weight, replace the frames by a layer of damp hessian covered by polythene sheet. The hessian must be kept continuously damp for 7 days (i.e. not wet/dry cycles), and suitable weights must be used to keep the polythene in place. If appropriate, surfaces may be ponded.
  - After 7 days wet during, apply white-pigmented resin-based curing compound in accordance with the manufacturer's instructions.
  - Cover with dry hessian for 14 days.
- b) Flat surfaces with starter bars:
  - Shade the whole area from sunshine before concreting commences, leaving enough room for personnel/placing access, and ensuring that no gaps are left in the sides/ends which would allow wind-tunnel effects.
  - As soon as concreting is complete, cover the top surface with damp hessian (which is to be kept continuously damp for 7 days) and a layer of polythene.
  - Maintain cover-only curing from the 7th to the 14th day.
- c) Vertical surfaces:
  - Leave formwork in place for at least 24 hours and keep continuously wet. After removing the forms, immediately wet the surface and cover the sides by damp hessian (which is to be kept continuously damp for 7 days) or curing membrane, both of which are in turn to be covered by polythene.
  - Maintain cover-only curing from the 7th to the 14th day.

Any necessary repairs or finishing processes shall be carried out as soon and as quickly as possible, only exposing small areas at any one time.

Polythene sheeting shall be continuous without tears or holes and shall be white, opaque and reflective.

### 5.5.8 Curing Notices

Curing notices shall be exhibited for each concrete pour, stating the time and date when the concrete was placed, date for last wet curing and the date for completion of cover curing.

### 5.5.9 Curing of Repairs

All concrete repairs shall be cured in accordance with this section of the Specification.



## 5.6 Miscellaneous Concrete Works

### 5.6.1 Mass Concrete

The requirements for quality control, placing, compacting, testing and compliance for reinforced concrete shall apply equally to mass concrete.

Mass concrete shall be internally vibrated.

### 5.6.2 Blinding

Wherever structural reinforced or prestressed concrete is shown on the drawings as in contact with ground and is to be constructed "in the dry", a layer of plain concrete Grade C15, 75 mm thick, shall be provided unless detailed otherwise on the drawings.

### 5.6.3 Early Loading

Concrete shall at no time be subject to loading, including its own weight, which will induce a compressive stress in it exceeding 0.33 of the specified characteristic strength.

## 5.7 Reinforcing Steel

### 5.7.1 Quality of Reinforcing Steel

Bars for the reinforcement of concrete shall comply with the conditions and tests given in BS 4449.

Steel fabric for reinforcement shall comply with the tests and requirements of BS 4483.

Stainless steel reinforcement shall comply with the tests and requirements of BS 6744.

High tensile steel wire and strand for the pre-stressing of concrete shall comply with the tests and requirements of BS 5896.

Manufacturer's test sheets are to be supplied with each consignment of reinforcing steel.

Reinforcing steel, which is found to have developed brittleness, cracks or other imperfections, or which is not found to comply with the specified requirements shall be rejected and removed from the Site.

### 5.7.2 Protection of Reinforcing Steel

Reinforcing steel shall be protected during delivery to site to ensure that exposure to contamination and moisture is limited. Effective measures shall be taken by the Contractor to ensure that mechanical damage due to loading and unloading is avoided.

Storage on site shall be under cover and with bars stored on racks above floor level. Screening shall be provided to prevent contamination from wind-blown dust. All steel shall be clearly labelled and storage organised to allow easy identification of different deliveries, sizes and type of steel.

Similar care is required after bars have been cut and bent or assembled into cages placing in position.

The condition of all reinforcing steel shall be inspected regularly.

#### 5.7.3 Reinforcing Steel to be Clean

All reinforcement shall be clean and free from loose mill scale, dust, loose rust, active rust and coatings such as paint, oil etc. Where it is necessary, grit blasting shall be used to remove rust, oil, grease, salt or other deleterious matter. Repeated grit blasting may be necessary where reinforcement is in final position, but found on inspection to be contaminated. Any partially set concrete adhering to exposed reinforcement during concreting operations shall be removed.

#### 5.7.4 Bending of Bars

Bars shall be bent in accordance with BS 4466. Bars shall not be re-bent. Reinforcement temporarily projecting from concrete at joints shall not be bent out of position.

#### 5.7.5 Fixing of Reinforcing Steel

Reinforcing steel shall be wired together or otherwise effectively secured to prevent displacement during concreting.

Wire for binding shall be 1.63 mm annealed soft iron and the binding shall be done tightly with proper tools. Care shall be taken not to leave loose ends of tie wires projecting beyond the tied bars. The ends of the binding wire shall be cut short and bent away from the concrete face.

#### 5.7.6 Cover to Reinforcing Steel

Reinforcing steel shall be located so that the cover, when inspected in the formwork is not less than 75 mm. Accurate cover shall be secured by the use of plastic distance pieces of the correct size or other approved means.

#### 5.7.7 Welding Reinforcing Steel

All welding of reinforcement shall comply with the requirements of BS 7123. This requirement applies to welds of any kind including tack -welds.

The design of all items such as tack-welded reinforcement assemblies shall take into account any requirements in respect of transportation including the location and fixing of lifting points to ensure safe handling.

#### 5.7.8 Welding to Reinforcing Steel for Fixings

The welding of miscellaneous fixings such as holding-down bolts, edging angles etc. to the reinforcing steel will not be permitted. However, the Contractor may add lengths of stainless steel reinforcement which is to be conventionally wire-tied to the detailed reinforcement, and to which he may weld for the purpose of providing adequate support for fixings during the placing of concrete. In all cases, an electrically insulating material such as plastic to be inserted between the additional reinforcement and the detailed reinforcement in order to minimise corrosion due to stray electrical currents.

## 5.8 Formwork

### 5.8.1 General

Formwork shall be so designed and constructed that the concrete can be properly placed and thoroughly compacted and that the hardened concrete whilst still supported by the formwork shall comply with the required shape, position and levels subject to the tolerances and the standards of finish required by this Specification.

### 5.8.2 Sufficiency of Formwork

The Contractor shall be responsible for the sufficiency of all formwork.

Special care shall be taken to maintain the stability of the formwork and tightness of joints particularly during vibrating operations.

### 5.8.3 Cleanliness of Formwork

Special care shall be taken to ensure the cleanliness of formwork prior to deposition of concrete. Temporary openings shall be provided in stop-ends for the removal of water and debris.

### 5.8.4 Ties

The whole or part of the tie shall be capable of being removed so that no part remaining embedded in the concrete shall be nearer the surface than 75 mm. Any holes left after the removal of ties shall be plugged immediately with a cement mortar of the same richness using non-shrink materials.

### 5.8.5 Surface Treatment of Forms

The faces of the formwork in contact with the concrete shall be coated with non-staining shuttering oil or other approved material to prevent adhesion. Care shall be taken that the coating material is kept out of contact with reinforcement or embedded steelwork.

### 5.8.6 Striking of Forms

The Contractor shall be responsible for any damage arising from the removal of formwork. Any damage to the concrete or formwork will be made good.

All formwork shall be designed so that it can be removed without shock or vibration.

### 5.8.7 Formwork

All formwork shall be thoroughly scraped, cleaned and, repaired before being reused.

## 5.9 Tolerances and Surface Finishes

Condition of installed formwork shall be observed continuously in progress of concreting. If deformations or displacements of formworks influencing dimension or quality of concreted structures, are revealed, actions shall be taken to remove these problems or the concrete works are to be stopped temporarily.

Tolerances for formed surfaces of in-situ and pre-fabricated reinforced concrete are:

- Location of in-situ structure generally, relative to established setting-out lines, module lines, and levels: + 10 mm
- Longitudinal dimensions less than 30 m of same members: +10 mm
- Cross-sectional dimensions of beams, slabs, walls, etc.: 0 mm to +10 mm
- Size and location of penetrations, recesses, etc. + 5 mm
- Holding-down bolts, etc. as group: + 5 mm

## 6 Metalwork and Fixing of Metalwork

### 6.1.1 Materials

Weldable Structural Carbon Steels for hot rolled sections (other than structural hollow sections), plate and bar shall be grade 43A or 50A to BS 4360: 1987. Material referred to as MS (mild steel) shall be grade 43 steel.

