SCHEDULE 8

Terms and Conditions of Concession Agreement
CONCESSION AGREEMENT
RELATING TO THE
COROZAL CONTAINER TERMINAL
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THIS AGREEMENT IS MADE AS OF ☐ 20[●] (the "Award Date") and is entered into by and between Mr. Jorge Luis Quijano, acting on behalf of the AUTORIDAD DEL CANAL DE PANAMÁ, an autonomous, legal entity established and organized under the terms of the National Constitution of Panama and the Organic Law (Panama Canal Authority) No. 19 of 11 June 1997 (the "ACP"), duly authorized for this act by means of Resolutions of the Board of Directors of the ACP No. ACP-JD-RM 14-711 of 30 October 2014, No. ACP-JD-RM 15-770 of 24 November 2015 and No. ACP-JD-RM 16-839 of 26 September 2016 on the one hand, and [●] in his capacity as legal representative of [●], a company organized and existing under the laws of [●], registered with number [●], and whose registered address is at [●] (the "Concessionaire") on the other hand.

WHEREAS

(A) The ACP wishes to develop a modern common-user Container transhipment terminal at Corozal, Panama in order to cater for the increasing demand from shipping lines to use the transhipment system on Panama's Pacific coast, to promote and maintain Panama's key position as a Latin American transhipment hub, and to strengthen the core business of the Panama Canal by attracting more business from existing and new shipping lines calling at ports in the Republic of Panama and using the Panama Canal.

(B) The Board of Directors of the ACP resolved and approved, by means of Resolutions of the Board of Directors of the ACP No. ACP-JD-RM 14-711 of 30 October 2014, No. ACP-JD-RM 15-770 of 24 November 2015 and No. ACP-JD-RM 16-839 of 26 September 2016, the grant, by way of the Tender Process, of a concession to design, develop, finance, construct, operate and maintain the Corozal Container Terminal. Pursuant to a response to the RFQ the Awardee provided evidence of its qualifications to design, develop, finance, construct, operate and maintain the Corozal Container Terminal and pursuant to a response to the RFP the Awardee submitted its Binding Offer to design, develop, finance, construct, operate and maintain the Corozal Container Terminal on the terms and conditions set out in this Agreement.

(C) Pursuant to the provisions of the RFP and on the basis of the Binding Offer submitted in response thereto by the Awardee the Contracting Officer notified Awardee of the Award to it of the Concession for the Corozal Container Terminal.

THE PARTIES HAVE AGREED AS FOLLOWS

1. PRELIMINARY

1.1 Definitions

In this Agreement (including the Recitals and Appendices) unless the context otherwise requires the following words and expressions have the following meanings:

"Acceptable Bond Reinsurer Rating" means, in respect of any relevant reinsurer, a minimum long-term credit rating of "a-" from AM Best, "A-" from S&P, "A3" from Moody's and/or "A-" from Fitch, provided that if such reinsurer has several long-term credit ratings the rating with the
most recent date will be taken into account for these purposes;

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Accounting Date&quot;</td>
<td>means 31 December (or, in respect of the Final Operating Year, the Termination Date);</td>
</tr>
<tr>
<td>&quot;Accounting Records&quot;</td>
<td>means books of account, auxiliary books of account, invoices, cost accounting records, and all Terminal Contracts;</td>
</tr>
<tr>
<td>&quot;ACP Acquisition Regulations&quot;</td>
<td>means the acquisition regulations of the ACP approved by Agreement No. 24 of 4 October 1999, as amended by Agreements No. 30, 31 33, 34, 44, 48, 49, 54, 60, 61, 67, 79, 86, 104, 107, 133, 136, 137, 142, 143, 150, 153, 157, 159, 165, 166, 168, 174, 193, 212, 223 and 252 and from time to time, in each case in the original Spanish language;</td>
</tr>
<tr>
<td>&quot;ACP Blasting and Dredging Programme&quot;</td>
<td>means the blasting and capital dredging as set out in programme set out in Appendix 4;</td>
</tr>
<tr>
<td>&quot;ACP Commercial, Industrial and Service Activities Regulation&quot;</td>
<td>means the commercial, industrial and service activities regulation of the ACP approved by Agreement No. 35 of 30 May 2000, as amended by Agreements No. 49, 57, 90, 102, 239, 267 and 280 and from time to time, in each case in the original Spanish language;</td>
</tr>
<tr>
<td>&quot;ACP Land Use Regulation&quot;</td>
<td>means the regulation for the Use of the Panama Canal Patrimonial Land and Land under Panama Canal Authority Administration of the ACP approved by Agreement No.102 of 25 August 2005, as amended by Agreements No. 190, 192, 209, 213, 240, 251 and 282 and from time to time, in each case in the original Spanish language;</td>
</tr>
<tr>
<td>&quot;ACP Water Use Regulation&quot;</td>
<td>means the regulation for the Use of the Panama Canal Water approved by Agreement No. 103 of August 25, 2005, as amended by Agreements No 196, 251 y 282 and from time to time, in each case in the original Spanish language;</td>
</tr>
<tr>
<td>&quot;Actual Annual Container Movements Fees&quot;</td>
<td>means, in respect of any Operating Year, the aggregate Monthly Container Movements Fee paid by the Concessionaire to the ACP for all the Operating Months in that Operating Year;</td>
</tr>
</tbody>
</table>
"Affected Party" has the meaning given to it in clause 10.1;

"Affiliate" means, in relation to a company, that company's Subsidiaries, that company's Parent Company and each Subsidiary of that company's Parent Company; and "affiliated" shall be construed accordingly;

"Agreed Terminal Specifications" means the conceptual design and specifications of the Corozal Container Terminal set out in Error! Reference source not found.;

"Ancillary Terminal Services" means the provision of terminal-related services which are or will become necessary for the effective operation of the Corozal Container Terminal other than Container Movements, including:

(a) repairing and maintenance of Containers and providing other value added services relating to Containers; and

(b) providing potable water, shore power and, subject to clause 6.7, bunker fuel to Eligible Container Vessels, save to the extent that any such services are to be performed by the ACP under this Agreement or the nature of the terminal-related services is such that it can only be provided by the ACP or a Governmental Entity;

"Annual Ancillary Gross Revenue" means, in respect of any Operating Year, the aggregate gross revenue of the Concessionaire and its Permitted Affiliates (if any) from Ancillary Terminal Services in that Operating Year, in accordance with the audited financial statements of the Concessionaire and its Permitted Affiliates (if any) for that Operating Year;

"Annual Container Movements Fees Shortfall" has the meaning given to it in clause 3.4;

"Annual Maintenance Report" has the meaning given to it in clause 7.3;

"Applicable Laws and Regulations" means, with respect to any person, property, transaction, event or other matter:
(a) the Contract Governing Laws;
(b) any treaty or international conventions to which the Republic of Panama is a party including all conventions relating to port security and safety such as the IMO's International Convention for the Safety of Life at Sea (SOLAS) 1974 (including the International Ship and Port Facility (ISPS) Code);
(c) any judgment issued by the proper court or arbitral tribunal in relation to any of the Parties; and
(d) any interpretation of any of the foregoing by any person having jurisdiction over any of the foregoing, or charged with its administration or interpretation, having the force of law,
in each case to the extent relating or applicable to such person, property, transaction, event or other matter;

"Applicable Permits" means all relevant licences, consents, authorisations, filings, notifications, registrations and approvals (including any operating permits) from the Panama Maritime Authority, the Panamanian Ministry of Commerce and Industry, the Panamanian Health Ministry, the Panamanian Customs Authority, the Panamanian Environmental Ministry, the Panamanian Ministry of Agriculture, the Municipality of the District of Panama and/or any other Panamanian Governmental Entity;

"Approved Bond Issuer" has the meaning given to in accordance with clause 12.5;

"Approved Guarantee Issuer" means a bank duly established and operating in the Republic of Panama with a valid general license issued by the SSRP and having a minimum long-term credit rating of "BBB" from S&P, "Baa2" from Moody's and/or "BBB" from Fitch (or in each case such lesser rating as the ACP may in its sole and absolute discretion accept);
"Approved Insurer" means an international insurance company having a minimum rating of "a-" from AM Best, "A-" from S&P, "A3" from Moody's and/or "A" from Fitch (or in each case such lesser rating as the ACP may in its sole and absolute discretion accept);

"Award" means the Administrative Resolution No. [●] of the Contracting Officer awarding the Concession for the Corozal Container Terminal to the Awardee;

"Award Date" has the meaning given to it at the beginning of this Agreement;

"Awardee" means [insert name of the Prequalified Party that was awarded the Award], the one hundred per cent (100%) Parent Company of[1] the Concessionaire;

"Binding Offer" has the meaning given to it in the letter from the Contracting Officer at the beginning of the RFP;

"Board" means the board of directors of the Concessionaire from time to time;

"Canal Risk" means any threat to the security, safety or operational integrity of the Panama Canal and/or the Corozal Container Terminal, or any of their respective facilities or users;

"Common-User Basis" means the obligation throughout the entire Concession Term to serve all container shipping operators;

"Completion Survey" has the meaning given to it in clause 5.8(d);

"Concession Area" means the land and water area described in Part A of Appendix 1;

"Concession Area Preparatory Works" means the preparatory works described in paragraph 1 of Appendix 3;

"Concession Area Rent" has the meaning given to it in clause 3.1(b);

[Delete text in square brackets if the Prequalified Party that is awarded the Award has not specified that its rights under the Contract are to be assigned to its wholly owned Panamanian SPV i.e. if this is the case then the Awardee is also the Concessionaire.]
"Concession Area Rights Date" means the date on which the Concessionaire obtains the right to enter upon, use and occupy the Concession Area in accordance with clause 4.2(a);

"Concession Fees" means the rents, fees and revenue share set out in, and as adjusted in accordance with, clause 3;

"Concession for the Corozal Container Terminal" has the meaning given to it in clause 2.1;

"Concession Land Area Rate" means, subject to clause 3.2(a), [●] US Dollars (US$[●])², as set out in the Awardee's Binding Offer;

"Concession Maintenance Plan" has the meaning given to it in clause 7.2;

"Concession Term" has the meaning given to it in clause 2.2, and includes for the avoidance of doubt any extension in accordance with clause 2.2(b) or 2.2(c);

"Concession Water Area Rate" has the meaning given to it in clause 3.1(b)(ii);

"Concessionaire Change of Control" means that any person or persons holding a direct or indirect interest in the Concessionaire assign(s) or otherwise transfer(s) or dispose(s) of, or encumber(s), or enter(s) into any agreement to assign or otherwise transfer or dispose of, or encumber, any direct or indirect interest in the Concessionaire;

"Conflict Matter" has the meaning given to it in clause 9.4;

"Conflict Matter Meeting" has the meaning given to it in clause 9.4;

"Container" means a steel or aluminium box that is specifically built in accordance with applicable ISO standards to stow cargo for the purposes of multimodal transport including ventilated, insulated, refrigerated, flat rack, vehicle rack, open top, bulk liquid, dry bulk or other special configurations thereof;

"Container Movement" means:

² [To be completed on the basis of the Awardee's Binding Offer.]
(a) any unloading of a Container from an Eligible Container Vessel to the Corozal Container Terminal; or

(b) any loading of a Container onto an Eligible Container Vessel from the Corozal Container Terminal,

provided that any transhipment of a Container from one Eligible Container Vessel to another Eligible Container Vessel, shall constitute only one Container Movement rather than two;

"Contract" means:

(a) this Agreement including its Appendices, and the Execution Version;

(b) the Award;

(c) the Binding Offer provided by the Awardee;

(d) the RFP including its Schedules (other than this Agreement which is contained within such a Schedule);

(e) the Statement of Qualifications provided by the Awardee; and

(f) the RFQ,

but excluding for the avoidance of doubt the documents included in the VDR (as defined in the RFP) which were provided to Prequalified Parties (as defined in the RFQ) to carry out due diligence in relation to the Concession Area and the Corozal Container Terminal, and which are only reference documents provided for such purposes and shall in no circumstances constitute part of the Contract;

"Contract Governing Laws" means:

(a) the Provisions of the Constitution of Panama, particularly those contained in Title XIV thereof;
(b) the Organic Law of the ACP No. 19 of 11 June 1997; and

(c) all rules, statutes, regulations, orders and decrees issued by the ACP from time to time including the ACP Acquisition Regulations and the ACP Commercial, Industrial and Service Activities Regulation; the ACP Water Use Regulation and the ACP Land Use Regulation;

"Contracting Officer" means the contracting officer designated by the ACP from time to time in relation to the Tender Process and the Concession for the Corozal Container Terminal;

"Corozal Container Terminal" means the Container terminal to be designed, developed, financed, constructed, operated and maintained at Corozal, Panama by the Concessionaire in accordance with this Agreement, and includes the Terminal Facilities and/or the Terminal Rail Spur Access, as the context may require;

"Defaulting Party" has the meaning given to it in clause 11.1;

"Design Discrepancies Notice" has the meaning given to it in clause 4.7;

"Disputes" has the meaning given to it in clause 17.4;

"EIS" means the Environmental Impact Study prepared in relation to the Corozal Container Terminal and approved by the ACP, including the Environmental Management Plan and any other plans prepared pursuant to such Environmental Impact Study, as set out in Appendix 10;

"Eligible Container Vessel" means any ship that is constructed for the transport of Containers only;

"Encumbrance" means any mortgage, charge, pledge, lien, option, restriction, right of first refusal, right of pre-emption claim, right, interest or preference granted to any third party, or any other encumbrance or security interest of any kind (or any agreement or
commitment to create any of the foregoing), and to "encumber" shall be construed accordingly;

"Environment" means:
(a) land, including surface land, sub-surface strata, sea bed and river bed under water (as defined in paragraph (b) below), and natural and man-made structures;
(b) water, including coastal and inland waters, surface waters, ground waters and water in drains and sewers;
(c) air, including air inside buildings and in other natural and man-made structures above or below ground; and
(d) any and all living organisms or systems supported by those media, including humans;

"Environmental Standards" means:
(a) all Applicable Laws and Regulations relating to the Environment; and
(b) accreditation of environmental management systems with ISO14001 (or such other equivalent quality standard which replaces or is in substitution for such standard) and application of the Self Diagnosis Method (SDM) and the Port Environmental Review System (PERS);

"Event of Default" means:
(a) in the case of any Party, that Party becoming insolvent or unable to pay its debts within the meaning of the insolvency legislation applicable to it and having stopped paying its debts as they fall due, or a process having been instituted that could lead to that Party being dissolved and its assets being distributed among that Party's creditors, shareholders or other contributors, or a step having been taken to initiate any process by or under which:
(i) the ability of the creditors of that Party to take any action to enforce their debts is suspended, restricted or prevented;

(ii) some or all of the creditors of that Party accept, by agreement or in pursuance of a court order, an amount less than the sums owing to them in satisfaction of those sums with a view to preventing the dissolution of that Party;

(iii) a person is appointed to manage the affairs, business and assets of that Party on behalf of that Party's creditors; or

(iv) the holder of a charge over assets of that Party is appointed to control the business and assets of that Party;

(b) in the case of any Party, that Party committing a breach of this Agreement;

(c) in the case of the Concessionaire:

(i) a Concessionaire Change of Control other than any Concessionaire Change of Control that has been approved by the ACP in writing[; and/or

(ii) any amendment of any constitutional document of the Concessionaire other than any such amendment that is required to comply with a change of any Applicable Laws and Regulations and/or that has been approved by the ACP in writing]

(d) in the case of the Concessionaire, the Container Movements completed by the Concessionaire in each of three (3) consecutive Operating Years being less

3 [Delete text in square brackets in the Execution Version if the Concessionaire is the Awardee. Retain text if the Concessionaire is an SPV.]
than the respective Guaranteed Annual Container Movements for each such consecutive Operating Year; or

(e) in the case of the Concessionaire, that the Awardee does not submit all the documentation set out in paragraph 11 of the RFP in accordance with the RFP;

(f) in the case of the Concessionaire, without prejudice to paragraph (b) above, the Concessionaire and/or any of its Affiliates committing a breach of any Applicable Laws and Regulations including in relation to restrictive or other anti-competitive agreements or practices (including cartels, pricing, resale pricing, market sharing, bid rigging, terms of trading, purchase or supply and joint ventures, dominant or monopoly market positions), business misdeeds and lack of honesty;

"Excluded Terminal Contracts" has the meaning given to it in clause 14.7(b);

"Excluded Terminal Equipment" has the meaning given to it in clause 14.7(b);

"Execution Version" has the meaning given to it in clause 1.5;

"Expansion Area" means the land and water area described in Part B of Appendix 1;

"Expansion Program" has the meaning given to it in clause 2.3;

"Final Operating Month" means the Operating Month commencing on the first day of the calendar month in which the Termination Date occurs and ending on the Termination Date;

"Final Operating Year" means the Operating Year commencing on 1 January of the calendar year in which the Termination Date occurs and ending on the Termination Date;

"Final Terminal Designs" means the final designs, drawings and specifications required for the construction and equipping of the Corozal Container Terminal and the Terminal Road Access containing all of the
relevant elements indicated in Error! Reference source not found.;

"First Operating Month" means the Operating Month commencing on the First Operations Date and ending on the last day of the calendar month in which the First Operations Date occurs;