Steels for hot rolled structural hollow sections shall be grade 43C or 50C to BS 4360: 1987.

Stainless steels for plate and bar shall be grade 304 S11 (304L) or 316 S13 (316L) to BS 1449 Part 2: 1983.

### 6.1.2 Sections

Rolled steel universal beams and columns, rolled steel channels and universal bearing piles shall comply with BS 4: Part 1.

Rolled steel angles and rolled hollow sections shall comply with BS4848 parts 2 and 4.

### 6.1.3 Bolts, Nuts and Washers:

ISO metric black bolts and nuts shall comply with BS 4190 or BS 4933.

ISO metric precision bolts and nuts shall comply with BS 3692.

Washers for ISO metric bolts shall comply with BS 4320.

Stainless Steel Fasteners shall comply with BS 6105.

### 6.1.4 Welding

Welding electrodes shall be in accordance with BS EN 499 of the grade compatible with the characteristics of the parent metal.

Welding shall be carried out in accordance with BS 5135 using plant in accordance with BS 638. Surfaces to be welded shall be properly prepared and left clean and free from all extraneous matter.

### 6.1.5 Galvanising

All galvanising shall be by hot dip process to give a coating of zinc of at least 600 grams per square metre.

### 6.1.6 Fixing Metalwork

Metalwork shall be fixed to concrete with substantial fastenings.

Bolts, frames, step-irons, etc., to be fixed in situ shall be accurately set in position and held rigidly in the formwork during deposition of concrete.

Pre-formed pockets for foundation bolts shall be formed by boxes or sleeves of an approved type which can be struck cleanly or which are suitable to be cast in. After the surrounding concrete has hardened the boxes shall be stripped if required. The pockets shall be temporarily until the foundation bolts are set. Any damage to pockets shall be made good at the Contractor's expense.

Before bolts are grouted up, the pockets shall be thoroughly cleaned and the concrete wetted.

Patent bolt fixings shall be fixed or fitted in accordance with the manufacturer's instructions.

### 6.1.7 Grout Mixes

Unless otherwise specified grout shall generally consist of high-strength non-shrink cementitious grouts (of at least 50 N/mm<sup>2</sup> strength at 7 days or earlier, measured by 100 x 100 x 100 cube tests), mixed and placed strictly in accordance with the Manufacturer's instructions.

Only sufficient water shall be added to achieve the required plasticity and no further water shall be added at a later stage after the grout has been mixed. Grout shall be used within a maximum time of 30 minutes of mixing or as directed by specialist grout manufacturer.

### 6.1.8 Preparation of Concrete Surfaces

Concrete surfaces against which grouts are to be placed or poured shall be lightly sand blasted or scabbled to remove laitance and left free from dust, grease, mould oil or any other contaminant. Similarly, baseplates to be bedded on mortar shall be thoroughly cleaned of all loose rust, galvanising spelter, dirt, oil, grease, paint, etc. In addition all surfaces shall be dry unless the grout is a formulation designed for use on wet surfaces.

## 7 Surface and Foul Drainage

### 7.1 Pipes, Valves and Fittings

#### 7.1.1 Pipes, Pipe Supports and Pipe Protections

Pipes, their fittings, supports and protection shall be capable of withstanding the service conditions for the design life of the terminal.

All pipes, their fittings and connections shall be fully protected against all types of corrosion in order to enable ease of maintenance in the future.

#### 7.1.2 PVC-u Pipes and Fittings for Gravity Drains and Sewers

PVC-u pipes and fittings for drains and sewers shall have flexible mechanical joints and shall be coloured golden brown. Pipes and fittings of nominal sizes:

- 110 mm and 160 mm shall comply with the requirements of BS 4660, or shall be equal and approved;
- 200 mm and above shall comply with the requirements of BS 5481, or shall be equal and approved.

#### 7.1.3 Concrete Pipes and fittings

Concrete pipes and fittings for drains and sewers shall be manufactured with sulphate resisting cement to BS 4027 and shall comply with BS 5911 or equal and approved.

#### 7.1.4 Check Valves

Check valves shall be ductile iron swing check valves complying with BS 5153, or equal and approved, with PN 10 double flanges and bitumen painted. The disk shall have an external handle to permit manual operation.

All internal surfaces of the valve in contact with the contents of the pipeline shall be protected with an approved coating chemically resistant to seawater.

#### 7.1.5 Sludge Plugs

Sludge plugs shall consist of a flanged cast iron body with a gunmetal face drilled to BS 4504 PN 10. The plug shall be a hardwood cone. The valve shall be supported in the open position by a stainless steel lifting rod with cotter. The wall support shall be cast iron.

#### 7.1.6 Flap Valves

The frame and flap of the flap valve shall be of cast iron to BS 1452 with gunmetal faces. The flap shall be double hung. Hinge pins and links shall be of gunmetal. Valves shall be suitable for wall mounting.

#### 7.1.7 Gullies and Drainage Channels

Each gully shall comply with one of the following British Standards:

- BS 437 Cast iron spigot and socket drain pipes and fittings.
- BS 5991 Pre-cast concrete pipes, fittings and ancillaries.

Gullies buried in the ground shall be bedded on and surrounded with Grade C20/20 concrete 150 mm thick and well compacted.

Gully and drainage channel grates and frames shall be manufactured in ductile iron and shall comply with BS EN 124 Class E600.

## 7.2 Bedding and Backfill Materials

### 7.2.1 Bedding and Side Fill

Bedding and side fill material shall consist of hard, clean, crushed rock or granular material having a grading within the limits specified below.

Sieve Size	Percentage of Mass Passing		
	Graded Aggregate	Single Sized Aggregate	
mm	14 mm to 5 mm	14 mm	10 mm
20.0	100	100	-
14.0	90 - 100	85 - 100	100
10.0	50 - 85	0 - 50	85 - 100
5.0	0 - 10	0 - 10	0 - 25
2.36	-	-	0 - 5

The compaction fraction of the material shall be:

- 0.3 for bedding material for rigid pipes.
- 0.15 for flexible non-pressure pipes.

The water soluble sulphate content of the material shall be less than 1.9 g of sulphate (as SO<sub>3</sub>) per litre when tested in accordance with BS 1377: Part 3.

### 7.2.2 Backfill Material

Selected fill, whether selected from locally excavated material or imported, shall consist of uniform, readily compactable material, free from vegetable matter, building rubbish and frozen material, or material susceptible to spontaneous combustion and excluding clay of liquid limit greater than 80 and/or plastic limit greater than 55 and materials of excessively high moisture content. Clay lumps and stones retained on 75 mm and 37.5 mm sieves respectively shall be excluded from the fill material.

## 7.3 Manholes and Chambers

### 7.3.1 General

On all pipes built into manholes/chambers a flexible joint shall be provided as close as is feasible to the outside face of the structure, compatible with the satisfactory completion and subsequent movement of the joint. The distance to the joint of the next pipe away from the manhole/chamber shall be between 0.5 m and 0.75 m.

Where the invert of the manhole is more than 900 mm below the finished cover level, hot dipped galvanised malleable iron steps to BS 1274, or equal or approved, shall be provided on the manhole/chamber walls, staggered at not more than 300 mm centres vertically and at 300 mm centres horizontally.

Access ladders shall be fabricated from mild steel and shall be hot dipped galvanised to BS 729, or equal and approved, on completion of all fabrication.

### 7.3.2 Precast Concrete Manholes/Chambers

Precast concrete manholes/chamber sections and cover slabs shall comply with BS 5911 or equivalent and approved. The sections shall be jointed using cement mortar. The completed manhole shall be surrounded with 150 mm thickness of Grade C20/20 concrete well compacted.

### 7.3.3 In-situ Concrete for Manholes/Chambers

All visible concrete surfaces shall have a fair face finish. In-situ concrete shall be constructed in accordance with the requirements of this Specification.