"First Operating Year" means the Operating Year commencing on the First Operations Date and ending on 31 December of the calendar year in which the First Operations Date occurs;

"First Operations Date" means the earlier of the Preliminary Operations Commencement Date (if any) and the Operations Commencement Date;

"Force Majeure Event" means any:

(a) lightning, flood, drought, earthquake or other natural disaster;

(b) epidemic or pandemic;

(c) terrorist attack, civil war, civil commotion or riot, war, threat of or preparation for war, armed conflict, imposition of sanctions, embargo, or breaking off of diplomatic relations;

(d) nuclear, chemical or biological contamination;

(e) interruption or failure of utility service exceeding one hour;

(f) collapse of buildings, fire, explosion or accident;

(g) labour or trade dispute, strike, industrial action or lockout,

which in each case is not directly or indirectly attributable to or caused by, and beyond the reasonable control or influence of, the Affected Party, and could not reasonably have been foreseen, prevented or guarded against by the Affected Party (whether by applying Good
Industry Practice, by complying with its obligations under this Agreement, or otherwise); "Good Industry Practice" means those practices, methods, equipment, specifications and standards of safety and performance, as the same may change from time to time, employed by experienced international contractors or operators undertaking the design, development, financing, engineering, construction, operation, maintenance, and/or management services of or in relation to port facilities of a type and size similar to the Corozal Container Terminal, which in the exercise of reasonable judgement in light of the facts known at the time the judgement or decision was made, are considered good, safe and prudent practices in connection with the design, development, financing, engineering, construction, operation, maintenance, and/or management services (as applicable) of or in relation to port facilities of a type and size similar to the Corozal Container Terminal, with commensurate standards of safety, performance, dependability, efficiency and economy, after due regard to the special factors and conditions that prevail in the Concession Area (which is part of and/or adjacent to the Panama Canal);

"Governmental Entity" means any supra national, national, state, municipal or local government (including any subdivision, court, administrative agency or commission or other authority thereof) or any governmental or private body exercising any regulatory, taxing, importing or other governmental or governmental authority;

"Guaranteed Annual Container Movements" means, in respect of any Operating Year, the Guaranteed Annual Container Movements specified in respect of that Operating Year in Appendix 7, as adjusted in accordance with paragraphs 1 to 3 of Appendix 7;

"Guaranteed Annual Container Movements Fees" means, in respect of any Operating Year, the product of:

(a) the Guaranteed Annual Container Movements specified in respect of that Operating Year in the table in Appendix 7
(as adjusted in accordance with paragraphs 1 to 3 of Appendix 7); and

(b) the Per Movement Fee as at that Operating Year,

provided that if in accordance with clause 3.3 the Per Movement Fee changes and such change occurs during an Operating Year, then without prejudice to paragraphs 1 to 3 of Appendix 7 the Guaranteed Annual Container Movements Fees in respect of that Operating Year shall be calculated on a pro rata basis taking into account the respective number of days prior to and after the change in the Per Movement Fee;

"Handover Condition" means that the Corozal Container Terminal (including for the avoidance of doubt all Terminal Structures and all Terminal Equipment) shall be in good order and condition in accordance with Good Industry Practice (allowing for normal wear and tear), and that the Corozal Container Terminal (including for the avoidance of doubt all Terminal Structures and all Terminal Equipment) shall be in such condition so as to enable the ACP or its nominee to continue to perform activities the same as or substantially similar to the Terminal Services for a continuous period of not less than five (5) years following the expiry of the Concession Term;

"IASB" means the International Accounting Standards Board;

"IFRS" means international accounting standards, as issued by the IASB;

"IMO" means the International Maritime Organisation, a specialised agency of the United Nations established in 1948;

"Incomplete Terminal Construction Works Costs" means, in the event that this Agreement is terminated before the First Operations Date in the circumstances set out in clause 14.8(b), the sum of:

(a) an amount equal to the direct costs incurred by the Concessionaire in respect of those parts of the Terminal Construction Works that have been completed as at the
date of such termination and in respect of any preparatory work performed on those parts of the Terminal Construction Works that have not been completed as at the date of such termination, subject in each case to such costs having been necessary and reasonably incurred by the Concessionaire; and

(b) an amount equal to the lower of:

(i) ten per cent (10%) of the amount in paragraph (a) above; and

(ii) an amount equal to the indirect costs incurred by the Concessionaire in respect of those parts of the Terminal Construction Works that have been completed as at the date of such termination and in respect of any preparatory work performed on those parts of the Terminal Construction Works that have not been completed as at the date of such termination, subject in each case to such costs having been necessary and reasonably incurred by the Concessionaire; and

(c) an amount equal to five per cent (5%) of the sum of the amounts in paragraphs (a) and (b) above;

"Intermediate Terminal Designs" means the intermediate designs, drawings and specifications required for the construction and equipping of the Corozal Container Terminal and the Terminal Road Access containing all of the relevant elements indicated in Error! Reference source not found.;

"ISO" means the International Organization for Standardization;

"LD Amount" means liquidated damages payable in respect of each elapsed day referred to in:
(a) clause 4.10(b) in an amount equal to the quotient of:

(i) the Guaranteed Annual Container Movements Fees that apply in respect of the Operating Year in which such day occurs in; and

(ii) three hundred sixty five (365); or

(b) clause 5.10 or 5.11 in an amount equal to the quotient:

(i) the Guaranteed Annual Container Movements Fees that apply (or would have applied but for the relevant delay in the completion of the Terminal Construction Works) in respect of the Operating Year in which such day occurs in; and

(ii) three hundred sixty five (365); or

(c) clause 8.13 or 12.8 in an amount equal to ten thousand US Dollars (US$10,000.00);

"Liaison Committee" has the meaning given to it in clause 4.14;

"Losses" means any and all damages, losses, liabilities, costs, charges, expenses, actions, proceedings, claims and demands;

"Maintenance Requirements" has the meaning given to it in clause 7.1;

"Maintenance Survey" has the meaning given to it in clause 7.4;

"MLWS" means 'mean low water springs', the average height of low waters occurring at the time of the spring tides;

"Monthly Container Movements Fee" has the meaning given to it in clause 3.1(c);

"Net Cost" means, in respect of the benefit of any Terminal Contract or in respect of any Terminal Equipment or Terminal Structure, the cost thereof as reported in the audited interim Financial Statement at the Termination Date, in accordance with paragraphs 7, 8, 10, 11, 12, 13, 14, 16(a) and (b), 20, 21, 22
and 27 of International Accounting Standard No. 16 – Property, Plant and Equipment (IAS 16), as published by the IASB on 1 January 2015, resulting from the application of the cost model permitted by paragraph 30 of IAS 16;

"Non-Defaulting Party" has the meaning given to it in clause 11.1;

"Obligatory Insurance Policies" means:

(a) whilst any Terminal Construction Works are being undertaken:

   (i) construction/erection all risks insurance, with a limit on liability of not less than the aggregate construction/erection contract value;

   (ii) employers' liability insurance, with a limit on liability of not less than fifty million US Dollars (US$50,000,000.00) per accident or occurrence and no limit on the number of accidents or occurrences;

   (iii) comprehensive third party liability insurance including property damage, pollution, or injury or death to any third parties (including the ACP's employees, agents, representatives and contractors) entering the Concession Area, with a limit on liability of not less than fifty million US Dollars (US$50,000,000.00) per accident or occurrence and no limit on the number of accidents or occurrences; and

   (iv) any other insurance or insurances that may be necessary to protect the Concessionaire, its employees, and the Concession Area and the Corozal Container Terminal against loss, damage or destruction, in each case with a limit on liability of not less than ten million US Dollars (US$
10,000,000.00) per accident or occurrence and no limit on the number of accidents or occurrences; and

(b) whilst any Terminal Services are being provided:

(i) comprehensive third party liability insurance including property damage, pollution, or injury or death to any third parties (including the ACP’s employees, agents, representatives and contractors) entering the Concession Area, with a limit on liability of not less than twenty five million US Dollars (US$25,000,000.00) per accident or occurrence and no limit on the number of accidents or occurrences;

(ii) terrorism, physical damage or physical loss insurance, with a limit on liability of not less than one hundred million US Dollars (US$100,000,000.00) per occurrence and no limit on the number of occurrences;

(iii) business interruption insurance (in relation to the Terminal Services and the Panama Canal operations), with a limit on liability of not less than twenty five million US Dollars (US$25,000,000.00) per occurrence and no limit on the number of occurrences;

(iv) employers’ liability insurance, with a limit on liability of not less than fifty million US Dollars (US$50,000,000.00) per accident or occurrence and no limit on the number of accidents or occurrences; and
(v) any other insurance or insurances that may be necessary to protect the Concessionaire (including its employees, agents, representatives and contractors), and the Concession Area and the Corozal Container Terminal against loss, damage or destruction, in each case with a limit on liability of not less than ten million US Dollars (US$10,000,000.00) per accident or occurrence and no limit on the number of accidents or occurrences;

"Observer" has the meaning given to it in clause 9.2;

"Operating Month" means a period ending at 11.59 pm on the last day of a calendar month (or, in the case of the Final Operating Month, the Termination Date) and commencing at 12.00am (midnight) on the first day of that calendar month (or, in the case of the First Operating Month, on the First Operations Date);

"Operating Year" means a period ending on and including an Accounting Date and commencing on the day following the immediately preceding Accounting Date (or, in the case of the First Operating Year, on the First Operations Date);

"Operations Commencement Certificate" has the meaning given to it in clause 5.9(a);

"Operations Commencement Date" means the date that is up to seven (7) days after the date of any Operations Commencement Certificate other than a Preliminary Operations Commencement Certificate provided by the ACP;

"Option Right" has the meaning given to it in clause 2.3;

"Option Right Exercise End Date" has the meaning given to it in clause 2.4;

"Option Right Exercise Notice" has the meaning given to it in clause 2.4;

"Panama Canal" means the Panama Canal, including the waterway, its anchorages, berths and entrances, land and sea, river, lake waters, locks, ancillary dams, dikes, buoys, navigational aids and water control
structures, as the same may be expanded or modified from time to time;

"Parent Company" has the meaning given to it in the definition of Subsidiary;

"Party" means the ACP or the Concessionaire, in each case in its capacity as a party to, and bound by the terms of, this Agreement and "Parties" means both of them in such capacity;

"Payment Bond" means a payment bond in the form set out in Appendix 8;

"Payment Bond Amount" means, in relation to the Payment Bond to be provided in accordance with clause 12.5 in respect of:

(a) the Terminal Construction Works, an amount equal to twenty million US Dollars (US$20,000,000.00); and

(b) the Terminal Services to be provided at the Terminal Facilities, an amount equal to ten million US Dollars (US$10,000,000.00);

"Per Movement Fee" means, subject to clause 3.3, [●] US Dollars (US$[●])4, as set out in the Awardee's Binding Offer per every Container Movement;

"Permitted Affiliate" means any Affiliate of the Concessionaire:

(a) to which the ACP has in accordance with clause 16.2 permitted the assignment, sub-contracting or sub-concessioning of any of the Concessionaire's rights, title, interest or obligations under this Agreement; and

(b) which is or has been involved in the provision of any Terminal Services;

"Prejudicial Governmental Action" has the meaning given to it in clause 10.5;

"Preliminary Operations Commencement Certificate" has the meaning given to it in clause 6.9;

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4 [To be completed on the basis of the Awardee's Binding Offer.]
"Preliminary Operations Commencement Date" means the date that is seven (7) days after the date of the Preliminary Operations Commencement Certificate (if any) provided by the ACP in accordance with clause 6.9;

"Preparatory Works" means the Concession Area Preparatory Works and/or the Terminal Rail Spur Access Area Preparatory Works, as the context may require;

"Quality Standards" means accreditation of quality management systems with ISO9001, and accreditation of health and safety management systems with ISO18001 (or in each case such other equivalent quality standards which replace or are in substitution for such standards);

"Replacement Instrument" has the meaning given to it in clause 12.7;

"RFP" means the request for proposals published by the ACP pursuant to the Tender Process on 7 October 2016, as amended;

"RFQ" means the request for qualifications published by the ACP pursuant to the Tender Process on 25 November 2015, as amended;

"Safety and Security Requirements" has the meaning given to it in clause 8.14(c);

"Social Fund" has the meaning given to it in clause 8.9(d);

"SSRP" means the Superintendence of Insurance and reinsurance of the Republic of Panama (Superintendencia de Seguros y Reaseguros de Panamá);

"Statement of Qualifications" has the meaning given to it in Schedule 1 of the RFQ;

"Step-in Right" has the meaning given to it in clause 9.6;

"Subsidiary" means a company in which another company (the "Parent Company") directly or indirectly through one or more Subsidiaries:

(a) holds or controls a majority of the voting rights in it;
(b) holds or controls the right to appoint or remove a majority of its Board of Directors; and/or

(c) has the power to exercise dominant influence or control, or actually exercises dominant influence or control over it,

and for the avoidance of doubt any company which is a Subsidiary of another company is also a Subsidiary of that second company’s Parent Company (if any);

"Suitable Accountant" means a firm of accountants with an office in the Republic of Panama which is one of the top four international audit firms by total revenue (as set out in the 2015 international auditing firms listings published by "Accounting Today" or "Accountancy Age");

"Suitable Independent Surveyor" means a reputable international technical engineering consultancy firm:

(a) with at least ten (10) years of experience in technical assistance, surveying, inspection and quality auditing of transportation infrastructure, and the maintenance thereof; and

(b) which is not affiliated to either of the Parties and has not previously been engaged by either of the Parties (or their respective Affiliates) in the five (5)-year period ending on the date of its proposed appointment pursuant to the provisions of clause 5.8(d), 7.4 or 14.3;

"Surviving Provisions" means clauses 1 and 8.1, the indemnity in clause 8.8, and clauses 14, 15.3, 16 and 17;

"Temporary Operation Period" has the meaning given to it in clause 6.9;

"Tender Process" means the international, competitive tender procedure numbered CCO-16-003, conducted by the ACP in accordance with the Contract Governing Laws in relation to the grant of the Concession for the Corozal Container Terminal;
"Terminal Construction Performance Guarantee" means an irrevocable unconditional on-demand performance guarantee in the form set out in Appendix 9 from any Approved Guarantee Issuer;

"Terminal Construction Proprietary Information" means confidential information, trade secrets, manufacturing techniques, processes and know-how and all technical information and material relating to the Terminal Construction Works (or any relevant part thereof) including formulae, specifications, process description, sampling plans, laboratory procedures and any other data relating to the Terminal Construction Works (or any relevant part thereof) and further including any technical manuals to be provided under any construction contract containing any such information, secrets, techniques, processes, know-how, data and material;

"Terminal Construction Works" means the Terminal Facilities Construction Works and/or the Terminal Rail Spur Access Construction Works, as the context may require;

"Terminal Construction Works Completion Date" has the meaning given to it in clause 5.3;

"Terminal Construction Works Programme" has the meaning given to it in clause 4.13;

"Terminal Contract" means any legally binding agreement, contract or arrangement entered into by the Concessionaire or any of its Permitted Affiliates in relation to the Corozal Container Terminal including in relation to any Terminal Construction Works or Terminal Services;

"Terminal Contract Net Cost" has the meaning given to it in clause 14.5(a);

"Terminal Equipment" means the equipment (to be) installed or used at the Corozal Container Terminal, as repaired, restored, replaced or supplemented from time to time in accordance with clause 7.1 and/or 9.6;

"Terminal Equipment Net Cost" has the meaning given to it in clause 14.5(b);

"Terminal Facilities" means the Terminal Structures and the Terminal Equipment set out in or contemplated by the Agreed Terminal Specifications (and the Final
"Terminal Facilities Construction Works" means the civil and ancillary works to be undertaken by or on behalf of the Concessionaire in accordance with the Terminal Construction Works Programme and this Agreement (including clauses 8.1, 8.4 and 8.9) in order to effect and put in place the Terminal Facilities;

"Terminal Operations Performance Guarantee" means an irrevocable unconditional on-demand performance guarantee in the form set out in Appendix 9 from any Approved Guarantee Issuer;

"Terminal Operations Performance Guarantee Amount" means, in relation to any Terminal Operations Performance Guarantee to be provided in respect of any Operating Year in accordance with clause 12.3, an amount equal to the sum of:

(a) the Guaranteed Annual Container Movements Fees applicable for that Operating Year; and

(b) the Guaranteed Annual Container Movements Fees for the two Operating Years immediately following that Operating Year;

"Terminal Rail Spur Access" means the rail spur access set out in the Agreed Terminal Specifications (and the Final Terminal Designs) that is (to be) located at the Terminal Rail Spur Access Area;

"Terminal Rail Spur Access Area" means the area described in Part C of Appendix 1;

"Terminal Rail Spur Access Area Preparatory Works" means the preparatory works described in Appendix 3;

"Terminal Rail Spur Access Area Rights Date" means the date on which the Concessionaire obtains the right to enter upon and use the Terminal Rail Spur Access Area in accordance with clause 4.2(b);

"Terminal Rail Spur Access Construction Works" means the civil and ancillary works to be undertaken by the Concessionaire and in coordination with the Panama Canal Railway Company, in accordance with the Terminal
Construction Works Programme and this Agreement (including clauses 8.1, 8.4 and 8.9) in order to effect and put in place the Terminal Rail Spur Access;

"Terminal Road Access " means the two overpasses providing access from the Avenida Omar Torrijos Herrera to the Concession Area, and the u-turn facility on the Avenida Omar Torrijos Herrera, as described in the Agreed Terminal Specifications and the Environmental Impact Study;

"Terminal Road Access Construction Works" means the civil and ancillary works to be undertaken by or on behalf of the Concessionaire in accordance with clause 8.9(c) or by or on behalf of the Panamanian Ministry of Works in order to effect and put in place the Terminal Services, in accordance with the Concession Agreement.

"Terminal Services" means:

(a) the performance of Container Movements in respect of Eligible Container Vessels calling at the Corozal Container Terminal; and

(b) the provision of Ancillary Terminal Services;

"Terminal Structure Net Cost" has the meaning given to it in clause 14.5(c);

"Terminal Structures" means all works of civil construction, structures, utilities, access roads and berths, and all superstructures including buildings, structures, offices sheds, warehouses, canteens and other buildings, facilities and support structures (to be) built, installed or otherwise erected or created at or on the Concession Area, in each case as repaired, restored, replaced or supplemented from time to time in accordance with clause 7.1 and/or 9.6;

"Termination Date" has the meaning given to it in clause 14.1;

"Termination Notice" means a notice from one Party to the other to terminate this Agreement, which the relevant Party may provide to the other in the circumstances set out in clauses 4.11, 5.7, 5.12, 10.4, 10.5 and 11.2;
"Termination Statement" has the meaning given to it in clause 14.5; and
"Upfront Fee" means [●] US Dollars (US$[●])
5, as set out in the Awardee's Binding Offer.

1.2 Interpretation

In this Agreement:

(a) clause, paragraph and Appendix headings do not affect the interpretation of this Agreement;

(b) the Appendices form part of this Agreement and any reference to this Agreement shall include the Appendices;

(c) references to:

(i) clauses and Appendices are to clauses of, and appendices to, this Agreement, and unless otherwise provided for references to paragraphs are to paragraphs of the Appendices in which the reference appears;

(ii) any Party shall include that Party's personal representatives, successors and permitted assigns;

(iii) a person shall include an individual, firm, company, Governmental Entity, state or agency of a state, or any joint venture, association, partnership, works council or employee representative body (whether or not having separate legal personality);

(iv) a company shall include any company, corporation or other body corporate, wherever and however incorporated or established;

(v) a particular statute, statutory provision, subordinate legislation or regulation (including the ACP Acquisition Regulations and the ACP's rulings in relation thereto) is a reference to it as it is in force from time to time taking account of any amendment or re-enactment and includes any statute, statutory provision or subordinate legislation which it amends or re-enacts and subordinate legislation for the time being in force made under it;

(vi) times of day are, unless the context otherwise requires, to the Republic of Panama local time;

(d) unless the context otherwise requires, words in the singular include the plural and in the plural include the singular. A reference to either gender includes a reference to the other gender;

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5 [To be completed on the basis of the Awardee's Binding Offer.]
(e) the words **include** and **including** are illustrative, do not limit the sense of the words preceding them and shall be deemed to include the expression **without limitation**; and

(f) the words or symbols **US$$**, **US Cents**, **US Dollars** are references to the lawful currency of the United Stated of America.

1.3 **Contract Governing Laws**

This Agreement and any non-contractual obligations arising out of or in connection with this Agreement shall be governed by, and interpreted in accordance with, the Contract Governing Laws. If and to the extent that any matter relating to this Agreement and/or any non-contractual obligations arising out of or in connection with this Agreement is a matter that is not foreseen, or capable of being governed by, and interpreted in accordance with, the Contract Governing Laws it shall be governed by, and interpreted in accordance with, the applicable laws of the Republic of Panama, with the exclusion of the choice of law provisions.

1.4 **Language of Agreement**

This Agreement (other than the form of Payment Bond in Appendix 8 which is drawn up in the Spanish language) is drawn up in the English language. In the event that this Agreement is translated into any other language the English language text (or, in the case of the form of Payment Bond in Appendix 8, the Spanish language text) shall prevail in the event of any conflict between the different language texts.

1.5 **Effectiveness and Conflicts**

The ACP and the Concessionaire are legally bound by the terms of this Agreement automatically with effect from the Award Date. To evidence such agreement, the Parties [shall execute an agreement in the form of this Agreement (with any blanks or text in italics and/or in square brackets completed/deleted) (the "**Execution Version**") within forty-five (45) days of the Award Date]/[have executed this Agreement (the "**Execution Version**") following the Award Date]⁶. In the event of any conflict between the documents comprising the Contract, the following descending order of priority shall prevail:

(a) this Agreement and the Execution Version;

(b) the Award;

(c) the Binding Offer provided by the Awardee;

(d) the RFP including its Schedules (other than this Agreement which is contained within such a Schedule);

(e) the Statement of Qualifications provided by the Awardee;

(f) the RFQ.

⁶ [Second option only to be retained for the Execution Version. First option applies to the Agreement that takes effect on the Award Date.]
and each such document shall be interpreted accordingly.

2. **GRANT OF CONCESSION AND CONCESSION TERM**

2.1 **Grant of Concession**

The Concessionaire is hereby granted the right, and the Concessionaire hereby assumes the obligation, to design, develop, finance, construct, operate and maintain the Corozal Container Terminal (including undertaking the Terminal Construction Works and providing the Terminal Services) at the Concession Area subject to and in accordance with the terms of this Agreement at its own cost and risk, and without recourse to the ACP’s credit or guarantees (the ”**Concession for the Corozal Container Terminal”**).

2.2 **Concession Term**

The term of the Concession for the Corozal Container Terminal (the ”**Concession Term”**”) shall commence upon the Award Date and expire on the date that is twenty (20) years after the Award Date unless:

(a) this Agreement terminates earlier in accordance with clause 14.1(c) or 14.1(d), in which case it shall expire on the relevant Termination Date specified in such clauses; or

(b) the Concessionaire has not exercised the Option Right by the Option Right Exercise End Date and notifies the ACP by no later than the date that is eighteen (18) years after the Award Date of its request for a ten (10) year extension of the Concession Term, in which case provided that:

(i) no Event of Default has occurred in relation to the Concessionaire that has not been remedied (where capable of remedy) in accordance with clause 11;

(ii) the Concessionaire has complied with all its obligations under this Agreement; and

(iii) by no later than the date that is nineteen (19) years after the Award Date the Parties have renegotiated clause 3 in order to increase the Concession Fees for such extension period by an amount satisfactory to both of the Parties, it shall expire on the date that is thirty (30) years after the Award Date; or

(c) the Concessionaire has exercised the Option Right by the Option Right Exercise End Date and notifies the ACP by no later than the date that is eighteen (18) years after the Award Date of its request for a twenty (20) year extension of the Concession Term, in which case provided that:

(i) no Event of Default has occurred in relation to the Concessionaire that has not been remedied (where capable of remedy) in accordance with clause 11;

(ii) the Concessionaire has complied with all its obligations under this Agreement; and
(iii) the ACP has consented to the Concessionaire's Expansion Program and this Agreement has be amended as contemplated in clause 2.3, it shall expire on the date that is forty (40) years after the Award Date.

2.3 Option for Expansion

The Concessionaire is hereby granted the right (the “Option Right”) to request the right, subject to the ACP's consent as provided for in this clause, to enter upon, use and occupy the Expansion Area in order to develop additional transhipment capacity at the Corozal Container Terminal through a minimum of two (2) additional berths with an overall length of at least 731 metres in order to handle two (2) million additional TEUs per year at the Coronal Container Terminal (the "Expansion Program"). If the Concessionaire wishes to exercise the Option Right, it must notify the ACP thereof (such notice an "Option Right Exercise Notice") by no later than the eighth (8th) anniversary of the Award Date (the "Option Right Exercise End Date") including in the Option Right Exercise Notice full details of the Expansion Program proposed by it. The ACP shall as soon as practicable after receipt of an Option Right Exercise Notice determine in its sole discretion whether to consent to the Concessionaire's Expansion Program or not and, if it consents thereto, this Agreement shall be amended in order to include the Expansion Area in the Concession for the Corozal Container, to take account of the Expansion Program and to modify clause 3 in order to increase the Concession Fees by an amount satisfactory to both of the Parties.

2.4 Lapse of Option Right

If by the Option Right Exercise End Date the Concessionaire has not provided an Option Right Exercise Notice, then the Concessionaire will forfeit any and all rights in relation to the Expansion Area and the ACP shall be free to grant to any person any concession or other rights (including leases) in relation to the Expansion Area and/or any other ACP lands on the Pacific side of the Panama Canal, including in connection with the construction, development, expansion and/or operation thereon of any transhipment Container terminal.

2.5 No Other Right to Extend Concession

For the avoidance of doubt, in no event shall the Concessionaire have any right or option to extend the Concession for the Corozal Container Terminal other than in accordance with clauses 2.2(b), 2.2(c) and 2.3.

3. CONCESSION FEES

3.1 Upfront Fee, Rent, Movement Fees and Revenue Share

In consideration of the grant of the Concession for the Corozal Container Terminal the Concessionaire shall, subject to clauses 3.2 and 5.11, pay to the ACP:

(a) the Upfront Fee within forty (40) days of the Award Date;

(b) rent in relation to the Concession Area (the "Concession Area Rent") equal to the sum of:
(i) the product of:
   (A) the Concession Land Area Rate; and
   (B) 694,689 (being the aggregate square meters of the land area comprised within the Concession Area); and

(ii) the product of:
   (A) fifty US Cents (US$0.50) (the "Concession Water Area Rate"); and
   (B) 79,650 (being the aggregate square meters of the water area comprised within the Concession Area),

which shall be payable from the First Operations Date in respect of each Operating Month until and including the Final Operating Month, in advance on the first day of each and every Operating Month;

(c) a monthly fee (the "Monthly Container Movements Fee") in respect of each elapsed Operating Month equal to the product of the Per Movement Fee and the Container Movements completed in that Operating Month, payable within seven (7) days of the end of that Operating Month; and

(d) an annual ancillary gross revenue share of eight per cent (8%) of the Annual Ancillary Gross Revenue in that Operating Year (the “Annual Ancillary Gross Revenue Share”) in respect of each elapsed Operating Year, payable within sixty (60) days of the end of that Operating Year (or, in the case of the Final Operating Year, on the Termination Date).

The Concessionaire shall report the number of Container Movements completed in each Operating Month and the Annual Ancillary Gross Revenue in accordance with clause 9.1 and high transparency and accountability standards.

3.2 Concession Area Rent Adjustments

The Concession Land Area Rate, the Concession Water Area Rate and the Concession Area Rent shall, save as provided in clause 6.10, be adjusted as follows:

(a) each of the Concession Land Area Rate and the Concession Water Area Rate from time to time shall be increased by three and a half per cent (3.5%) at the end of each Operating Year; and

(b) the Concession Area Rent in respect of any Operating Month that consists of fewer days than the total days in the respective calendar month (including where the First Operations Date is a day other than 1 January, or where the Termination Date is a day other than 31 December) shall be adjusted on a pro rata basis to reflect the number of days in such Operating Month.

For the avoidance of doubt in the event that a Force Majeure Event occurs and the Concessionaire is the Affected Party, the Concession Area Rent in respect of the period in
which the relevant Force Majeure Event subsists shall continue to be payable and shall not be adjusted.

3.3 **Per Movement Fee Adjustment**

The Per Movement Fee from time to time shall be increased by three US Dollars (US$3) with effect from the day after the fourth anniversary of the Award Date and with effect from each successive quinquennial period commencing thereafter until the Termination. By way of illustration only, if the First Operating Year commences on the day after the third anniversary of the Award Date, then the Per Movement Fee shall increase with effect from the commencement of the second Operating Year, the commencement of the seventh Operating Year, the commencement of the twelfth Operating Year and the commencement of the seventeenth Operating Year.

3.4 **Annual Container Movements Fees Shortfall**

In the event that the Actual Annual Container Movements Fees paid or payable during or in respect of any Operating Year are less than the Guaranteed Annual Container Movements Fees in respect of that Operating Year, the Concessionaire shall, save as provided in clause 6.10, at the same time as it is required to pay the Monthly Container Movements Fee in respect of the last Operating Month of such Operating Year in addition also pay to the ACP an amount equal to the shortfall (being the amount by which such Actual Annual Container Movements Fees are less than such Guaranteed Annual Container Movements Fees) (the "**Annual Container Movements Fees Shortfall**"). For the avoidance of doubt, in the event that the Actual Annual Container Movements Fees paid or payable during or in respect of an Operating Year exceed the Guaranteed Annual Container Movements Fees in respect of that Operating Year the ACP shall not be obliged to pay to the Concessionaire an amount equal to the excess.

4. **PRE-CONSTRUCTION**

4.1 **Concession Area Preparatory Works**

The ACP shall:

(a) complete the Concession Area Preparatory Works within forty five (45) days of the Award Date; and

(b) complete the Terminal Rail Spur Access Area Preparatory Works within eighteen (18) months of the Award Date.

4.2 **Rights to Concession Area**

As soon as reasonably practicable following completion of any Preparatory Works the ACP shall confirm the same by notice to the Concessionaire. With effect from the date specified in the notice confirming the completion of:

(a) the Concession Area Preparatory Works the Concessionaire shall have the right to enter upon, use and occupy the Concession Area to the extent required to undertake the Terminal Facilities Construction Works; and
(b) the Terminal Rail Spur Access Area Preparatory Works the Concessionaire and the Panama Canal Railway Company shall have the right to enter upon and use the Terminal Rail Spur Access Area to the extent required to undertake the Terminal Rail Spur Access Construction Works.

4.3 Terminal Rail Spur Access Right of Way

Solely for the purpose of using the Terminal Rail Spur Access the ACP grants to the Concessionaire a right of way through the Terminal Rail Spur Access Area, at no cost, until the Termination Date. The ACP shall at all times be entitled to use, and to grant rights to third parties to use, the Terminal Rail Spur Access and the Terminal Rail Spur Access Area generally.

4.4 State of Concession Area

Each of the Concession Area and the Terminal Rail Spur Access Area shall on the Concession Area Rights Date and the Terminal Rail Spur Access Area Rights Date respectively be free of occupancy but shall be subject to the ACP's ownership rights in relation thereto, and the Concessionaire agrees to accept each of the Concession Area and Terminal Rail Spur Access Area on an “as is” basis.

4.5 Specific Acknowledgments regarding the Concession Area

The Concessionaire specifically acknowledges that:

(a) it has taken all measures necessary to ascertain the nature and location of the Concession Area and the Terminal Rail Spur Access Area and has inspected the Concession Area and the Terminal Rail Spur Access Area and satisfied itself as to the nature of the climatic, hydrological and general physical conditions of the Concession Area and the Terminal Rail Spur Access Area (including the type, quality and quantity of the surface and subsurface material and any obstacles therein or thereon), and is aware of the proposed Preparatory Works and all risks, contingencies, obstacles and all other circumstances which may influence or affect the Concessionaire and its rights and obligations under or pursuant to this Agreement including but not limited to the following:

(i) the conditions relating to the transportation, disposal, handling and storage of materials;

(ii) the availability of labour, water, electric power, and the general accessibility of the Concession Area and the Terminal Rail Spur Access Area;

(iii) the conditions concerning weather, bodies of water, or any other similar physical conditions at the Concession Area and the Terminal Rail Spur Access Area;

(iv) the conformation and conditions of the terrain;

(v) the type of equipment and facilities required for and during the Terminal Construction Works and the provision of the Terminal Services; and
(vi) the terms of this Agreement including clauses 8.1, 8.2 and 8.3, and the ACP navigational rulings and restrictions described in Appendix 5;

(b) no part of the Concession Area or the Terminal Rail Spur Access Area may at any time be used by the Concessionaire or any of its Affiliates, contractors, sub-contractors, customers, agents and representatives for any purpose other than undertaking the Terminal Construction Works and providing the Terminal Services in accordance with this Agreement, and the Concessionaire shall take all measures necessary to prevent its Affiliates, contractors, sub-contractors, customers, agents and representatives from doing so; and

(c) the Concessionaire shall not have title to, or any right of ownership over, the Concession Area, the Terminal Rail Spur Access Area or the Corozal Container Terminal (or in each case any part thereof including any Terminal Equipment or any Terminal Structure), or any right to make a claim or exercise any right in relation thereto including any right to obtain a *título constitutivo de domino* in respect thereof, and nothing in this Agreement shall be deemed to imply or permit the creation of any Encumbrance over the Concession Area, the Terminal Rail Spur Access Area or the Corozal Container Terminal (or in each case any part thereof).

4.6 **Preparation of Draft Terminal Designs**

The Concessionaire shall at its own cost and risk be responsible for the preparation of:

(a) draft Intermediate Terminal Designs, which shall be submitted to the ACP for information purposes, no later than sixty (60) days after the Award Date; and

(b) draft Final Terminal Designs, which shall be submitted to the ACP for information purposes, no later than one hundred twenty (120) days after the Award Date or, if the ACP has provided a Design Discrepancies Notice in relation to the draft Intermediate Terminal Designs, one hundred eighty (180) days after the Award Date.