### 7.3.4 Mortar

Mortar shall comprise 1 : 0.25 : 3 cement : lime : sand – it shall be mixed and conveyed to the Works only when required. Mortar which has begun to set shall not be used.

### 7.3.5 Manholes Covers and Frames

Manhole covers and frames shall be manufactured from ductile iron and shall comply with BS EN 124 Class E600. They shall have a minimum clear opening of 600 mm square.

### 7.3.6 Oil Interceptors

Each interceptor shall have sufficient treatment capacity to produce a discharge of a quality that is less than 5 mg of oil per litre of discharge. The minimum capacity of the main chamber of each interceptor shall be 8 m<sup>3</sup>.

Ventilation pipes from the interceptors shall terminate 2.5 m above ground and shall be fixed by approved means.

## 7.4 Installation

### 7.4.1 Excavation

Excavation for pipelines, manholes/chambers shall be carried out in accordance with this specification, and to the lines and levels as shown in the drawings.

Over-excavation below the levels shown in the drawings shall be refilled with clean, well-compacted bedding material or lean concrete.

The Contractor shall ensure that the sides of pits and trenches and other excavation are at all times adequately supported by timbering or other approved means. The Contractor shall be responsible for the safety of all such timbering.

The Contractor shall maintain by suitable pumps or drains all trenches and excavation free from water, until in the opinion of the Employer's Representative, the concrete or other works therein are sufficiently ready to withstand the effects of water.



Surplus excavated material shall be removed from the site by the Contractor.

#### 7.4.2 Backfilling

Excavation not occupied by concrete works or pipes shall be backfilled with approved selected materials.

Backfilling shall only be carried out after the Employer's Representative has approved works within excavations.

For pipes which are not surrounded with concrete, the first layer of filling shall be granular/selected material and shall not be thrown directly on pipes, but shall be carefully placed and compacted over the pipes by hand.

The Contractor shall ensure that all filling shall be deposited and compacted in layers not exceeding 225 mm depth to the same dry density as adjoining soil.

Timber and shoring shall be withdrawn ahead of the layer to be compacted, care being taken to keep sides of trenches and excavation solid and to fill all spaces left by the withdrawn timber.

#### 7.4.3 Pipe Laying

Pipes shall be laid to true line and level.

Pipes shall be joined using sealing rings, together with pipe manufacturer's recommended lubricant, leaving recommended gaps at the end of spigots to allow for movement.

Pipelines shall be adequately protected from damage and ingress of debris. All exposed ends of pipelines shall be sealed at the end of the working day.

### 7.5 Bedding and Surround

- **Granular Bed:**

An even layer of granular bedding material shall be laid and compacted to the specified thickness over the full width of the trench. The area around sockets shall be scooped out locally and pipes laid digging slightly into the bed and resting uniformly on their barrels.

More granular material shall be laid and compacted uniformly to half the pipe diameter.

- **Granular Surround:**

After completing the bed granular material shall be laid and compacted uniformly in 100 mm layers to the specified thickness above the crown of the pipe.

- **Concrete Protection:**

Pipes to be bedded, cradled or surrounded with concrete shall be supported on pre-cast concrete setting blocks, the top face of each block being covered with two layers of bitumen damp-proof sheeting.

Where pipes with flexible joints are used, the concrete bed and surround shall be interrupted over its full cross-section at each pipe joint by an 18 mm thick, shaped, compressible fibre board.

Concrete grade C20/20 to the specified thickness shall be placed in one operation.

### 7.6 Rainwater Pipes and Gutters

Rainwater pipework and gutters shall be of one type manufacture and shall comply with one of the following British Standards:

- BS 460 Specification for cast iron rainwater goods.
- BS 2997 Specification for aluminium rainwater goods.
- BS4576 Unplasticized polyvinyl chloride (PVC-U) rainwater goods and accessories.

Rainwater pipes and gutters shall be installed to ensure the complete discharge of rainwater from the building without leaking. Provision for thermal movement shall be made when fixing and jointing rainwater pipes and gutters.

Gutters shall be laid to a true line and level to ensure no ponding or backfall. The roofing underlay shall be dressed in to the gutter. Outlets shall be positioned to align with the below ground drainage connections.

Rainwater pipes and gutters shall be jointed and fixed in accordance with the manufacturer's recommendations. Plated, galvanised or non-ferrous fastening suitable for the purpose and compatible with the material being fixed shall be used.

Cut ends of pipes/gutters shall be clean and square with all burrs removed.

Where junctions are made, these shall be with purpose made fittings and there shall be no materials projecting into the bore of the pipes/gutters. All surplus jointing compounds, sealants shall be removed from the joints.

## 7.7 Testing and Commissioning

### 7.7.1 Testing Non-Pressure Pipelines

Non-pressure pipelines laid in open cut shall be tested after they are jointed and before any concreting or backfilling is commenced, other than such as may be necessary for structural stability whilst under test.

The pipelines shall be tested by means of an air or water test.

A further test shall be carried out after the backfilling is complete.

### 7.7.2 Water Test for Non-Pressure Pipelines

The test pressure for non-pressure pipelines up to and including 750 mm nominal bore shall be not less than 1.2 m head of water above the pipe socket or ground water level, whichever is the higher at the highest point, and not greater than 6 m head at the lowest point of the section.

The pipeline shall be filled with water and a minimum period of 2 hours shall be allowed for absorption, after which water shall be added from a measuring vessel at intervals of 5 minutes and the quantity required maintaining the original water level noted. Unless otherwise specified, the length of pipeline shall be accepted if the quantity of water added over a 30-minute period is less than 0.5 litre per lineal metre of nominal bore.

### 7.7.3 Air Test for Non-Pressure Pipelines

Non-pressure pipelines to be air tested shall have air pumped in by suitable means until a pressure of 100 mm head of water is indicated in a U-tube connected to the system. The pipeline shall be accepted if the air pressure remains above 75 mm head of water after a period of 5 minutes without further pumping, following a

period for stabilisation. Failure to pass the test shall not preclude acceptance of the pipeline if a successful water test, ordered by the Employer's Representative, can subsequently be carried out.

#### 7.7.4 Infiltration

Non-pressure pipelines and manholes shall be tested for infiltration after backfilling. All inlets to the system shall be effectively closed and any residual flow shall be deemed to be infiltration

## 8 Mechanical Services Pipework and Fittings

### 8.1 General

#### 8.1.1 Pipework

Mild steel pipework up to and including DN125 shall be to BS 1387, heavyweight grade, above DN126 shall be to BS 3601. Galvanised pipework shall be screwed to BS 21, using fittings complying with BS 143 having tapered joints made with suitable compound.

Pipework systems shall be designed and installed in accordance with BS 806 or BS 1306 and BS 6700 as appropriate.

All pipework and fittings shall be suitable for operating at twice the working pressure and shall be tested for twice the working pressure for a period of 3 hours, or as required by the relevant British Standards.

Standard or purpose-made brackets shall adequately support all plant and pipework and provision shall be made to allow for expansion and contraction of pipes.

Detailed sketches of anchors considered necessary on site shall be provided to the Employer's Representative and his approval obtained before commencing erection. The Contractor shall be responsible for ensuring the anchoring is sufficient and appropriate to prevent expansion taking place beyond that which is desirable. Anchors shall comply with BS 3974.

At low points in the system, drain points shall be provided to ensure that every main and connected appliance can be properly and expediently emptied for maintenance and frost protection.

#### 8.1.2 Copper Pipework

Copper pipework systems shall be designed and installed in accordance with BS 1306.

Pipework shall be light gauge copper tube to BS 2871.

Welders and brazers shall hold a current certification of competency, validated by an appropriate independent approved body.

### 8.1.3 Welding

Welding shall be:

- to class II by electric arc process to BS 2971, using welding materials to BS 639 or
- to Class II by oxy-acetylene process to BS 2640, using welding materials to BS 1453.

Oxy-acetylene welding shall not be used for pipework greater than DN100, or for pipe flanges of any size.

Welders shall, if required by the Employer's Representative, demonstrate their ability to him by carrying out a specimen butt (without backing) and branch pipe connection fusion test at site in accordance with BS 487: Part 1. Welders unable to meet the requirements of BS 487: Part 1 will not be allowed to carry out welding in connection with the Works.

### 8.1.4 Brazing

Brazing shall be carried out in accordance with BS 1723.

Valves and stopcocks shall in all respects comply with the by-laws and requirements of the local Water Authority Undertaking. The Contractor shall be responsible for providing valves, which satisfy the Authority and shall provide in duplicate, if required, test certifications of each valve or stopcock.

Valves and stopcocks shall be installed in pipework so as to be easily accessible for operation with due regard to the building and area in which they are fixed. Valves, etc., installed in positions with, in the opinion of the Employer's Representative, are inaccessible, shall be repositioned at the Contractor's expense.

Every valve and stopcock shall be provided with an indestructible label clearly stating the purpose of the valve and the services controlled. The lettering shall be in white capital letters 6 mm high on a black background. Each label shall be securely ring-clipped to the valve or stopcock concerned.

## 9 Electrical Services

### 9.1 Cable Installations

#### 9.1.1 General

Cables shall not be bent to a radius smaller than that recommended in the relevant Standards or as recommended by the manufacturer. If the figures are at variance the greater radius shall apply.

Protection against mechanical damage shall be provided as appropriate.

Particular attention shall be given to:

- Cables rising from ground to floor level
- Cables passing through elements of structures.

### 9.1.2 Cables in Underground Ducts

Ducts shall have nylon draw cords provided throughout.

Positions of ducts shall be marked clearly at surface level.

Ducts entering buildings shall be resealed, after the cables have been pulled in, by an approved method.

### 9.1.3 Surface Cable Installation

All cables run on the surface shall be supported and fixed by proprietary cable cleats, and accessories or cable straps. All cable cleats, straps and accessories shall be suitable for the environment and where appropriate resistant to sunlight and extremes of temperature. The spacing of supports shall satisfy the requirements of the relevant Standards and the cable manufacturer's recommendations.

### 9.1.4 Cable Identification

A permanent numbered tag shall be fitted at each end of every cable. This tag shall bear the cable reference number allocated to the cable on the cable schedule and installation drawings.

## 9.2 Testing of Electrical Installations and Plant

### 9.2.1 Tests at Works

All of the equipment covered by this Specification shall be tested in accordance with all relevant design and installation standards and codes of practice.

Routine and type tests will be required as a minimum. Type tests will not be required if certificates are submitted at the time of tendering to show that the relevant type tests have already been performed on essentially similar equipment.

Facilities shall be provided for the Employer's Representative to witness all tests if he so desires. At least twenty one days notice shall be given of the date and the place at which the equipment will be ready for inspection and testing.

### 9.2.2 Tests at Site - The Installation

The Contractor shall notify the Employer's Representative, in writing, when each section of the work is complete and when the whole of the work is completed. Each section and the whole of the work shall be tested in accordance with all relevant design and installation standards and codes of practice. The tests shall show that the whole installation complies with those standards and codes of practice unless any deviation therefrom shall have been authorised by this Specification. Any deviation from those standards and codes of practice shall be recorded on the test certificate(s).

As a minimum the following tests shall be carried out on all installations and the results logged and submitted to the Employer's Representative.

- Earth Continuity Test
- Insulation Resistance Test

- Earth Loop Impedance Test
- Polarity Test
- Earth Electrode Resistance Tests
- Functional Test of all Equipment

The Contractor shall provide all personnel, equipment and apparatus necessary for carrying out the tests on site and all tests shall be carried out in the presence and to the satisfaction of the Employer's Representative.

### 9.2.3 Tests at Site - Plant and Equipment

After completion the Contractor shall test the plant as a whole and where necessary the items and components thereof, in accordance with all relevant design and installation standards and codes of practice, or where tests are not so specified, to the satisfaction of the Employer's Representative. These tests shall prove the mechanical and electrical operation of the plant, including the correctness of the protective devices and auxiliary wiring and measure its insulation resistance.

The Contractor shall provide all personnel equipment and apparatus necessary for carrying out the tests on site and all tests shall be carried out in the presence of and to the satisfaction of the Employer's Representative.

## 9.3 Commissioning

The Contractor shall set out work and correctly set up the completed installation. The correct operation of all components and the complete installation shall be successfully demonstrated to the Employer's Representative before the installation will be taken over.

The Contractor shall submit to the Employer's Representative full details of the commissioning tests proposed, together with the details of measurements that will be taken. Details of the tests carried out and the results shall be included in the record documentation to be provided by the Contractor.

The Contractor shall rectify at his expense any defects found during testing in his installation or materials and equipment provided by him. He shall also exchange any items of equipment, components or connections provided by him that are found necessary to make the system work correctly and record these changes.

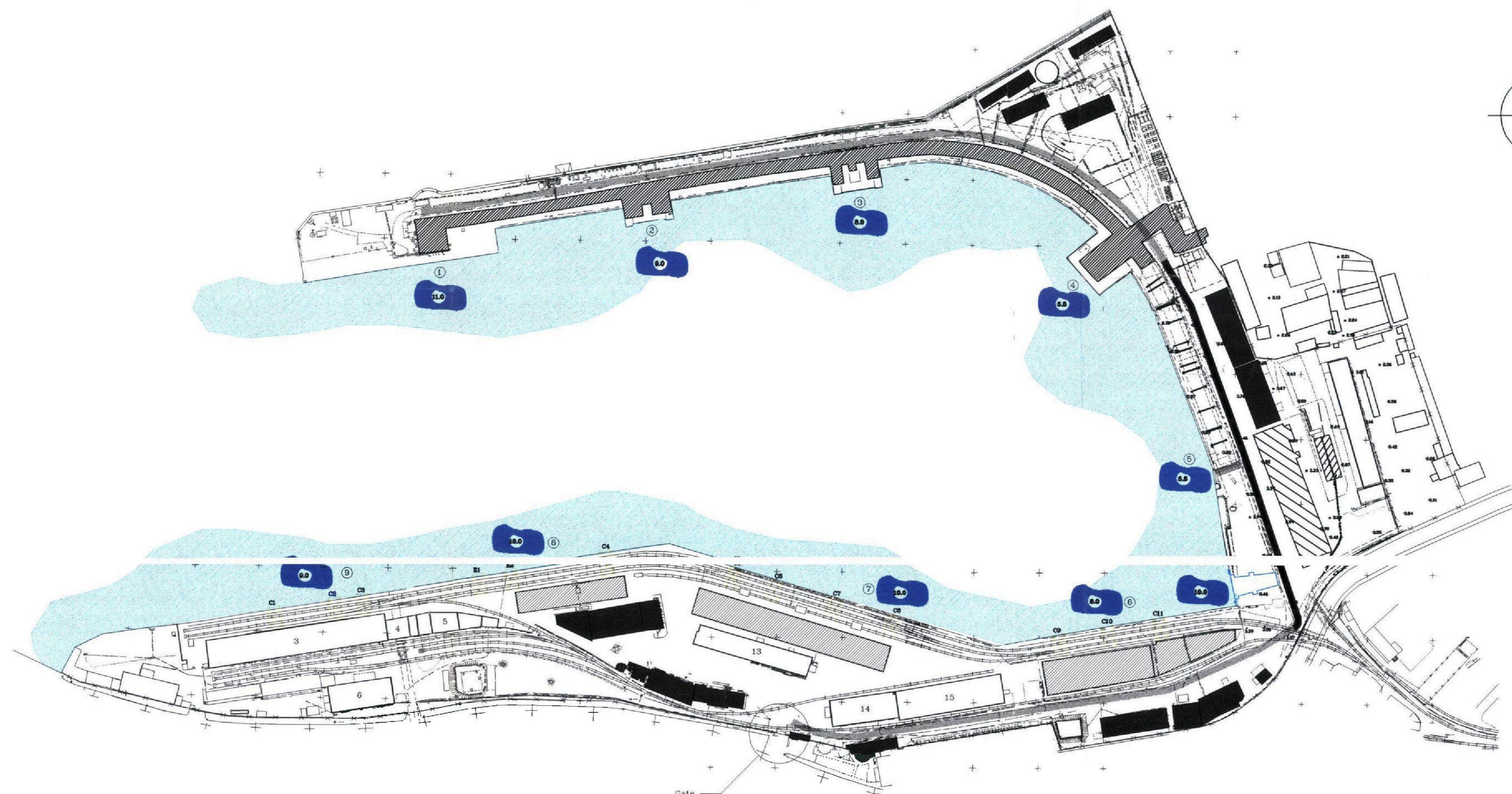
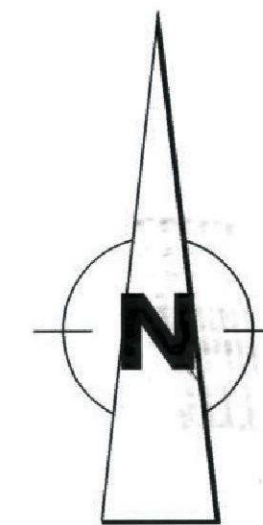
## Section 4