The Intermediate Terminal Designs and the draft Final Terminal Designs for the Terminal Road Access shall be submitted to the ACP before any Terminal Road Access Construction Works begins.

4.7 **Revision of Draft Terminal Designs**

The ACP has the right (but no obligation) within thirty (30) days of receipt of the draft Intermediate Terminal Designs or draft Final Terminal Designs to provide its comments thereon through a notification (a "**Design Discrepancies Notice**") to the Concessionaire specifying any discrepancies between the Agreed Terminal Specifications and such draft Intermediate Terminal Designs or draft Final Terminal Designs, following which the Concessionaire shall be required to revise the draft Intermediate Terminal Designs or draft Final Terminal Designs (as the case may be) to take account of the discrepancies noted in the relevant Design Discrepancies Notice and shall re-submit the same to the ACP within thirty (30) days of the date of the relevant Design Discrepancies Notice. The draft Final Terminal Designs submitted
by the Concessionaire (where relevant after all such required revisions) shall be the Final Terminal Designs for the purposes of this Agreement.

4.8 **Responsibility for Final Terminal Designs**

Notwithstanding any review of the draft Final Terminal Designs by the ACP and its comments thereon (if any), the Concessionaire shall be solely responsible for any error, defect and/or deficiency in the Final Terminal Designs, and for the technical feasibility, and operational capability and reliability of the Corozal Container Terminal. The Concessionaire shall not under any circumstances represent to any person that the ACP has accepted any responsibility for the Final Terminal Designs, or the technical feasibility, or operational capability or reliability of the Corozal Container Terminal.

4.9 **Changes to or Deviations from Final Terminal Designs**

Any change to, or deviation during any Terminal Construction Works or Terminal Road Access Construction Works from, the Final Terminal Designs must be consistent with the Agreed Terminal Specifications and must be submitted for information to the ACP.

4.10 **Interruption of Terminal Services due to Design Errors**

Save as provided in clause 6.10 in the event that:

(a) following the First Operations Date the Terminal Services are interrupted or suspended directly or indirectly as a result of any error, defect or deficiency in the Final Terminal Designs, then such interruption or suspension shall not constitute a Force Majeure Event and the relevant Concession Fees shall continue to be payable;

(b) such interruption or suspension continues for a period of more than forty (40) days, the Concessionaire shall pay to the ACP the relevant LD Amount for each elapsed day following such forty (40) days-period during which the Terminal Services remain suspended or interrupted, until the earlier of the date on which the Terminal Services resume or the Termination Date.

4.11 **Termination Right upon Prolonged Interruption**

In the event that following the First Operations Date the Terminal Services are interrupted or suspended directly or indirectly as a result of any error, defect or deficiency in the Final Terminal Designs and such interruption or suspension continues for a period of more than ninety (90) days the ACP shall be entitled to terminate this Agreement by providing a Termination Notice to the Concessionaire.

4.12 **Non-Exclusive Remedies**

The rights of the ACP under clauses 4.10 and 4.11 are without prejudice to its rights for breach of this Agreement.
4.13 **Terminal Construction Works Programmes**

The Concessionaire shall, by no later than the Concession Area Rights Date, prepare and submit to the ACP a construction works programme ("Terminal Construction Works Programme"), which shall:

(a) contain a breakdown of, and timeline for, all the material activities that shall be required in order to complete all the Terminal Construction Works by no later than the Terminal Construction Works Completion Date;

(b) indicate, and take account of, any intention of the Concessionaire to seek a Preliminary Operations Commencement Certificate in accordance with clause 6.9; and

(c) take account of, and be prepared subject to, the ACP Blasting and Dredging Programme as set out in Appendix 4 and the Panama Canal restrictions set out in Appendix 5, and all other relevant provisions of this Agreement.

4.14 **Establishment of Liaison Committee**

The Parties shall establish and maintain throughout the term of this Agreement a joint liaison committee (the "Liaison Committee"), consisting of three (3) representatives of each Party. The Liaison Committee shall meet on or around each anniversary of the Award Date, provided that any member of the Liaison Committee may on not less than seven (7) days' notice convene a meeting at any time if required.

4.15 **Functions of Liaison Committee**

The Liaison Committee's functions are to provide a mechanism for the joint review of issues relating to all aspects of the performance of this Agreement including any construction works or interface issues (including in relation to dredging and the Terminal Rail Spur Access Construction Works), and environmental and/or local community issues (including the Terminal Road Access Construction Works) that may arise during the Terminal Construction Works. The Liaison Committee shall also consult with, and provide all necessary co-operation and assistance to, the Panamanian Ministry of Works regarding the construction of the Terminal Road Access.

5. **TERMINAL CONSTRUCTION**

5.1 **ACP Capital Dredging**

The ACP shall, subject to the Concessionaire complying with its obligations in clause 5.3 in relation to the Terminal Construction Works, be responsible at its own cost and risk for the blasting and dredging required to achieve:

(a) a depth at the access channel to the Corozal Container Terminal of minus sixteen point three (-16.3) meters MLWS (with overdredging of zero point six (0.6) meters);

(b) a depth at the turning basin for the Corozal Container Terminal of minus sixteen point three (-16.3) meters MLWS (with overdredging of zero point six (0.6) meters);
(c) a depth from the east prism line till one hundred fifty five (155) meters from the centre of the navigational channel toward the shoreline, and along the length of the berths of the Terminal Facilities of minus sixteen point three (-16.3) meters MLWS (with overdredging of zero point six (0.6) meters); and

(d) a slope that will start at one hundred fifty five (155) meters from the centre of the navigational channel till two hundred (200) meters from the centre of the navigational channel,

in each case in accordance with the requirements of, and by the relevant dates specified in, the ACP Blasting and Dredging Programme and the Terminal Construction Works Programme. The ACP shall be entitled to appoint contractors to undertake all or some of the blasting and dredging required by this clause 5.1.

5.2 Supplementary ACP Dredging

If any supplementary dredging is required as a result of any delay by the Concessionaire in complying with its relevant obligations in clause 5.3, the ACP shall without prejudice to its rights against the Concessionaire under this Agreement for such delay ensure that the required supplementary dredging is undertaken as soon as practicable, subject to the payment by the Concessionaire of the actual cost incurred by the ACP in respect of such supplementary dredging, at the current commercial rates at the time that such supplementary dredging is undertaken by the ACP. The ACP will notify the Concessionaire of the commercial rates that will be charged for such supplementary dredging at least three (3) days in advance of undertaking such supplementary dredging and the manner of payment thereof to the ACP.

5.3 Concessionaire Terminal Construction Works

The Concessionaire shall within three (3) years of the Concession Area Rights Date (the "Terminal Construction Works Completion Date") complete:

(a) the Terminal Facilities Construction Works including the blasting and dredging required for the construction of berth pockets alongside the quay walls of the Terminal Facilities of seventy (70) meters width and minus eighteen (-18) meters MLWS depth (with overdredging of zero point six (0.6) meters); and

(b) the Terminal Rail Spur Access Construction Works,

in each case at its own cost and risk and in accordance with the Terminal Construction Works Programme, provided that the Concessionaire shall not be restricted from negotiating the terms and conditions of the Terminal Rail Spur Access Construction Works with the Panama Canal Railway Company.

5.4 Construction Contractors

The Concessionaire shall be entitled to appoint contractors to undertake all or some of the Terminal Construction Works (as well as the maintenance dredging pursuant to clause 7.6(b) and the construction and maintenance of dock defences pursuant to clause 7.7) on the Concessionaire's behalf, provided that all proposed contractors or sub-contractors of the
Concessionaire shall be notified in advance to the ACP. In no circumstances shall any contractor suspended or debarred from receiving contracts with ACP or any person listed in paragraph 21.5 of the RFQ be permitted to act as contractor or sub-contractor of the Concessionaire.

5.5 Contractor Terms

Where the Concessionaire appoints any contractor to undertake all or some of the Terminal Construction Works (or any maintenance dredging pursuant to clause 7.6(b), or any construction or maintenance of dock defences pursuant to clause 7.7) on the Concessionaire's behalf the Concessionaire shall procure that any contract entered into with any such contractor:

(a) includes a requirement to undertake any works in accordance with the Final Terminal Designs and all relevant provisions of this Agreement;

(b) includes a prohibition on the contractor's ability to assign its rights under any such contract or to sub-contract any of its obligations thereunder, in each case without the ACP's prior written consent;

(c) includes an undertaking on the parties thereto to retain, for the benefit of the ACP, any and all Terminal Construction Proprietary Information; and

(d) complies with clause 8.17.

5.6 Terminal Construction Works Suspension

In the event that the Contracting Officer at any time considers that any Terminal Construction Works are not being undertaken in compliance with the terms of this Agreement (including clauses 8.4 and 8.9) the ACP may by notice to the Concessionaire require the Concessionaire to immediately suspend the whole or any part of the Terminal Construction Works and to not resume the same until the Concessionaire has taken all actions required by the Contracting Officer. Any suspension of the Terminal Construction Works pursuant to this clause 5.6 shall not constitute a Force Majeure Event and for the avoidance of doubt the Concessionaire shall be responsible for all costs of any such suspension and any remobilisation.

5.7 Termination Right upon Prolonged Suspension

In the event that the Concessionaire fails to take all actions required by the Contracting Officer in accordance with clause 5.6 and as a result any suspension of any Terminal Construction Works continues for a period of more than ninety (90) days the ACP shall be entitled to terminate this Agreement by providing a Termination Notice to the Concessionaire.

5.8 Completion of Terminal Construction Works

Upon completion of the Terminal Construction Works the Concessionaire shall promptly provide to the ACP:

(a) a notice confirming that the Terminal Construction Works have been duly completed in accordance with this Agreement;
(b) "as built" drawings reflecting the Terminal Facilities and Terminal Rail Spur Access, as actually designed, engineered and constructed;

(c) an "as built" survey illustrating the layout of the Terminal Facilities and Terminal Rail Spur Access, and, where relevant, setback lines, if any, of the buildings and structures forming part of the Terminal Facilities; and

(d) a survey prepared by a Suitable Independent Surveyor, appointed and paid by the Concessionaire and approved by the ACP to verify the extent to which the Terminal Facilities and Terminal Rail Spur Access are in compliance with this Agreement (a "Completion Survey"), and, if not, what actions need to be taken by the Concessionaire to ensure compliance with this Agreement.

5.9 Operations Commencement Certificate

If the Completion Survey provides that:

(a) no actions need to be taken in respect of the Terminal Facilities, then the ACP shall within seven (7) days of receipt by the ACP of the Completion Survey issue to the Concessionaire a certificate (an "Operations Commencement Certificate") authorising the Concessionaire to commence the provision of the Terminal Services at the Terminal Facilities; or

(b) any actions need to be taken in respect of the Terminal Facilities or Terminal Rail Spur Access, then the Concessionaire shall take such actions within thirty (30) days of submission of the Completion Survey to the ACP and once such actions have been completed in accordance with the Completion Survey, the ACP shall within seven (7) days issue to the Concessionaire an Operations Commencement Certificate.

For the avoidance of doubt the issue of an Operations Commencement Certificate is save as provided for in clause 6.9 conditional on the Terminal Rail Spur Access Construction Works having been completed and the actions (if any) provided in relation thereto in the Completion Survey having been completed in accordance with such Completion Survey, and save as provided for in clause 6.10 once the ACP issues an Operations Commencement Certificate (including a Preliminary Operations Commencement Certificate) the Concessionaire shall be obliged to pay the relevant Concession Fees in accordance with clause 3.

5.10 Compensation for Delays by the Concessionaire

Other than where the delay is a direct result of a delay by the ACP in performing its relevant capital dredging obligations in accordance with clause 5.1, in the event that the Terminal Construction Works are not completed in full by the Terminal Construction Works Completion Date and/or the Concessionaire does not complete any required actions within the time period provided for in clause 5.9(b), the Concessionaire shall in each case pay to the ACP the LD Amount for each elapsed day following such relevant date or expiry of such relevant time period that the Terminal Construction Works or such actions respectively have not been completed.
5.11 **Compensation for Delays by the ACP**

In the event that the Terminal Construction Works are not completed in full by the Terminal Construction Works Completion Date as a direct result of a delay by the ACP in performing its relevant capital dredging obligations in accordance with clause 5.1 then subject to the First Operations Date having occurred (if at all) the ACP shall compensate the Concessionaire in an amount equal to the product of the relevant LD Amount and the number of days that the Terminal Construction Works were delayed as a result of such delay by the ACP. Such compensation shall be paid exclusively by way of deduction from the Monthly Container Movements Fee payable to the ACP under clause 3.1(c) until the full amount to be compensated has been deducted. For the avoidance of doubt the ACP shall not be required to compensate the Concessionaire by any other means.

5.12 **Termination Right upon Prolonged Delay**

In the event that the Terminal Construction Works are not completed in full within ninety (90) days of the Terminal Construction Works Completion Date and/or the Concessionaire does not complete any required actions within ninety (90) days of receipt of the relevant Completion Survey, the ACP shall in each case be entitled to terminate this Agreement by providing a Termination Notice to the Concessionaire.

5.13 **Non-Exclusive Remedies**

The rights of the ACP under clauses 5.10 and 5.12 are without prejudice to its rights for breach of this Agreement.

6. **TERMINAL OPERATION**

6.1 **Marine Services**

With effect from the First Operations Date:

(a) the ACP shall at is own cost and risk:

(i) provide or procure the provision of pilotage services for Eligible Container Vessels using the Corozal Container Terminal;

(ii) undertake the co-ordination and scheduling for the entry, berthing, unberthing and sailing of Eligible Container Vessels to, at or from the Corozal Container Terminal in a manner that optimizes the utilisation of the access channel and after taking account of the priority of Panama Canal transit traffic, any ongoing Terminal Construction Works, the ACP’s and the Concessionaire’s blasting and/or dredging obligations under clauses 5.1 and 7.6, and the security and operational integrity of the Panama Canal; and

(iii) provide waterside safety, and safety of water navigation in the access channel, the turning basin and the vicinity of the Corozal Container Terminal;
(b) the Concessionaire shall:

   (i) provide to the ACP all necessary information in relation to its customers and
       Eligible Container Vessels proposing to berth or unberth at or from the Corozal
       Container Terminal in order to enable the ACP to undertake the port co-
       ordination tasks mentioned in clause 6.1(a)(ii);

   (ii) provide, at no cost to the ACP, office space at the Concession Area (with water,
       electricity, sewage, air conditioners, and phone and internet lines) for any
       person assigned by the ACP to perform the port co-ordination tasks referred to
       in clause 6.1(a)(ii);

   (iii) without prejudice to clauses 3.1, 6.1 and 6.2, pay to the ACP a port co-
       ordination fee, at the commercial rates prevailing as at the First Operations
       Date; and

   (iv) subject always to clause 8.1 provide or procure (including where possible
       through the ACP) the provision of towage services to its customers.

6.2 Charges and Dues for Marine Services provided by the ACP

   All marine services provided directly by the ACP to the Eligible Container Vessels using the
   Corozal Container Terminal (including pilotage) shall accrue to and be recovered directly by
   the ACP from the shipping agency and/or shipping line. As at the Award Date the official
   charges and dues for ACP marine services are published on the following webpage:

6.3 Governmental Entities Spaces

   In compliance with Applicable Laws and Regulations the Concessionaire shall provide, at no
   cost to the ACP and/or the applicable Panamanian Governmental Entities (including those in
   charge of immigration, customs, health and any other relevant Government departments), office
   space at the Concession Area (with water, electricity, sewage, air conditioners, and phone and
   internet lines) for any persons assigned by such Panamanian Governmental Entities to perform
   their duties.

6.4 Terminal Services

   The Concessionaire shall within seven (7) days of the issue of an Operations Commencement
   Certificate (including any Preliminary Operations Commencement Certificate) commence the
   provision of Terminal Services at or through the Terminal Facilities (or the relevant completed
   part thereof) and continue the same at its own cost and risk until the Termination Date, in each
   case:

   (a) on a Common-User Basis;

   (b) in accordance with Good Industry Practice and by maintaining the Quality Standards;

   (c) twenty-four (24) hours a day, seven (7) days a week and fifty-two (52) weeks a year;
(d) without, subject to clause 6.5, any unfair or discriminatory treatment which establishes or may establish barriers to entry for shipping lines in relation to the Corozal Container Terminal;

(e) independently of any other port or terminal in the Republic of Panama including through the employment of management and other personnel and the appointment of external accountants not employed at or involved with any other port or terminal operating in the Republic of Panama; and

(f) otherwise in accordance with the terms of this Agreement (including clauses 8.1, 8.4 and 8.9).

In providing the Terminal Services the Concessionaire shall ensure that the Corozal Container Terminal is continuously available to service the needs of international shipping lines as well as the needs of the Panamanian export and import activity, and that the ACP remains at all times compliant with Applicable Laws and Regulations relating to the maritime sector and international maritime standards.