### The Drawings

## Drawing List

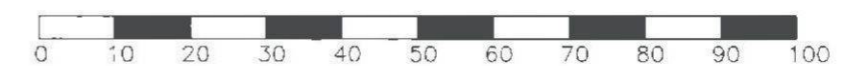
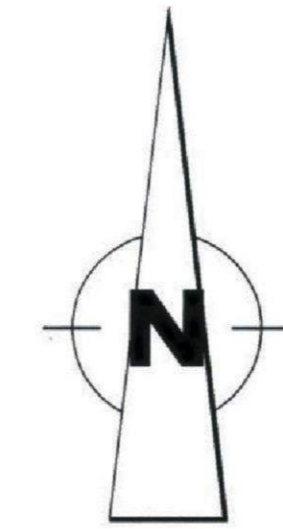
- Drawing 4.2.1 Layout Port of Batumi
- Drawing 4.2.2 Existing Layout Terminal
- Drawing 4.2.3 Cross Sections Existing and New Situation
- Drawing 4.2.4 New Layout
- Drawing 4.2.5 Demolition Works
- Drawing 4.2.6 New Utilities
- Drawing 4.2.7 Gate and Sewerage Details





	Port Building
	Warehouse
	Open Storage
	Crane
	Berth number
	Rail Track
	Waterdepth
	Oil pipelines
	Main port road
	Port area

project		FEASIBILITY STUDY OF NEW TERMINAL FACILITIES IN THE GEORGIAN PORTS		
subject		TENDER DRAWINGS MULTI PURPOSE TERMINAL BATUMI LAYOUT EXISTING SITUATION		
		client		
		7 sheets, sheetnr. 1		
drawn	checked	approved	in	format
15.07.98	15.07.98	15.07.9		A2
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Hamburg Port Training Institute GmbH Dornier System Consult Rotterdam Maritiem Group				drawingnr.
				4.2.1
				filename
				21970GAC
				revision
				A

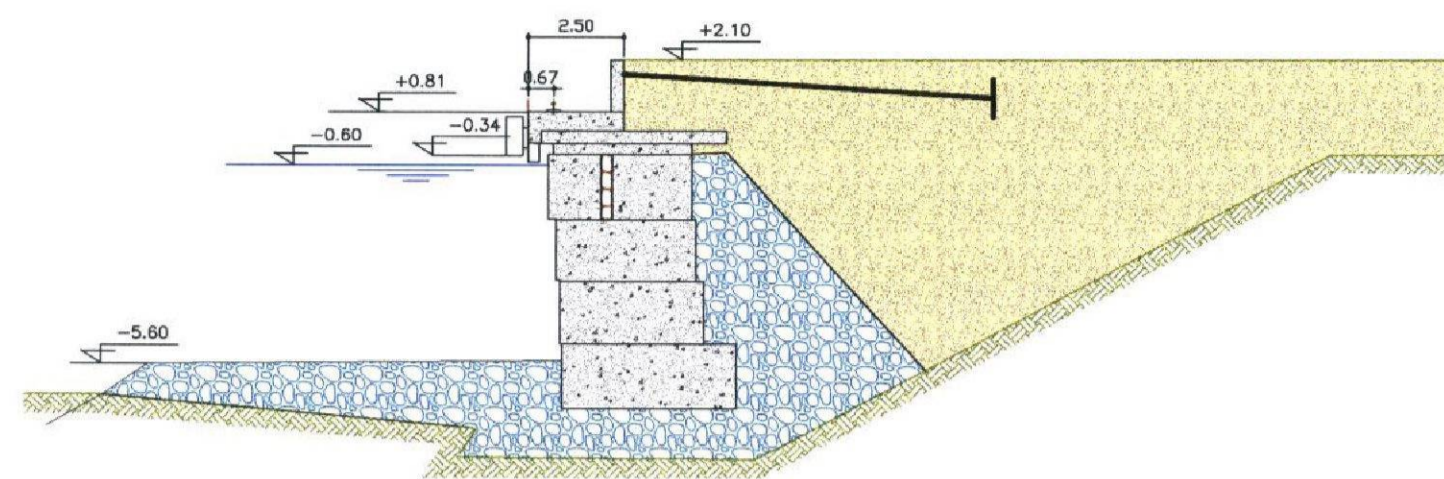


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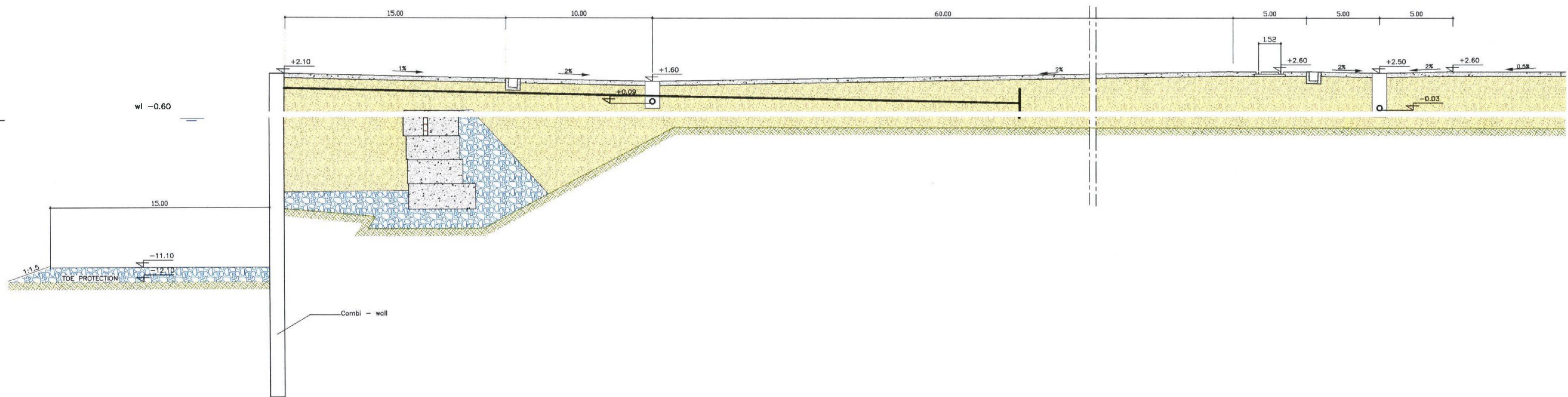
- Road
- Unpaved
- Concrete
- Oil separator
- Sheds / buildings
- Planned railway connection
- Port road
- Fence
- Site boundary
- Railway
- Ground level

Level in m ref. system Baltic Sea Level

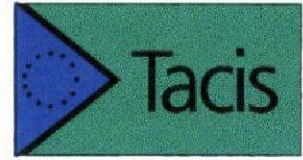
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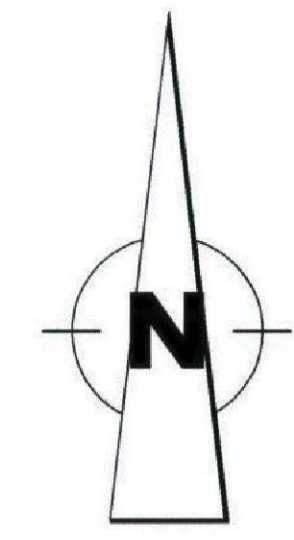
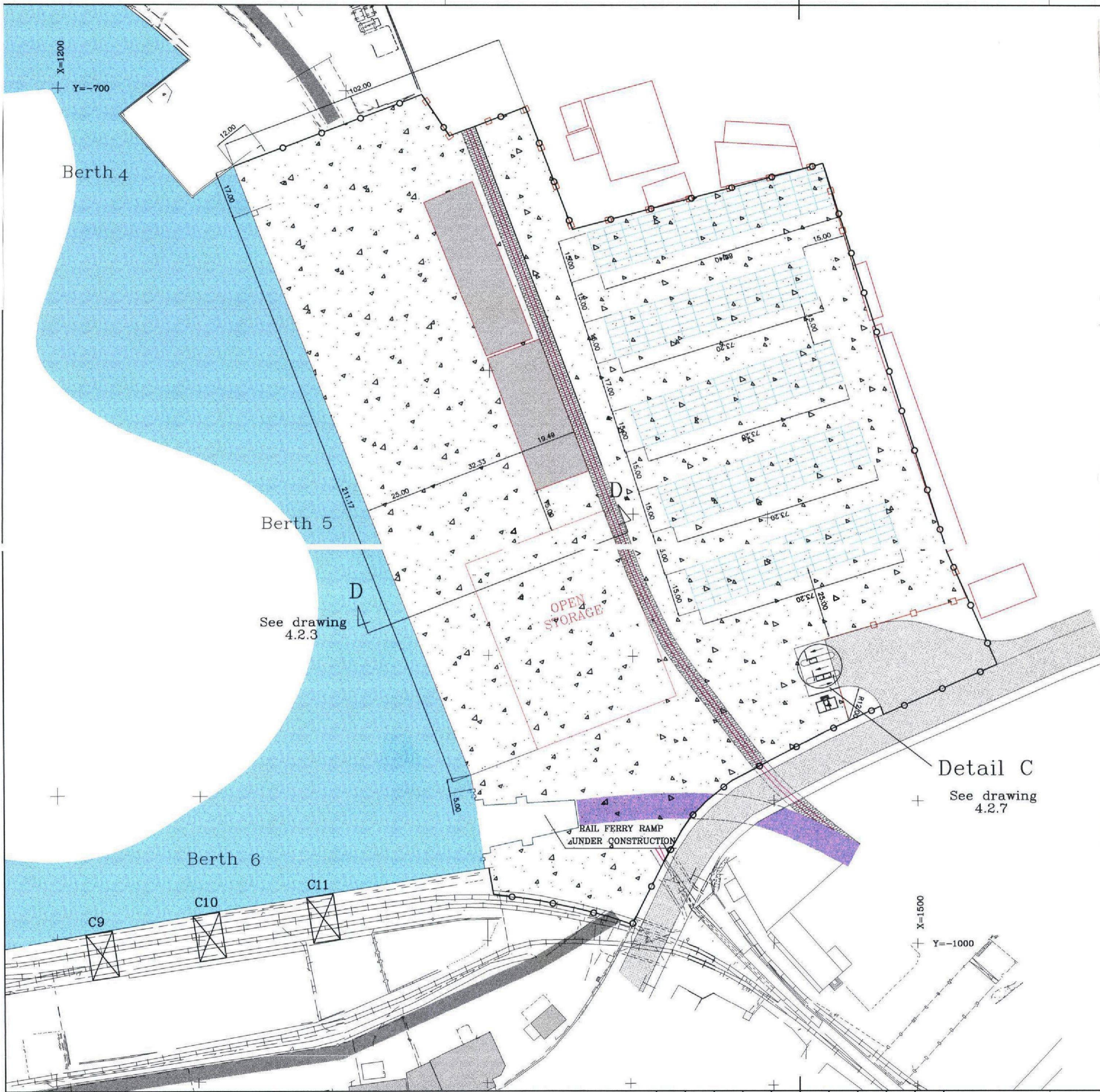


CROSS SECTION BERTH 5 (EXISTING SITUATION)

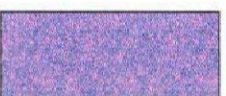
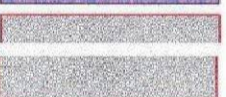

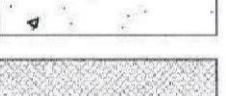



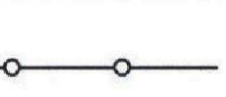



CROSS SECTION D-D BERTH 5 (NEW SITUATION)

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client							
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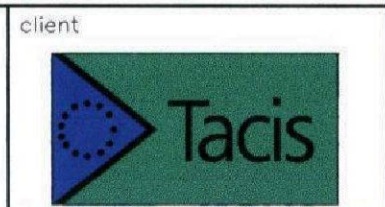


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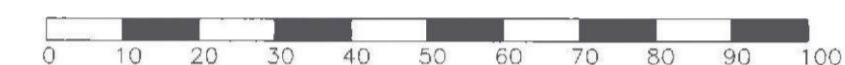
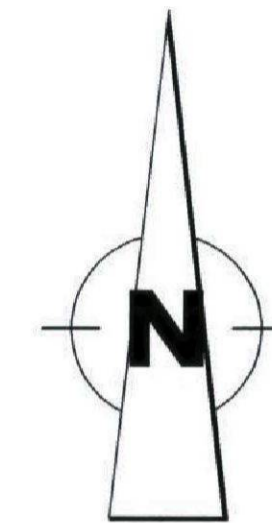
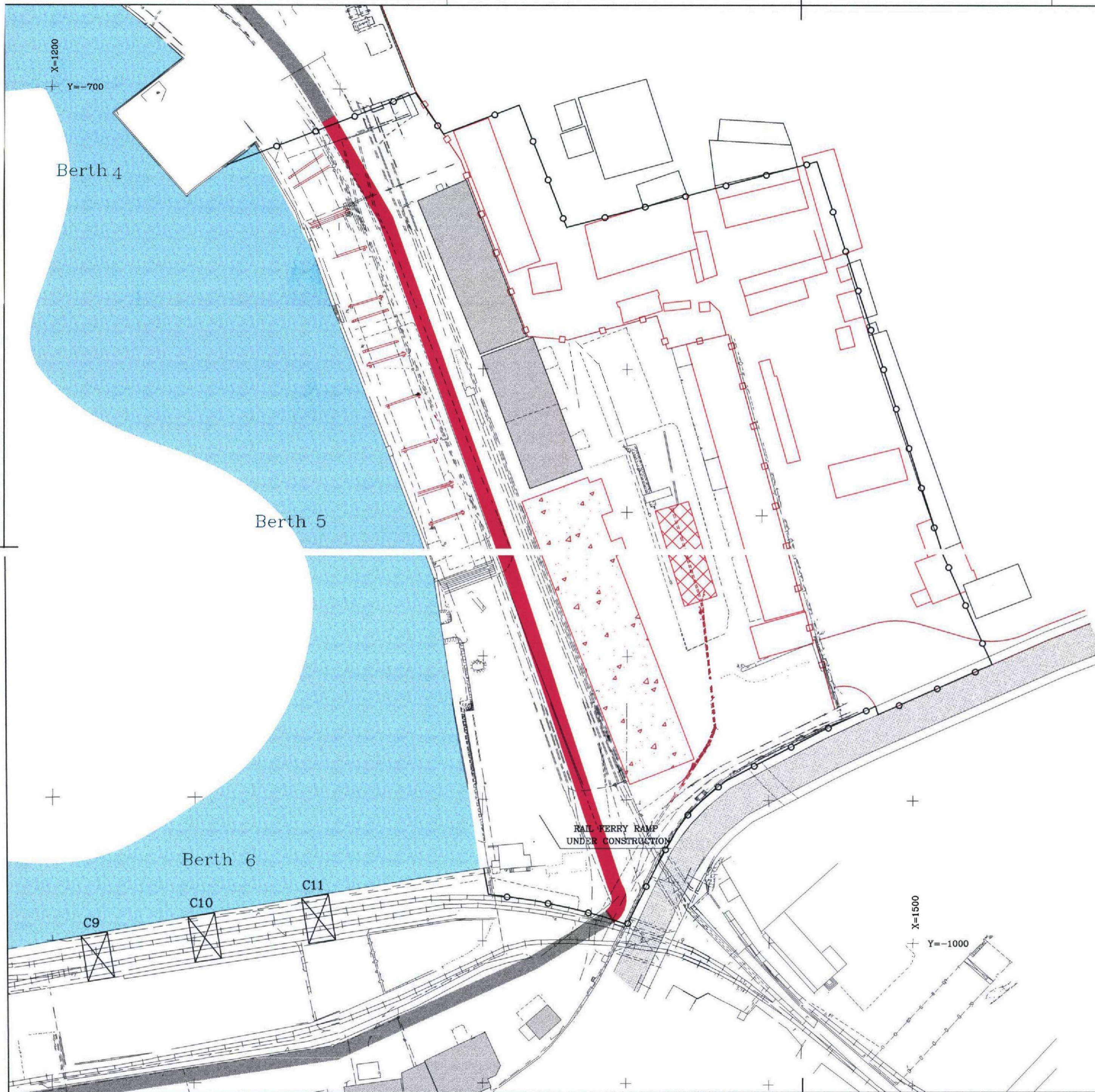
-  Planned railway connection
  -  existing building
  -  Concrete
  -  Asphalt
  -  Pavement railway crossing
  -  New railway
  -  New quay wall
  -  Site boundary
  -  Fence
- Dimensions in m