6.5 **Tariffs charged by the Concessionaire**

The Concessionaire shall, subject to clauses 6.1(b)(ii) and 6.2, be entitled to charge and collect directly from its customers, tariffs or other charges for all services provided by the Concessionaire at the Corozal Container Terminal in accordance with this Agreement and Applicable Laws and Regulations, and shall assume all costs and risk relating thereto. The Concessionaire may (if it has notified the ACP thereof in advance) provide selective tariff discounting or rebating in order to optimise its long term profitability in accordance with Good Industry Practice.

6.6 **Utilities**

The Concessionaire shall:

(a) in relation to the Terminal Construction Works and the Terminal Services, and in relation to the requirements of the users of the Corozal Container Terminal, obtain electricity from ETESA (Empresa de Transmisión Eléctrica, S.A.) and potable water from IDAAN (Instituto de Acueductos y Alcantarillados Nacionales); and

(b) be responsible for connecting and disconnecting the Eligible Container Vessel berthed at the Corozal Container Terminal to the relevant utility outlets, metering the quantity provided to the Eligible Container Vessels and invoicing the relevant shipping line or agency in relation to the provision of electricity and water, and the handling services provided.

6.7 **Vessel Bunkering**

The Concessionaire shall be entitled to provide bunker fuel to the users of the Corozal Container Terminal as an Ancillary Terminal Service, provided that:
(a) the only permitted way to provide such services shall be through land pipe lines built under the berths of the Corozal Container Terminal and connected to ACP bunkering installations (and for the avoidance of doubt no fuel barges shall be allowed); and

(b) the ACP shall (unless it notifies the Concessionaire otherwise) have the exclusive right to provide such bunker fuel and shall invoice the relevant shipping lines or agencies directly in relation to the bunker fuel provided to the relevant Eligible Container Vessels.

The Concessionaire shall notify the ACP if it intends to provide bunker fuel to the users of the Corozal Container Terminal so that the Parties can coordinate and identify all the actions required for such purposes.

6.8 Coordination Role of the ACP

Without prejudice to any Panamanian Governmental Entity having power under any Applicable Laws and Regulations to regulate any activity in the Concession Area, the Parties agree that the ACP will coordinate with any and all Panamanian Governmental Entities in respect of any Applicable Permits, regulatory inspections (including any boarding authorization to an Eligible Container Vessels) and/or investigations or other enquires as required by the Concessionaire for the provision of any Terminal Services. The Concessionaire shall liaise exclusively with the ACP in respect of any such matter, other than in relation to the supply of electricity and potable water under clause 6.6(a).

6.9 Preliminary Operations Commencement Certificate

The ACP hereby grants to the Concessionaire the exceptional right to request a preliminary Operations Commencement Certificate in respect of the provision of the Terminal Services at the Terminal Facilities (the "Preliminary Operations Commencement Certificate") on any day in the period between the Concession Area Rights Date and the Operations Commencement Date (the "Temporary Operation Period") which the ACP shall provide to the Concessionaire provided that:

(a) the Concessionaire has completed the construction of at least two (2) of the three (3) berths described in the Agreed Terminal Specifications at the Terminal Facilities, as well as the appropriate Container yard; and

(b) the Completion Survey for that part of the Terminal Facilities, which shall be submitted by the Concessionaire to the ACP in accordance with the provisions of clause 5.8 (which shall apply mutatis mutandis), indicates that no actions are required to be taken by the Concessionaire or, if such Completion Survey indicates that any actions are required to be taken, such actions have been duly completed by the Concessionaire.

For the avoidance of doubt, the issue of a Preliminary Operations Commencement Certificate shall not in any way release the Concessionaire from the obligation to complete the Terminal Construction Works in full in accordance with clause 5.3 and provide the Terminal Services at the fully completed Terminal Facilities with effect from the Operations Commencement Date.
6.10 **Temporary Operation Period**

In the event that the Concessionaire obtains a Preliminary Operations Commencement Certificate:

(a) there shall be no adjustment to the Concession Land Area Rate or the Concession Water Area Rate under clause 3.2(a) during the Temporary Operation Period;

(b) no Annual Container Movements Fees Shortfall shall be payable under clause 3.4 during the Temporary Operation Period;

(c) no LD Amount shall be payable in relation to the circumstances set out in clause 4.10(b) during the Temporary Operation Period; and

(d) no Terminal Operations Performance Guarantee shall be required under clause 12.3 until the Operations Commencement Date.

7. **TERMINAL MAINTENANCE**

7.1 **Maintenance of Terminal**

The Concessionaire shall at its own cost and risk ensure that at all times its maintenance and operating procedures and activities (including those set out in the Concession Maintenance Plan) are carried out in a manner that ensures that:

(a) the Corozal Container Terminal (including all the Terminal Structures and all the Terminal Equipment) is maintained, repaired, restored, replaced and/or supplemented to optimise the provision of the Terminal Services in an uninterrupted manner;

(b) all the Terminal Structures and the Terminal Equipment achieve their respective full design lives;

(c) the Corozal Container Terminal (including all the Terminal Structures and all the Terminal Equipment) is or can be handed over to the ACP on the Termination Date in a condition complying with the Handover Condition; and

(d) all recommendations and/or requirements of any contractor or manufacturer warranties and/or guarantees are complied with and, to the extent not conflicting with the foregoing, the Concessionaire complies with Good Industry Practice,

(together, the "Maintenance Requirements").

7.2 **Concession Maintenance Plan**

The Concessionaire shall prepare a maintenance program for the entire Concession Term (the "Concession Maintenance Plan") in compliance with the terms of this Agreement including the Maintenance Requirements. The Concession Maintenance Plan shall be submitted to the ACP within sixty (60) days of the First Operations Date. The Concession Maintenance Plan shall include:
(a) a preventative maintenance and lifecycle schedule;
(b) arrangements and procedures for carrying out reactive repairs;
(c) criteria to be adopted for deciding maintenance needs;
(d) intervals and procedures for carrying out inspections at the Corozal Container Terminal including underwater inspections of elements of the Concession Area;
(e) intervals at which the Concessionaire shall carry out routine maintenance;
(f) arrangements and procedures for carrying out safety related measures;
(g) a copy of all the operation and technical manuals, and maintenance plans of any Terminal Equipment with a value of more than two hundred fifty thousand US Dollars (US$250,000.00); and
(h) intervals for maintenance works of more than one hundred thousand US Dollars (US$100,000.00) and the scope thereof,

provided that the Concessionaire shall be required to update the Concession Maintenance Plan every five (5) years during the Concession Term.

7.3 Annual Maintenance Report

The Concessionaire shall prepare an annual maintenance report for each Operating Year (an "Annual Maintenance Report") in compliance with the terms of this Agreement including the Maintenance Requirements. The Annual Maintenance Report shall be submitted to the ACP no later than sixty (60) days after the end of each Operating Year. Each Annual Maintenance Report shall include:

(a) details of the maintenance arrangements and procedures carried out during the relevant Operating Year; and
(b) the amount expended in the execution of the relevant Concession Maintenance Plan during the relevant Operating Year.

7.4 Maintenance Surveys

If the ACP at any time believes that the Concessionaire is in breach of the Maintenance Requirements then it may procure, at its own cost, the carrying out of a survey of the Corozal Container Terminal by a Suitable Independent Surveyor (a "Maintenance Survey") to assess whether the Corozal Container Terminal has been and is being maintained by the Concessionaire in accordance with the Maintenance Requirements and the Concession Maintenance Plan. If the Maintenance Survey shows that the Concessionaire has not complied or is not complying with the Maintenance Requirements and/or the Concession Maintenance Plan, the ACP shall by notice to the Concessionaire provide a copy of the Maintenance Survey report which shall set out the actions (if any) to be taken to comply with the Maintenance Requirements and/or the Concession Maintenance Plan and the period within which the Concessionaire must take such actions (if any).
7.5 **Remedial Actions**

The Concessionaire shall take the actions (if any) set out in any Maintenance Survey report within the period specified in the relevant report and any costs it incurs in taking actions shall be at its own expense. The ACP shall be entitled to inspect the Corozal Container Terminal to verify (including through an additional Maintenance Survey) that the required actions have been completed in accordance with the Maintenance Requirements and/or the Concession Maintenance Plan, and the relevant Maintenance Survey report. In the event that the Concessionaire fails to take any actions set out in any Maintenance Survey report and/or fails to take such actions within the time set out in any such report, then the ACP may without prejudice to its rights under this Agreement rely on clause 9.6.

7.6 **Maintenance Dredging**

With effect from the First Operations Date:

(a) the ACP shall at its own cost and risk maintain the depth at the access channel and the turning basin in accordance with clause 5.1 so that Eligible Container Vessels can safely berth and unberth at or from the Corozal Container Terminal; and

(b) the Concessionaire shall at its own cost and risk maintain each berth pocket completed by the Concessionaire alongside the quay wall of the Terminal Facilities,

provided that all maintenance dredging to be carried out by or on behalf of the Concessionaire shall be subject to the prior co-ordination with the ACP in accordance with clause 8.1 and to the directions of the ACP as to the disposal site for the dredged material.

7.7 **Dock Defences**

With effect from the date of issue of an Operations Commencement Certificate (including any Preliminary Operations Commencement Certificate) the Concessionaire shall at its own cost and risk, subject always to clause 8.1, as soon as practicable construct and maintain dock defences for Eligible Container Vessels, taking account of the Pacific Ocean tide variations. The Concessionaire must submit the design and specifications of the dock defences for approval by the ACP. If after their construction such dock defences are not in accordance with the design and/or specifications approved by the ACP or they were wrongly constructed, the Concessionaire shall promptly, following notification thereof by the ACP, replace them or take any necessary actions that may be requested by the ACP.

8. **CONTINUING OBLIGATIONS**

8.1 **Supremacy of Canal Operations**

The Concessionaire acknowledges and agrees that notwithstanding anything to the contrary in the Contract:

(a) the ACP has exclusive control of and regulates any and all navigation of vessels in the Panama Canal (whose waterway abuts the berths forming part of the Corozal Container Terminal), including the exclusive right to determine the priority of, and to halt, any
movement or transit of any vessel (including dredgers and other port construction vessels, and Eligible Container Vessels) in or through all or any part of the Panama Canal;

(b) the vessel related activities of the Concessionaire and its contractors in or by the Panama Canal (including in relation to the Terminal Construction Works and the maintenance dredging under clause 7.6(b) shall in accordance with clause 8.1(a) be subject to the vessel movement coordination, and the assignment of pilots, by the ACP;

(c) the Panama Canal’s operations and its maintenance, modernization and expansion or other development may include dredging, drilling and/or blasting which may impact any Terminal Construction Works and/or Terminal Services, and accordingly the Concessionaire shall take all safety measures necessary to avoid being affected by them;

(d) any present or future maritime operations of the ACP in the Panama Canal including any dredging, drilling or blasting shall have priority over the Concessionaire's and its contractors' and sub-contractors' activities;

(e) the Concessionaire shall assume and not seek to hold liable the ACP, its contractors, the Republic of Panama or the owner or charterer of any vessel transiting the Panama Canal for any Losses suffered or incurred by the Concessionaire or its Affiliates, contractors or customers due to suction, waves, wakes and/or any other effect caused by any vessel transiting the Panama Canal or any spills caused by any such vessels;

(f) no installation, alteration or removal of any lighting (including construction lighting and navigational aids containing lights), and no use of telecommunication devices, on or around the Concession Area, by or on behalf of the Concessionaire or its Affiliates, contractors, sub-contractors or customers shall be permitted without the prior approval of the ACP and if, following any such approval, any such lighting or telecommunication device interferes or is likely to interfere with the security or operational integrity of the Panama Canal or its operation generally the Concessionaire shall promptly following notification thereof by the ACP make any necessary changes or take any necessary actions as may be requested by the ACP; and

(g) the Concessionaire shall at all times comply with the Panama Canal restrictions set out in Appendix 5.

8.2 ACP Approval for Relocations

In undertaking any Terminal Construction Works or providing any Terminal Services the Concessionaire shall:

(a) protect from any damage all the infrastructure, superstructures and equipment existing at or on the Concession Area, its surroundings, and properties of third parties adjacent or close to the Concession Area, and if any such infrastructure, superstructures or equipment need to be relocated, demolished or removed for the purposes of undertaking the Terminal Construction Works and/or providing the Terminal Services
in accordance with this Agreement, the Concessionaire shall seek the prior written approval of the ACP to do so; and

(b) promptly repair at its cost, any damage caused by it to such infrastructure, superstructures and equipment, whether belonging to the ACP or third parties,

provided that if any such damage occurs, the ACP shall have the right to undertake any repairs or replacements required and, at its sole determination, to charge any Losses suffered or incurred thereby to the Concessionaire.

8.3 ACP Navigational Installations

The ACP shall have the right throughout the term of this Agreement to install inside the Concession Area, whenever it requires the same, towers, signals or lights (including power supply lines or underground telecommunications infrastructure) required for navigation through the Panama Canal. In the event that the ACP is to undertake any such installations, the Concessionaire shall give the ACP and its contractors unrestricted access to the Concession Area for the purpose of undertaking such installations and thereafter to maintain and repair such installations. The Concessionaire shall not be entitled to any discount on the rents or other amounts payable to the ACP under clause 3.1 as a result of any of the foregoing.

8.4 Compliance with Applicable Laws and Regulations

The Concessionaire shall:

(a) subject to clause 6.8 obtain all Applicable Permits required for:

(i) undertaking the Terminal Construction Works other than any permit from the Municipality of the District of Panama which will not be required given that under the Constitution of the Republic of Panama the ACP is subject to:

(A) Title XIV of the Constitution;
(B) the general laws (Law 19 of 1997) which implement Title XIV of the Constitution; and
(C) the regulations issued by the Board of Directors of the ACP in order to regulate the general laws,

and therefore the Terminal Construction Works shall not require any construction permits from any other public entities; and

(ii) providing the Terminal Services,

provided that the ACP shall use its best endeavours to support the Concessionaire in obtaining such Applicable Permits; and

(b) at all times comply with all Applicable Laws and Regulations and Applicable Permits in relation to the Terminal Construction Works and Terminal Services and procure that its Permitted Affiliates, employees, officers, directors, contractors, sub-contractors and
agents (and its Permitted Affiliates' employees, officers, directors, contractors, sub-contractors and agents) comply with all Applicable Laws and Regulations and Applicable Permits accordingly.

8.5 **Corrupt Practices and Ethics**

Without prejudice to the generality of clause 8.4 the Concessionaire agrees, confirms and undertakes that:

(a) it has not and will not, and none of its Permitted Affiliates, employees, officers, directors, contractors, sub-contractors and agents (and its Permitted Affiliates' employees, officers, directors, contractors, sub-contractors and agents) has or will, directly or indirectly, pay, give, deliver, receive or agree (or undertake to pay, give, deliver, receive or agree) any bribe, pay-off, kick-back, gift, gratuity, commission, amount or other thing of value, or any interest-free loans, contributions or donations, in any way or form and whether in local or foreign currency, in the Republic of Panama or any other place where such conduct relates to this Agreement, in each case in violation of any Applicable Laws and Regulations including any applicable anti-corruption legislation or similar legislation of the Republic of Panama to any person including any government officials or employees, political parties, political party officials or political candidates or third persons with influence over government officials or employees; and

(b) it has and shall maintain in place an ethics or compliance program which implements internal procedures to prevent and detect violations of Applicable Laws and Regulations, and to promote ethical behaviour by and within the Concessionaire's and its Permitted Affiliates' organisation and business.

8.6 **Concessionaire Organogram**

The Concessionaire shall:

(a) promptly following the Award Date provide to the ACP an organogram showing the actual or proposed organisational structure of the Concessionaire, and the relationship between the different named individuals, the departments / divisions and the jobs at the different hierarchical levels within the Concessionaire's organisation; and

(b) in the event of any changes to any of the foregoing prior to the Termination Date, provide within seven (7) days of such changes to the ACP an updated organogram.

8.7 **Marketing Efforts**

The Concessionaire shall at all times seek to undertake marketing and related activities in order to ensure global awareness of the Corozal Container Terminal and its facilities, availability and resources, and to promote usage of the Corozal Container Terminal by shipping and other companies. No later than thirty (30) days prior to the First Operations Date the Concessionaire shall prepare and deliver to the ACP a detailed strategic marketing plan for the Corozal Container Terminal, and shall update such strategic marketing plan in respect of each Operating
Year commencing after the First Operations Date and deliver the same to the ACP no later than sixty (60) days prior to each such Operating Year.

8.8 Concessionaire Personnel and Indemnity

The Concessionaire shall employ and maintain a workforce that is sufficient in number and qualification to enable the Concessionaire to duly and timely fulfil all its obligations under this Agreement. Without prejudice to the generality of the foregoing the Concessionaire shall:

(a) adopt, have properly approved, and continuously implement appropriate policies relating to staff recruitment, training, working regulations, practices and conditions, remuneration and other employment and human capital management matters and procedures consistent with Good Industry Practice;

(b) take appropriate measures to ensure that its staff is familiarised with the Concessionaire's obligations under this Agreement; and

(c) establish and maintain a non-discriminatory, safe, efficient, and modern working environment at the Corozal Container Terminal.