project **FEASIBILITY STUDY OF NEW TERMINAL FACILITIES IN THE GEORGIAN PORTS**








subject **TENDER DRAWINGS  
MULTI PURPOSE TERMINAL BATUMI  
NEW LAYOUT**



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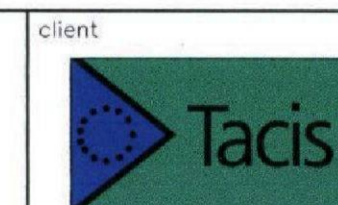


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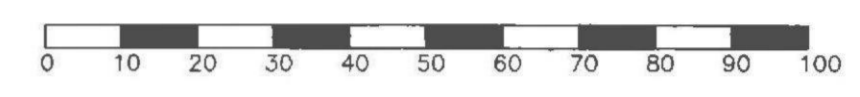
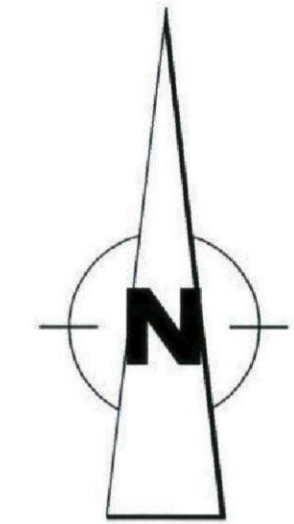
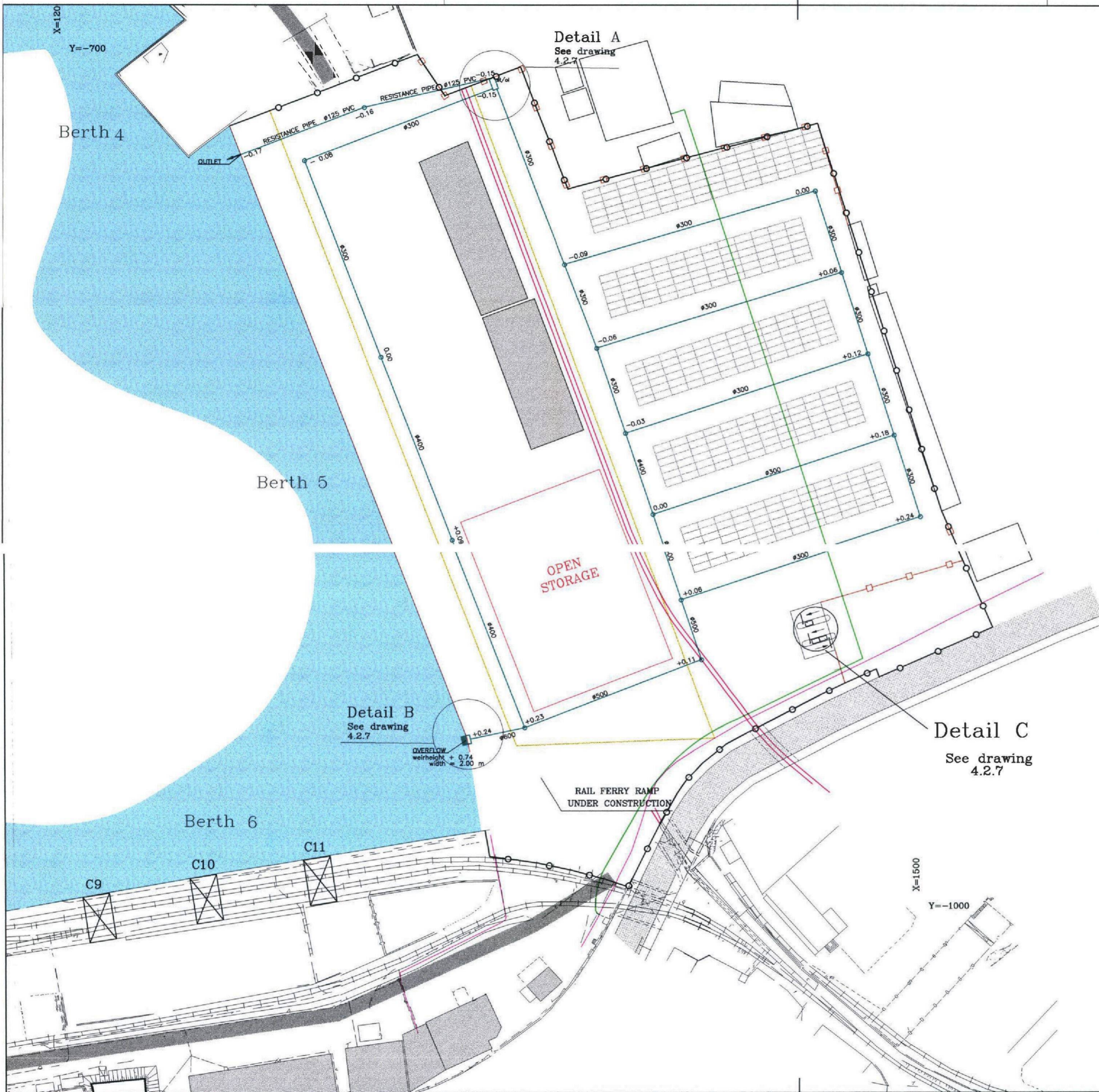
-  Demolition sheds/buildings
-  Demolition road
-  Demolition foundation
-  Demolition oil separator
-  Building
-  Demolition Fence
-  Site boundary

project **FEASIBILITY STUDY OF NEW TERMINAL FACILITIES  
IN THE GEORGIAN PORTS**

subject **TENDER DRAWINGS  
MULTI PURPOSE TERMINAL BATUMI  
DEMOLITION WORKS**



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Hamburg Port Training Institute GmbH			drawingnr.	4.2.5
Dornier System Consult			filename	2197OGAM
Rotterdam Maritiem Group			revision	B



LEGEND	
	New sewerage in concrete unless otherwise specified
	Waste water rail wagon cleaning
	Cable duct
	Settling tank / oil interceptor
	Manhole
	Bottom-level inside pipe
	Overflow
	Existing electricity cable
	New railway
	New quay wall
	Site boundary
	Fence

REMARKS:  
 levels in m. Ref. system Baltic Sea level  
 diameter in mm  
 Small resistance pipe is necessary to avoid turbulence in settling tank!!