The Concessionaire shall indemnify the ACP from any Losses suffered or incurred as a result of any claims brought by the Concessionaire's or any Permitted Affiliate's current or former contractors, sub-contractors, directors, officers, employees or agents (or such contractors', Permitted Affiliates’ or sub-contractors’ employees or representatives), or by any current or former labour unions seeking to represent the Concessionaire's or its contractors' employees.

8.9 Environment and Community Engagement

The Concessionaire shall:

(a) when undertaking any Terminal Construction Works or providing any Terminal Services comply with or maintain the Environmental Standards, and submit all applicable reports and take all mitigation measures required by the EIS;

(b) within five (5) years of the First Operations Date use its best efforts to obtain a "Green Certification" applicable to the operations of Ports or similar document, issued by a recognized international entity, and shall submit regularly to the ACP evidence that such certification remains valid throughout the Concession Term;

(c) with effect from the Concession Area Rights Date and not later than five (5) years from the Concession Area Rights Date, complete the construction of one overpass providing access from the Avenida Omar Torrijos Herrera to the Concession Area near to Altos de Jesus community (Diablo Heights) which forms part of the Terminal Road Access and complements the u-turn facility which forms part of the Terminal Road Access Works, and not later than five (5) years from the date in which ACP grants the Option Right to expand the Concession Area, complete the construction of a second overpass forming part of the Terminal Road Access; and
with effect from the Concession Area Rights Date establish a social fund (the "Social Fund") for the purpose of funding projects for the benefit of the communities surrounding the Concession Area as set out in Appendix 6, provided that the ACP shall determine what projects all or part of the Social Fund shall be used for and on the Termination Date the benefit of the Social Fund shall be transferred to the ACP or its nominee.

The ACP shall at all times strictly monitor the Concessionaire's compliance with all its environmental and community obligations under this Agreement including the EIS and the Agreed Terminal Specifications (and Final Terminal Designs once prepared).

8.10 Obligatory Insurance Policies

The Concessionaire shall:

(a) at its own cost and risk purchase through Approved Insurers the relevant Obligatory Insurance Policies in respect of:

(i) the Concession Area, the Terminal Facilities Construction Works, the Terminal Rail Spur Access Area and the Terminal Rail Spur Access Construction Works by no later than the Concession Area Rights Date; and

(ii) the Terminal Facilities, the Terminal Services to be provided at the Terminal Facilities, and the Terminal Rail Spur Access and its use by no later than the First Operations Date;

(b) provide evidence to the ACP of the Obligatory Insurance Policies purchased, provided that if the Concessionaire fails to purchase and maintain any Obligatory Insurance Policy (or if it fails to purchase the same up to the required sum or if any insurance company that has issued an Obligatory Insurance Policy to the Concessionaire ceases to be an Approved Insurer) the ACP may, in its sole and absolute discretion, purchase and maintain (or top up) such Obligatory Insurance Policy and the Concessionaire shall on demand indemnify the ACP for all Losses suffered or incurred thereby;

(c) punctually pay the premium payable on each Obligatory Insurance Policy so as to keep the Obligatory Insurance Policies in force and valid until the Termination Date and not do anything which could make any of the Obligatory Insurance Policies void or voidable or entitle any Approved Insurer to terminate or refuse to pay under any of the Obligatory Insurance Policies; and

(d) apply all moneys received under any Obligatory Insurance Policy towards the repair, renovation, restoration or substitution of the Corozal Container Terminal (or parts thereof) which may have been damaged or destroyed.

8.11 Additional Insurance Terms

All Obligatory Insurance Policies shall:

(a) include the ACP as a co-insured party;
(b) include a waiver of any right of subrogation of the insurers thereunder against, amongst others, the ACP and its assigns and successors and its and their respective Affiliates, employees officers and directors of any right of the insurers to any set-off or counterclaim or any other deduction, whether by attachment or otherwise, in respect of any liability of any such person insured under any Obligatory Insurance Policy or in any way connected with any loss, liability or obligation covered by the Obligatory Insurance Policies; and

(c) include non-vitiation protection in respect of any claim made by the ACP as co-insured.

8.12 Insurer Rating Downgrade

In the event that any insurance company that has issued an Obligatory Insurance Policy ceases to be an Approved Insurer (whether as a result of a rating downgrade or otherwise) the Concessionaire shall, without the need for any notice from the ACP, obtain within ninety (90) days of such occurrence a replacement Obligatory Insurance Policy issued by an Approved Insurer, provided that if the Concessionaire is unable to procure such a replacement Obligatory Insurance Policy within such ninety (90)-day period then the Concessionaire shall be entitled to an extension of such time period subject to submitting to the ACP:

(a) a written request for such an extension:

(i) stating a reasonable period of time for such extension (which may not be longer than an additional ninety (90) days beyond the end of the ninety (90)-day period referred to above); and

(ii) stating that the Concessionaire reasonably believes that it will be able to obtain such replacement Obligatory Insurance Policy within such extension period; and

(b) evidence necessary to establish to the satisfaction of the ACP that the Concessionaire has used and is continuing to use its best efforts to obtain such replacement Obligatory Insurance Policy and that such replacement Obligatory Insurance Policy can be obtained within such extension period.

8.13 Compensation for Replacement Insurance Delays

If the Concessionaire fails to provide any replacement Obligatory Insurance Policy prior to the expiry of the initial ninety (90)-day period provided for in clause 8.12 or, if applicable, the extension period referred to in clause 8.12 it shall without prejudice to the ACP’s rights (including the right to procure the issue of an Obligatory Insurance Policy under clause 8.10(b)) in each case pay to the ACP an amount equal to the relevant LD Amount for each elapsed day after such expiry until the Concessionaire provides the relevant replacement Obligatory Insurance Policy issued by an Approved Insurer.

8.14 Safety and Security

The Concessionaire shall within sixty (60) days of the Award Date prepare and deliver to the ACP a detailed proposal in relation to the safety and security arrangements for the protection
of the Concession Area, the Terminal Rail Spur Access Area and the Corozal Container Terminal, including from damage (including damage by fire), unauthorised access or theft, and the protection of persons from bodily harm. Such safety and security arrangements must:

(a) include the installation of fencing or other barriers, closed-circuit television cameras or other appropriate surveillance methods, and the use and employment of suitably trained and equipped personnel to prevent and manage security breaches and other emergencies including fire combating (and the Concessionaire shall keep a record of the training provided to such personnel from time to time);

(b) contemplate ownership, or unfettered right of use, by the Concessionaire of all necessary equipment and facilities to enable the Concessionaire to respond to any emergency including damage (including damage by fire) or theft at the Corozal Container Terminal, and bodily harm to any person at the Corozal Container Terminal;

(c) comply with Applicable Laws and Regulations including the ACP’s safety and security regulations from time to time, and not in any way interfere with or adversely affect the Panama Canal operations (together the “Safety and Security Requirements”); and

(d) include a detailed safety management plan to implement, control, monitor and review compliance with the Safety and Security Requirements.

The ACP shall within fourteen (14) days of receipt of the safety and security arrangements proposal from the Concessionaire review the same to ensure it complies with clauses 8.12(a) to 8.12(c) and notify the Concessionaire of any changes it requires thereto. The Concessionaire shall implement and maintain the safety and security arrangements (as so approved or amended), with effect from the Concession Area Rights Date, at the Concession Area and, with effect from the Terminal Rail Spur Access Area Rights Date, at the Terminal Rail Spur Access Area, in each case subject to any (further) changes required by the ACP or any other Governmental Entity from time to time to ensure that the arrangements at all times comply with the Safety and Security Requirements.

8.15 Registry of Access Incidents

Concessionaire shall at all times keep a registry of:

(a) all the persons who access or have the right to access the Concession Area; and

(b) safety or security incidents occurring at the Concession Area and/or the Terminal Rail Spur Access Area including any damage (including by fire) to any part of the Terminal Facilities and/or the Terminal Rail Spur Access, and any unauthorised access or theft, or any bodily harm to persons, to or at the Concession Area and/or the Terminal Rail Spur Access Area,

and shall permit the Panamanian Police, the Panamanian Public Security Council and any other Panamanian National Defence Authority to inspect such registry when required.
8.16 Financial Year and Accounting Records

The Concessionaire shall:

(a) ensure that each of its financial years and those of its Permitted Affiliates (if any) for accounting purposes ends on the Accounting Date;

(b) at all times keep at its principal office in Panama proper Accounting Records in accordance with the requirements of this Agreement and all Applicable Laws and Regulations and IFRS, including in relation to all transactions relating to the Terminal Services, and procure that its Permitted Affiliates (if any) keep at their respective principal offices proper Accounting Records in accordance with the requirements of this Agreement and all Applicable Laws and Regulations and IFRS;

(c) without prejudice to the requirements of Applicable Laws and Regulations in relation to the retention of records, ensure that all Accounting Records of the Concessionaire and its Permitted Affiliates (if any) retained by the Concessionaire and its Permitted Affiliates (if any) throughout the Concession Term; and

(d) ensure that each of its financial statements, and each of the financial statements of its Permitted Affiliates (if any), account separately for the Corozal Container Terminal and (where relevant) for any other port or terminal operated or other business conducted by the Concessionaire and/or its Permitted Affiliates (if any), or in which the Concessionaire or its Permitted Affiliates (if any) have an interest, and are audited by a Suitable Accountant.

8.17 Transferable Terminal Contracts

The Concessionaire shall ensure that all Terminal Contracts (including for the avoidance of doubt all Obligatory Insurance Policies and all contracts entered into with contractors) contain a right to transfer the benefit and the burden of such Terminal Contracts to the ACP or its nominee for nominal or no consideration.

9. ACP MONITORING, ACCESS AND STEP-IN RIGHTS

9.1 Reporting Requirements

The Concessionaire shall:

(a) whilst any Terminal Construction Works are being undertaken, within seven (7) days of each elapsed calendar month deliver to the ACP a report containing details of:

(i) the progress of the Terminal Construction Works as against the Terminal Construction Works Programme, including any anticipated delay in achieving any milestones in the Terminal Construction Works Programme, and an update on the Terminal Road Access Construction Works;

(ii) the Concessionaire's compliance with the EIS and Environmental Standards in undertaking any Terminal Construction Works, any material breach of the EIS
or any Environmental Standards by the Concessionaire or any of its contractors, and any other material environmental issues that have occurred or arisen during such elapsed calendar month;

(iii) any damage (including damage by fire) to any Terminal Structures Terminal Equipment or Terminal Rail Spur Access, and any unauthorised access or theft, or any bodily harm to persons, to or at the Concession Area and/or the Terminal Rail Spur Access Area during such elapsed calendar month; and

(iv) any other information which the Concessionaire believes the ACP should be aware of in relation to the Corozal Container Terminal and any Terminal Construction Works, and an update on any of the issues referred to above in this clause 9.1(a) that were reported on in any previous report;

(b) whilst any Terminal Services are being provided, within seven (7) days of each elapsed Operating Month deliver to the ACP a report containing details of:

(i) the Container Movements completed in that elapsed Operating Month and the aggregate gross revenue of the Concessionaire and its Permitted Affiliates (if any) from Ancillary Terminal Services as at the end of such elapsed Operating Month;

(ii) the average berth occupancy of the operating berths at the Corozal Container Terminal during such elapsed Operating Month;

(iii) compliance with the EIS and Environmental Standards in providing the Terminal Services, any material breach of the EIS or any Environmental Standards, and any other material environmental issues that have occurred or arisen during such elapsed Operating Month;

(iv) any accidents or other incidents involving material damage or material injury that have occurred at the Corozal Container Terminal during such elapsed Operating Month;

(v) any material marketing initiatives that the Concessionaire is considering in relation to the Corozal Container Terminal;

(vi) any other information which the Concessionaire believes the ACP should be aware of in relation to the Corozal Container Terminal or the Terminal Services, and any update on any of the issues referred to above in this clause 9.1(b) that were reported on in any previous report;

(c) whilst any Terminal Services are being provided, within ninety (90) days of each elapsed Operating Year deliver to the ACP the following:

(i) the audited financial statements of the Concessionaire for that elapsed Operating Year and the audited financial statements of its Permitted Affiliates (if any) for that elapsed Operating Year showing, amongst other things, the Annual Ancillary Gross Revenue for that elapsed Operating Year;
(ii) a certificate issued by a Suitable Accountant confirming that the Monthly Container Movements Fees that were paid by the Concessionaire on the basis of the Container Movements reported on a monthly basis in respect of such elapsed Operating Year and that the Annual Ancillary Gross Revenue Share reported by the Concessionaire at the end of such elapsed Operating Year represent the true and accurate Monthly Container Movements Fees for such Operating Year and the true and accurate Annual Ancillary Gross Revenue for such Operating Year;

(iii) a report containing details of any regular replacements or repairs to be undertaken in accordance with the Maintenance Requirements and any material damage to or defect or disrepair at the Corozal Container Terminal that has occurred or arisen during such elapsed Operating Year and the action which the Concessionaire took in order to remedy such material damage, defect or disrepair; and

(iv) a report containing details of the number of employees of the Concessionaire and its Permitted Affiliates (if any) during that elapsed Operating Year.

Each of the reports referred to in this clause 9.1 shall be issued and signed by a legal representative of the Concessionaire having the rights under the laws of incorporation of the Concessionaire to represent the Concessionaire, save that the report on the monthly Container Movements under clause 9.1(b)(i) shall be issued and signed by the Chief Financial Officer of the Concessionaire.

9.2 Observer Appointment Right

With effect from the Concession Area Rights Date the ACP shall be entitled (but not obliged) from time to time by notice to the Concessionaire to appoint, and remove from, the Board an observer (who may or may not be an officer, executive or any employee of the ACP) (an "Observer").

9.3 Rights of Observer

The Observer shall have the same rights as all the directors on the Board including the right to attend and receive notice of any meeting of the Board (other than a Conflict Matter Meeting) together with an agenda specifying in reasonable detail the matters to be raised at the meeting and copies of any papers to be discussed at the meeting but the Observer shall not be permitted to vote on any matter to be resolved by the Board. If the Board delegates any or all of its powers or duties to a committee of the Board, the Observer shall have the right to receive notice of and attend meetings of any such committee (other than any Conflict Matter Meeting) as if such meetings were meetings of the Board.

9.4 Conflict Matters

If a matter to be considered or voted upon at a Board meeting or a meeting of a committee of the Board relates to:
(a) the Concessionaire enforcing rights under or taking any action against the ACP in relation to the Contract; or

(b) the Concessionaire defending itself against any action taken by the ACP,

then that matter (a "Conflict Matter") shall be considered at a separate meeting or meetings of the Board or committee of the Board (as the case may be) (each a "Conflict Matter Meeting") and the Observer shall not be entitled to receive notice of or attend any such meeting or meetings (or otherwise receive any advice provided to the Concessionaire on the Conflict Matter). For the avoidance of doubt, no matter other than a Conflict Matter may be considered at the relevant Conflict Matter Meeting and if in breach of this provision a matter other than a Conflict Matter is considered at a Conflict Matter Meeting the Concessionaire shall without prejudice to the ACP's other rights for breach of this Agreement promptly provide to the Observer a copy of the minutes of such Conflict Matter Meeting (with any references to the Conflict Matter redacted) and of any documents considered at such Conflict Matter Meeting other than any documents relating exclusively to the Conflict Matter.

9.5 General Monitoring and Audit Rights

The ACP and its representatives (and for the avoidance of doubt the Inspector General) including the Observer shall have the right at any time, to monitor the Terminal Construction Works, the Terminal Services, the Concessionaire's maintenance activities at the Corozal Container Terminal, and the Accounting Records of the Concessionaire and its Permitted Affiliates to determine whether the Concessionaire is in compliance with its obligations under this Agreement including and verifying that any of the amounts payable under clause 3 (including the Monthly Container Movements Fee and the Annual Ancillary Gross Revenue Share) are correct. For avoidance of doubt, such audit right includes unlimited access to the financial and cost system of the Concessionaire and its Permitted Affiliates. Without prejudice to any other access or information rights of the ACP under this Agreement the Concessionaire shall for these purposes:

(a) permit the ACP and its representatives to access the Concession Area upon twenty four (24) hours' notice; and

(b) supply the ACP and its representatives with all such information (including copies of the Accounting Records to be kept in accordance with clause 8.16) and access to personnel of the Concessionaire and its Permitted Affiliates (if any) as the ACP may reasonably request from time to time.

The Concessionaire acknowledges that whilst the ACP may decide not to monitor all or any part of the Terminal Construction Works, Terminal Services and/or maintenance activities, and/or access the Concession Area, this shall not be deemed to constitute any approval by the ACP or any other person of such works, operations or activities, or a waiver of any of the rights of the ACP under this Agreement, or release or discharge the Concessionaire from its obligations or liabilities under this Agreement.
9.6 **Emergency Access and Step-in Right**

Notwithstanding anything to the contrary in this Agreement:

(a) the ACP and its representatives may at any time, without giving notice to the Concessionaire and without having to follow any administrative or other procedure whatsoever, access and remain on the Concession Area in the event that, and for so long as, the ACP in its sole and absolute discretion considers that there is a Canal Risk; or

(b) in the event that:

(i) the Concessionaire has breached any obligations under this Agreement, and the ACP has requested in writing that the Concessionaire remedy the breach within a period of thirty (30) days and the Concessionaire has refused to do so or did not fully remedy the breach after the lapse of such time period to the satisfaction of the ACP; or

(ii) the ACP believes that the Concessionaire will not meet its obligations under this Agreement on time or at all, the ACP has requested in writing that the Concessionaire provide a detailed remediation plan within a period of thirty (30) days showing that the obligations in question will be met on time and the Concessionaire has refused to do so or did not provide a remediation plan after the lapse of such period,

the ACP shall have the immediate right (the "**Step-in Right**") without having to follow any administrative or other procedure whatsoever to suspend the Concessionaire's rights under clause 2.1, intervene in, and/or interrupt or restrict the use of, the Terminal Construction Works, the Terminal Services, the maintenance of the Terminal Structures and/or the Terminal Equipment, and/or the Corozal Container Terminal generally, and/or undertake all required actions itself or through third parties (including undertaking all or part of the Terminal Construction Works, providing all or part of the Terminal Services or maintaining all or some of the Terminal Structures and/or the Terminal Equipment).

9.7 **Assistance and Compensation for Step-in, No Limit on Statutory Rights**

In the event that the ACP exercises the Step-in Right:

(a) the Concessionaire shall be required to fully cooperate with the ACP and any relevant third party;

(b) the ACP shall not be liable for any Losses suffered or incurred by the Concessionaire or its Permitted Affiliates (if any), employees, officers, directors, contractors, sub-contractors and agents, as a consequence of such exercise;

(c) the Concessionaire shall indemnify the ACP for any Losses suffered or incurred by the ACP from such exercise; and
such exercise shall be without prejudice to any other rights of the ACP under this Agreement, and any statutory Step-in Right (or similar) available to the ACP shall in no way be affected or limited thereby.

10. FORCE MAJEURE AND GOVERNMENTAL ACTION

10.1 Obligations in relation to Force Majeure Event

If a Party is prevented, hindered or delayed in or from performing any of its obligations under this Agreement as a result of a Force Majeure Event (such Party, the "Affected Party") it shall:

(a) as soon as reasonably practicable after the start of the alleged Force Majeure Event (but in any event no later than seven (7) days from its start) notify the other Party of the Force Majeure Event, the date on which it started, its likely or potential duration, the effect of the Force Majeure Event on its ability to perform any of its obligations under this Agreement and the measures that it proposes to take in accordance with clause 10.1(b) to mitigate the effect of the Force Majeure Event on the performance of its obligations;

(b) use all reasonable endeavours to mitigate the effect of the Force Majeure Event on the performance of its obligations under this Agreement and to resume as soon as possible all or part (as the case may be) of the performance of its obligations under this Agreement; and

(c) for so long as it is affected by a Force Majeure Event provide to the other Party weekly reports providing any updates on the matters notified to the other Party pursuant to clause 10.1(a).

10.2 Effect of Force Majeure Event

Subject to the Affected Party having complied with its obligations under clause 10.1 and as otherwise provided in this Agreement:

(a) the Affected Party shall not be in breach of this Agreement to the extent that the Force Majeure Event prevents, hinders or delays it from performing any of its obligations under this Agreement; and

(b) the relevant Force Majeure Event shall operate to extend the time by which the Affected Party is required to perform each obligation under this Agreement which it has been prevented, hindered or delayed from performing by an amount of time equal to the duration of the Force Majeure Event, provided that a Force Majeure Event shall in no circumstances operate to extend the Concession Term.

10.3 Costs relating to Force Majeure Event

Each Party shall bear its own Losses (if any) incurred as a result of a Force Majeure Event.
10.4 **Termination Right upon Force Majeure**

If a Force Majeure Event prevents or hinders the Affected Party's performance of its obligations for a continuous period of more than one hundred eighty (180) days, either Party may terminate this Agreement by providing a Termination Notice to the other Party.

10.5 **Termination Right upon Governmental Action**

If due to any judicial action in the courts of the Republic of Panama or any action of any Panamanian Governmental Entity other than the ACP (including any expropriation or nationalisation of the Concession Area and/or the Corozal Container Terminal) ("Prejudicial Governmental Action") this Agreement is or will rendered illegal or impossible of being performed as contemplated herein or any obligation required to be performed under this Agreement is or will be delayed for more than three hundred and sixty five (365) days, the affected Party shall in each case be entitled to terminate this Agreement by providing a Termination Notice to the other Party.

10.6 **Concessionaire Mitigation of Governmental Action**

The Concessionaire shall, acting in accordance with Good Industry Practice, use all reasonable efforts to minimise the impact of any Prejudicial Governmental Action on its financial position.

11. **EVENTS OF DEFAULT**

11.1 **Notice of Event of Default**

Upon a Party (the "Defaulting Party") becoming aware of any Event of Default relating to it (other than, in the case of the Concessionaire, a breach of clause 3) it shall promptly (and in any event within three (3) days of becoming aware) notify the other Party (the "Non-Defaulting Party") of the Event of Default including reasonable details of the nature of the Event of Default and, where applicable, any steps that the Defaulting Party is intending to take to remedy such Event of Default.

11.2 **Termination Right upon Event of Default**

The Non-Defaulting Party shall be entitled to terminate this Agreement by providing a Termination Notice to the Defaulting Party at any time:

(a) in the case of an Event of Default (other than, where the Concessionaire is the Defaulting Party, following a breach of clause 3, 4.10, 5.10, 8.13 or 12.8) which is capable of remedy has not been remedied within thirty (30) days of being requested to do so by the Non-Defaulting Party;

(b) if the Event of Default is a breach by the Concessionaire of clause 3, 4.10, 5.10, 8.13 or 12.8 which has not been remedied within three (3) days of the breach; and

(c) in the case of an Event of Default which is not capable of remedy (including a breach by the Awardee of its obligation to submit all the documentation set out in paragraph 11 of the RFP in accordance with the RFP or a breach by the Concessionaire of
clause 8.5 which shall in each case be deemed to be Events of Default which are not capable of remedy).

12. PERFORMANCE GUARANTEEs AND PAYMENT BONDS

12.1 Provision of Terminal Construction Performance Guarantees

The Concessionaire shall prior to commencing the Terminal Construction Works in accordance with this Agreement provide to the ACP a Terminal Construction Performance Guarantee in an amount equal to fifty million US Dollars (US$50,000,000) and prior to commencing the Rail Spur Access Construction Works provide to the ACP a Terminal Construction Performance Guarantee in an amount equal to fifteen million US Dollars (US$15,000,000). If the ACP makes a demand under such Terminal Construction Performance Guarantee in accordance with clause 12.2 it shall notify the Concessionaire following which the Concessionaire shall within seven (7) days of such notice provide to the ACP a replacement Terminal Construction Performance Guarantee in an amount equal to the applicable amount.

12.2 Use and return of Terminal Construction Performance Guarantees

The Parties agree that the Terminal Construction Performance Guarantee shall serve as surety for the Concessionaire's obligations under this Agreement in respect of the Terminal Construction Works including any LD Amount payable pursuant to clause 5.10, clause 8.13 (to the extent that it relates to an Obligatory Insurance Policy required during the Terminal Construction Works) or clause 12.8 (to the extent relating to a Replacement Instrument that is a Terminal Construction Performance Guarantee) but excluding any LD Amount payable in relation to interruptions or suspensions of the Terminal Services in accordance with clause 4.10, together with any additional amounts of interest, costs and expenses (at the published ACP applicable tariff), in each case as specified in this Agreement. Upon the issue by the ACP of any Operations Commencement Certificate in respect of the provision of the Terminal Services at the Terminal Facilities (but not, for the avoidance of doubt, upon the issue of any Preliminary Operations Commencement Certificate) it shall promptly return to the Concessionaire any Terminal Construction Performance Guarantee then held by it.

12.3 Provision of Terminal Operations Performance Guarantees

The Concessionaire shall not less than thirty (30) days prior to the commencement of each Operating Year (but not for the avoidance of doubt in any Operating Year occurring during the Temporary Operation Period) provide to the ACP a Terminal Operations Performance Guarantee in respect of that Operating Year in an amount equal to the applicable Terminal Operations Performance Guarantee Amount which must be valid until the date that is three hundred ninety (390) days from the commencement of each Operating Year. If the ACP makes a demand under any Terminal Operations Performance Guarantee in accordance with clause 12.4 it shall notify the Concessionaire following which the Concessionaire shall within seven (7) days of such notice provide to the ACP a replacement Terminal Operations Performance Guarantee in an amount equal to the full applicable Terminal Operations Performance Guarantee Amount.
12.4 Use and return of Terminal Operations Performance Guarantees

The Parties agree that each Terminal Operations Performance Guarantee shall serve as surety for the Concessionaire's obligations under this Agreement (other than in respect of the Terminal Construction Works) including prompt payment when due of the Concession Fees and any LD Amount payable including pursuant to clause 4.10, clause 8.13 (to the extent that it relates to an Obligatory Insurance Policy required during the provision of the Terminal Services) or clause 12.8 (to the extent relating to a Replacement Instrument that is a Terminal Operations Performance Guarantee), together with any additional amounts of interest, costs and expenses (at the ACP applicable tariff as published), in each case as specified in this Agreement. Upon receipt by the ACP of any Terminal Operations Performance Guarantee in accordance with clause 12.3 it shall promptly return to the Concessionaire any Terminal Operations Performance Guarantee then held by it.

12.5 Provision of Payment Bonds

Prior to commencing each of the Terminal Construction Works and the provision of the Terminal Services the Concessionaire shall (to the extent that it has not done so already) provide to the ACP a Payment Bond in an amount equal to the applicable Payment Bond Amount issued by an Approved Bond Issuer. For these purposes an "Approved Bond Issuer" is an insurance company which:

(a) is duly established and operating in the Republic of Panama with a valid general license issued by the SSRP;

(b) has a minimum long-term credit rating of "BBB" from S&P, "Baa2" from Moody's and/or "BBB" from Fitch (or in each case such lesser rating as the ACP may in its sole and absolute discretion accept);

(c) is not subject to any extant debarment or sanction by the ACP or by the National Government of Panama pursuant to Applicable Laws and Regulation, not in a process of regularization, not undergoing an administrative or operational take over, and not subject to a forced liquidation ordered by the SSRP;

(d) shall, for the purposes of this Agreement, only be permitted to issue Payment Bonds up to a maximum of ten per cent (10%) of its most recent Technical Adjusted Net Worth as published by the SSRP in their quarterly report for the period during which the relevant Payment Bond is issued in accordance with this Agreement (or, in the case of any such insurer that is a branch of a foreign company, up to a maximum of ten per cent (10%) of the latest audited net worth of its Parent Company (as evidenced in a manner satisfactory to the ACP)), provided that:

(i) in order to allow more flexibility in the issuance of Payment Bonds, up to a maximum of five (5) co-insurers per Payment Bond shall be permitted, in which case:

(A) each such co-insurer must meet the requirements in clauses 12.5(a) to 12.5(d), and shall have the same rights and responsibilities as each
other co-insurer (other than the amount that it has agreed to be liable to pay under the relevant Payment Bond); and

(B) one such co-insurer shall be appointed as the leader and coordinator of the relevant Payment Bond, for its presentation as well as for its execution; and/or

(ii) where the amount of the relevant Payment Bond exceeds the maximum limits set out in clause 12.5(d), reinsurance coverage may be obtained with reinsurers that meet the requirements in 12.5(a), 12.5(c) and 12.5(d) and have an Acceptable Bond Reinsurer Rating (and for the avoidance of doubt, a reinsurer that meets such requirements and has an Acceptable Bond Reinsurer Rating shall be an Approved Bond Issuer), in which case the relevant primary (co-)insurer(s) (which for the avoidance of doubt must meet the requirements in clauses 12.5(a) to 12.5(d)) retain directly, in respect of each relevant Payment Bond, a minimum exposure of fifty per cent (50%) of the amount that is ten per cent (10%) of its/their respective most recent Adjusted Technical Net Worth as published by the SSRP in their quarterly report for the period during which the relevant Payment Bond is issued in accordance with this Agreement (or, in the case of any such insurer that is a branch of a foreign company, a minimum exposure of fifty per cent (50%) of the amount that is ten per cent (10%) of the latest audited net worth of its Parent Company (as evidenced in a manner satisfactory to the ACP)), and the reinsurer shall assume the remaining exposure under the relevant Payment Bond, subject to:

(A) a description of the reinsurance structure having been sent to the Finance and Risk Management Division of the Executive Vice Presidency for Administration and Finance of the ACP (or to the office that takes the place of this division within the ACP) no less than five (5) days prior to the date on or by which the relevant Payment Bond is to be provided under this Agreement including the following information:

(I) the Contract number and title;

(II) the name of the (co-)insurers and reinsurers underwriting the relevant Payment Bond, the amount and percentages thereof that they will respectively underwrite, and their most recent long-term credit ratings (and names of the relevant rating agencies);

(III) the value withheld by the Approved Bond Issuer from the relevant Payment Bond; and

(B) such reinsurance structure having been approved in writing by the ACP.
12.6 **Return of Payment Bonds**

Subject to the Concessionaire's compliance with its obligations under this Agreement and the terms and conditions of the Payment Bonds provided to the ACP, the ACP shall no later than the date that is one hundred and eighty (180) days from the Termination Date return to the Concessionaire any Payment Bond then held by it.

12.7 **Guarantee Issuer or Payment Bond Issuer Rating Downgrade**

In the event that any bank or insurer and/or reinsurer that has issued a Payment Bond, Terminal Construction Performance Guarantee and/or Terminal Operations Performance Guarantee held by the ACP ceases to be an Approved Bond Issuer or Approved Guarantee Issuer (whether as a result of ceasing to have a valid general license issued by the Superintendence of Banks of the Republic of Panama (Superintendencia de Bancos de Panamá) or the SSRP, becoming debarred or sanctioned by the ACP, and/or, in the case of a reinsurer, ceasing to have an Acceptable Bond Reinsurer Rating, or otherwise) the Concessionaire shall, without the need for any notice from the ACP, provide to the ACP within ninety (90) days of such occurrence a replacement Payment Bond, Terminal Construction Performance Guarantee and/or Terminal Operations Performance Guarantee (as the case may be) (the "Replacement Instrument") issued by an Approved Bond Issuer or Approved Guarantee Issuer (as the case may be), provided that if the Concessionaire is unable to procure a Replacement Instrument within such ninety (90)-day period then the Concessionaire shall be entitled to an extension of such time period subject to submitting to the ACP:

(a) a written request for such an extension:

   (i) stating a reasonable period of time for such extension (which may not be longer than an additional ninety (90) days beyond the end of the ninety (90)-day period referred to above); and

   (ii) stating that the Concessionaire reasonably believes that it will be able to obtain the Replacement Instrument within such extension period; and

(b) evidence necessary to establish to the satisfaction of the ACP that the Concessionaire has used and is continuing to use its best efforts to obtain the Replacement Instrument and that the Replacement Instrument can be obtained within such requested extension period.

12.8 **Compensation for Replacement Instrument Delays**

If the Concessionaire fails to provide any Replacement Instrument prior to the expiry of the initial ninety (90)-day period provided for in clause 12.7 or, if applicable, the extension period referred to in clause 12.7 it shall in each case pay to the ACP an amount equal to the relevant LD Amount for each elapsed day after such expiry until the Concessionaire provides the relevant Replacement Instrument.
13. **COSTS, PAYMENTS AND TAXES**

13.1 **Costs**

Save as otherwise expressly provided in this Agreement each Party shall be responsible for its own costs, expenses, taxes, levies, duties, charges or similar relating to the negotiation, preparation, execution and implementation of this Agreement.

13.2 **Method of Payments**

Unless otherwise agreed by the Parties any payment to be made by:

(a) the Concessionaire to the ACP shall be made to the bank account notified to the Concessionaire; and

(b) the ACP to the Concessionaire shall be made to the bank account notified to the ACP,

in each case in immediately available funds by electronic transfer on the due date for payment. Receipt of the amount due shall be an effective discharge of the relevant payment obligation.

13.3 **Interest on Late Payments**

If any sum due for payment in accordance with this Agreement is not paid on the due date for payment, the Party in default shall also pay on that sum a default interest at seven per cent (7%) per annum from, but excluding, the due date to, and including, the date of actual payment, calculated on a daily basis.

13.4 **No Withholding and Gross-up**

Save as otherwise provided in this Agreement or as required by Applicable Laws and Regulations all sums payable under or for breach of this Agreement shall be paid without any set off and free and clear of all deductions or withholdings whatsoever. If any deduction or withholding is required by Applicable Laws and Regulations from any payment under or for breach of this Agreement then, except in relation to interest, the payer shall pay the payee such additional amount as will, after such deduction or withholding has been made, leave the payee with the same amount as it would have been entitled to receive in the absence of any such requirement to make a deduction or withholding.

14. **TERMINATION**

14.1 **Termination Causes and Surviving Provisions**

The Parties' respective rights and obligations under this Agreement shall terminate:

(a) immediately upon the ACP exercising its right to terminate this Agreement in accordance with paragraph 7.5 of the RFP;

(b) at 11:59 pm on the last day of the Concession Term;
(c) on such other time and/or date determined by mutual agreement between the Parties, being a time and date no less than one hundred eighty (180) days after the date of such mutual agreement; or

(d) at 11:59 pm on the date that is one hundred eighty (180) days after the service of a Termination Notice,

(each such relevant date of termination (other than in the case of clause 14.1(a)), the "Termination Date"), except that the Surviving Provisions shall continue to have effect, and any rights or liabilities that have accrued under this Agreement as at the Termination Date shall subsist.