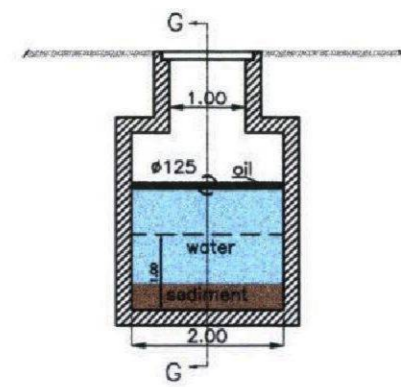
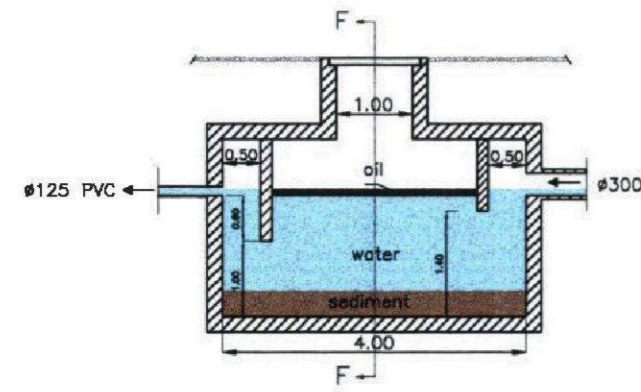
project **FEASIBILITY STUDY OF NEW TERMINAL FACILITIES IN THE GEORGIAN PORTS**

subject **TENDER DRAWINGS  
 MULTI PURPOSE TERMINAL BATUMI  
 NEW UTILITIES**



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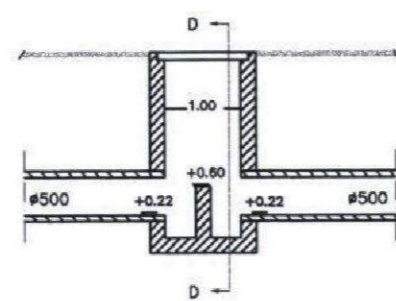
longitudinal section G-G



cross section F-F

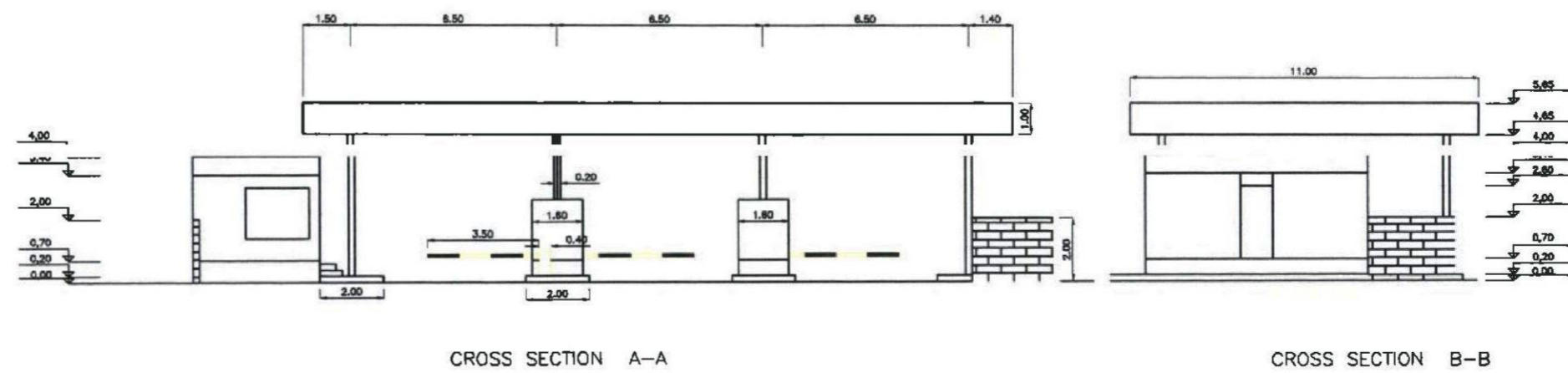
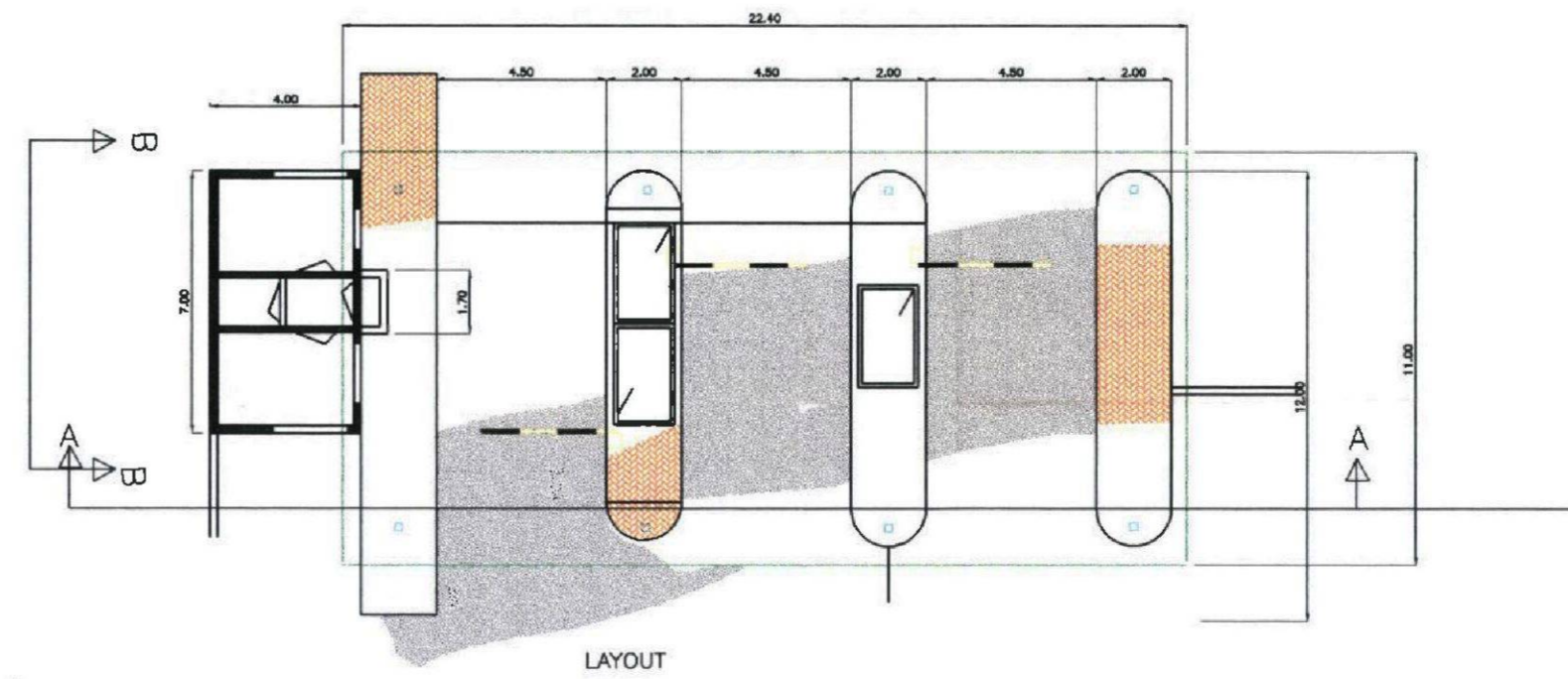
Detail A scale 1:100  
principle settling tank/oil interceptor

longitudinal section E-E




cross section D-D

Detail B scale 1:100  
principle overflow



NEW GATE

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subject				client		
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