14.2 Continued Performance and Maintenance as Going Concern

Without prejudice to the Concessionaire's other obligations under this Agreement (including under clauses 6.4 and 8.1) in the one hundred eighty (180)-day period prior to the Termination Date, the Concessionaire shall operate and maintain the Corozal Container Terminal:

(a) with the intent that the ACP or its nominee would be able to take over the operation and management of the Corozal Container Terminal at any time during such period, and the Concessionaire shall use its best endeavours to ensure that the ACP or its nominee has immediate access to all employees and all facilities within the Corozal Container Terminal within the Concessionaire's control for the purpose of preparing and implementing a terminal operator transition plan; and

(b) on the basis that, to the extent possible and practicable, the Corozal Container Terminal may be transferred to the ACP or its nominee as a going concern on the Termination Date and in particular with an appropriate number of employees (having sufficient skills, qualifications and experience),

provided that neither the Concessionaire nor any of its Affiliates shall during such period acquire any additional Terminal Equipment or enter into any new Terminal Contract without the ACP's prior consent.

14.3 Pre-Termination Survey

Not less than ninety (90) days prior to the Termination Date, the ACP shall instruct one or more Suitable Independent Surveyors to carry out a survey of the Corozal Container Terminal and provide to the ACP and the Concessionaire within thirty (30) days of his or their appointment a survey report on the extent to which the Concessionaire has complied with the Maintenance Requirements, and the extent to which the Corozal Container Terminal and the provision of Terminal Services are and have been in compliance with the Environmental Standards and the EIS, and, if not what action needs to be taken by the Concessionaire. The fees and expenses of the Suitable Independent Surveyor(s) appointed in accordance with this clause 14.3 shall be borne by the Parties equally.
14.4 Remedial Actions

If the survey report prepared pursuant to clause 14.3 states that any actions are required at the Corozal Container Terminal and/or in respect of the Terminal Services the Concessionaire shall promptly take such actions and complete the same prior to the Termination Date.

14.5 Preparation of Termination Statement

Not less than one hundred twenty (120) days prior to the Termination Date the Concessionaire shall prepare and submit to the ACP a draft statement (the "Termination Statement") which shall include:

(a) an itemized list of all of the Terminal Contracts in effect as at that date including a short summary of the subject matter of each such Terminal Contract and the identity of the parties thereto, together with the Net Cost of the benefit of each Terminal Contract as at the Termination Date (the "Terminal Contract Net Cost");

(b) an itemized list of all the Terminal Equipment as at that date, indicating in respect of each Terminal Equipment whether it is owned or leased by the Concessionaire or any Permitted Affiliate and details of any indebtedness incurred in relation thereto (including details of the respective Terminal Contract), together with the Net Cost of each Terminal Equipment as at the Termination Date ("Terminal Equipment Net Cost"); and

(c) an itemized list of each Terminal Structure as at that date, together with the Net Cost of each Terminal Structure as at the Termination Date (the "Terminal Structure Net Cost").

14.6 Agreement on Termination Statement

If within thirty (30) days of receipt of the draft Termination Statement the ACP:

(a) does not request any revisions to such draft Termination Statement such draft Termination Statement shall be the Termination Statement for the purposes of this Agreement; or

(b) requests any revisions to the draft Termination Statement:

(i) the Parties shall endeavour to agree such revisions within fifteen (15) days of such request, failing which the ACP shall within thirty (30) days appoint a Suitable Accountant to determine the matters in dispute in accordance with clause 17.1;

(ii) the draft Termination Statement subject to any revisions agreed between the Parties or required by the Suitable Accountant appointed in accordance with clause 14.6(b)(i) shall be the Termination Statement for the purposes of this Agreement.
14.7 Handover Formalities

The Concessionaire shall, on or by the Termination Date:

(a) vacate, and deliver possession to the ACP or its nominee of, the Concession Area, the Terminal Rail Spur Access Area and the Corozal Container Terminal (and not demolish or remove any Terminal Structures or Terminal Equipment other than Excluded Terminal Equipment), and assign and transfer to the ACP or its nominee all of the Concessionaire's rights, title and interest in the Concession Area, the Terminal Rail Spur Access Area and the Corozal Container Terminal;

(b) assign and transfer to the ACP or its nominee all of the Concessionaire's rights, obligations, title, property and interest in the Terminal Contracts and Terminal Equipment (other than any Terminal Contracts and/or Terminal Equipment that the ACP has previously notified the Concessionaire that it does not want to acquire (the "Excluded Terminal Contracts" and "Excluded Terminal Equipment" respectively) as well as any materials and information necessary or routinely used to operate and maintain the Corozal Container Terminal including, tools, consumables and spare parts, drawings, manuals and documents, intellectual property rights (including rights in software), computerised and non-computerised records, keys, passwords and access codes;

(c) transfer the benefit of the Social Fund to the ACP or its nominee as provided in clause 8.9(d);

(d) ensure that any and all Excluded Terminal Contracts and/or Excluded Terminal Equipment are (as appropriate) terminated and/or removed from the Concession Area, and that any damage caused thereby is made good to the satisfaction of the ACP; and

(e) ensure that it has discharged all of its obligations to its employees up to the Termination Date, including social security contributions and payment of any accrued benefits, and shall take all action requested by the ACP to effect the transfer to or employment by the ACP or its nominee of such of the Concessionaire's employees as the ACP or its nominee may wish to retain.

14.8 Return of Performance Guarantees and Compensation on Termination

Subject to the Concessionaire having complied with all its obligations under this clause 14, on the Termination Date the ACP shall return to the Concessionaire any Terminal Construction Performance Guarantee and/or Terminal Operations Performance Guarantee then held by it, and shall pay to the Concessionaire:

(a) if this Agreement terminates under any circumstances an amount equal to the sum:

(i) the aggregate Terminal Contract Net Cost of all of the Terminal Contracts as at the Termination Date other than any Excluded Terminal Contracts; and

(ii) the aggregate Terminal Equipment Net Cost of all of the Terminal Equipment as at the Termination Date other than any Excluded Terminal Equipment,
and for the avoidance of doubt no amounts shall be due to the Concessionaire in respect of any Terminal Structures in such circumstances;

(b) only if this Agreement terminates pursuant to a Termination Notice provided by the ACP or the Concessionaire under clause 10.5; or by the Concessionaire under clause 11.2, an amount equal to the sum:

(i) the aggregate Terminal Contract Net Cost of all of the Terminal Contracts as at the Termination Date other than any Excluded Terminal Contracts;

(ii) the aggregate Terminal Equipment Net Cost of all of the Terminal Equipment as at the Termination Date other than any Excluded Terminal Equipment; and

(iii) the aggregate Terminal Structure Net Cost of all of the Terminal Structures as at the Termination Date,

provided that if this Agreement is terminated in the circumstances set out in clause 14.8(b) before the First Operations Date the ACP shall pay to the Concessionaire the higher of the Incomplete Terminal Construction Works Costs and the relevant amount under clause 14.8(b).

14.9 **Exclusive Compensation**

The Concessionaire expressly agrees and accepts that the compensation payable in accordance with clause 14.8 shall be the only and final amount that can be claimed by the Concessionaire in any case of termination of this Agreement. In consideration of such compensation the Concessionaire hereby agrees to release, acquit, and forever discharge the ACP, its officers, directors, employees, representatives, designees or agents, and each of its assigns in all capacities whatsoever, from any and all actions, claims, demands, damages, obligations, liabilities, controversies and executions, of any kind or nature whatsoever, whether known or unknown, whether suspected or not, which have arisen, or may have arisen, or shall arise by reason of any matter, cause or thing whatsoever, related to this Agreement.

14.10 **Post-Termination Remediation**

To the extent that any time after the Termination Date there are on or at the Concession Area:

(a) any items which are either not necessary or routinely used to operate and maintain the Corozal Container Terminal or have been brought on to or erected on the Concession Area other than as required by this Agreement; and/or

(b) any Containers belonging to customers of the Concessionaire,

the Concessionaire shall indemnify the ACP for any Losses suffered or incurred by the ACP or its nominee in removing or arranging for the removal of such items from the Concession Area and/or handling or arranging for the handling of such Containers as reasonably required by the Concessionaire’s customers.
15. **WARRANTIES AND INDEMNITIES**

15.1 **Mutual Warranties**

Each Party warrants to the other as at the Award Date that it has the right, power and authority, has taken all action necessary, to execute, deliver and exercise its rights and perform its obligations under this Agreement, that its obligations under this Agreement are enforceable in accordance with their terms, and that the execution and delivery of, and the performance by it of its obligations under, this Agreement shall not:

(a) result in a breach of, or constitute a default under, any provision of its constitutional document or instrument to which it is a party or by which it is bound, or any Applicable Laws and Regulations, order, judgment or decree of any Governmental Entity to which it is a party or by or to which it is bound or submits; and

(b) require it to obtain any consent or approval of, or give any notice to or make any registration with, any Governmental Entity which has not been obtained or made both on an unconditional basis and on a basis which cannot be revoked.

15.2 **Concessionaire Warranties**

The Concessionaire warrants, acknowledges and agrees as at the Award Date that:

(a) it is not insolvent or bankrupt under the laws of its jurisdiction of incorporation, unable to pay its debts as they fall due, has not proposed or is liable to any arrangement (whether by court process or otherwise) under which its creditors (or any group of them) would receive less than the amounts due to them, that there are no proceedings in relation to any compromise or arrangement with creditors or any winding up, bankruptcy or insolvency proceedings concerning it or any of its Affiliates (and no events have occurred which would justify such proceedings), and that no steps have been taken to enforce any security over any of its assets or those of any of its Affiliates (and no event has occurred to give the right to enforce such security);

(b) it has available cash and/or loan facilities which provide in immediately available funds the necessary cash resources for it to meet its obligations under this Agreement at the relevant time, and, further, in the case that such financial resources consist of loan facilities the Concessionaire will be able to satisfy all conditions of drawdown to such loan facilities at or before the relevant time;

(c) it does not rely in any way on any information obtained directly or otherwise from the ACP (including the information in the VDR) and is obliged to makes its own enquiries as to the accuracy, reliability, completeness and adequacy of that information and in each case, the Concessionaire shall not be entitled to claim against the ACP on the grounds that any of such information is incorrect or insufficient; and

(d) neither it nor any of its Affiliates has disclosed any of the terms of the Awardee's Binding Offer to any other person directly or indirectly participating in the Tender Process (or any adviser to any such person) and has not otherwise colluded to influence, or discussed the outcome of, the Tender Process with any such person or adviser.
15.3 **Concessionaire Indemnities**

The Concessionaire shall indemnify the ACP and its employees and representatives against all Losses suffered or incurred (including pursuant to any actions, claims, demands or proceedings brought against the ACP by any third party including any owner or charterer of any vessel transiting the Panama Canal or any residents of areas adjacent or close to the Concession Area and the Terminal Rail Spur Access Area) as a result of:

(a) any acts, deeds or thing done or omitted to be done by the Concessionaire, its Affiliates or its or their contractors, sub-contractors’ directors, officers, employees representatives or agents (or such contractors' sub-contractors' directors, officers, employees, representatives or agents) in connection with this Agreement, the Terminal Construction Works and/or the Terminal Services;

(b) any breach of this Agreement by the Concessionaire; and

(c) any failure of the Concessionaire to comply with any Applicable Laws and Regulations or Applicable Permit in relation to the Terminal Construction Works, the Terminal Services or any other activities undertaken by it or its Affiliates contractors, sub-contractors' directors, officers, employees or agents (or such contractors’ or sub-contractors' directors, officers, employees, representatives or agents).

16. **GENERAL PROVISIONS**

16.1 **Future Concessions**

Subject to clause 2.3 the ACP expressly reserves the right, in its sole discretion, to grant to any other person(s), any kind of future concession in respect of ACP lands, lands under ACP privative administration or lands obtained by the ACP in the future with no restriction whatsoever.

16.2 **Concessionaire Assignment Prohibition**

Save as provided in clause 5.4, the Concessionaire may not:

(a) sub-contract or grant a sub-concession of, or enter into any similar arrangements in respect of, any of its rights, title, interest or obligations under this Agreement; or

(b) assign or otherwise transfer or dispose of, encumber, any of its rights, title, interest or obligations under this Agreement,

to any person (including any Affiliate of the Concessionaire) without the prior written consent of the ACP and compliance with any requirements of the ACP in relation thereto. Any sub-contracting, sub-concessioning or similar, or assignment, transfer or disposal or encumbering in breach of this clause 16.2 shall be of no effect and void.

16.3 **Announcements**

The Concessionaire shall not make any announcement or issue any communication in connection with the existence or subject matter of this Agreement without the prior written
approval of the ACP, provided that this restriction shall not apply to the extent that the announcement or communication is required by any law, stock exchange or any regulatory or other supervisory body or authority of competent jurisdiction, whether or not the requirement has the force of law. If this exception applies, the Concessionaire shall use its reasonable endeavours to consult with the ACP in advance as to its form, content and the timing of issue.

16.4 Confidentiality

Each Party shall treat as confidential and not disclose to any person any information acquired from or relating to the other Party as a result of entering into or performing its obligations under this Agreement provided that any Party may disclose such information:

(a) if and to the extent that it has become publicly available other than as a result of a breach by a Party of this Agreement;

(b) required to be disclosed by Applicable Laws and Regulations or by order or ruling of a court or administrative body of a competent jurisdiction or by the rules of a recognised investment exchange or any regulatory body to which any Party submits (but in which case to the absolute minimum necessary) provided that the disclosing Party shall use its best endeavours to first consult fully with the other Party to establish whether and, if so, how far it is possible to prevent or restrict such enforced disclosure and take all steps as it may require to achieve prevention or restriction; and/or

(c) to its directors or employees who require the information to perform their duties, or its advisers, auditors or bankers,

and a Party that discloses information to a person in accordance with this clause 16.4 shall procure that such person complies with the restrictions in this clause 16.4 as if such person were a party to this Agreement.

16.5 Notices

Any notice in connection with this Agreement shall be in writing in English and delivered by hand, email, registered post or courier using an internationally recognised courier company. A notice shall be effective upon receipt and shall be deemed to have been received:

(a) at the time of delivery, if delivered by hand, registered post or courier; or

(b) on receipt of a delivery return email from the correct address, if delivered by email,

provided that in all cases, where delivery does not occur between 7.00 am to 4.00 pm on any day other than a Saturday, Sunday, public holiday (in Panama) or day declared a non-working day by any Panamanian Governmental Entity, notice shall be deemed to have been received at 7.00 am on the immediately following day that is not a Saturday, Sunday, public holiday (in Panama) or day declared a non-working day by any Panamanian Governmental Entity.
16.6 **Addresses**

The postal and email addresses of the Parties for the purpose of clause 16.5 are:

(a) in the case of the ACP:

   Address: División de Administración de Proyectos de Construcción, Building 732, Ancón, Corozal Oeste, Panama, Republic of Panama

   Email: Jfernandez@pancanal.com

   For the attention of: The Contracting Officer for the Corozal Container Terminal; and

(b) in the case of the Concessionaire:

   Address: [●]

   Email: [●]

   For the attention of: [●].

16.7 **Contracting Officer's Representatives (COR)**

This Contracting Officer may, by way of written notice to the Concessionaire, designate one or more persons to be its representatives for the technical, financial or general administration of this Agreement. The terms of any such representative's authority in relation to this Agreement shall be set out in the notice to the Concessionaire.

16.8 **Entire Agreement**

The Contract constitutes the whole agreement between the Parties relating to the Concession for the Corozal Container Terminal and supersedes any arrangements, understanding or previous agreement between them relating to the subject matter it covers. Each Party acknowledges that in agreeing to and performing the Contract it does not rely on, and shall have no remedy in respect of, any statement, representation, assurance or warranty of any person other than as expressly set out in the Contract.

16.9 **Third Party Rights**

Except as expressly provided for in this Agreement, a person who is not a Party shall have no right under any statutory provision to enforce any of its terms.

16.10 **No Agency**

The Concessionaire shall act under this Agreement as an independent person, undertaking the Terminal Construction Works and providing the Terminal Services solely on its own behalf. Nothing in the Contract shall be construed as creating a relationship of agency between the
ACP and the Concessionaire. All employment arrangements are, therefore, solely the
Concessionaire's concern, and ACP shall have no liability with respect thereto.

16.11 **Severability of Provisions**

If any provision of the Contract (or part of a provision) is found by any court or administrative
body of competent jurisdiction to be invalid, unenforceable or illegal, the other provisions shall
remain in force. If any invalid, unenforceable or illegal provision would be valid, enforceable
or legal if some part of it were deleted, the provision shall apply with whatever modification is
necessary to give effect to the commercial intention of the Parties.

16.12 **Waivers of Rights**

No failure or delay of any Party in exercising its rights under the Contract (including the right
to require performance of any provision of this Agreement) shall be deemed to be a waiver or
release of such rights. Any waiver or release must be specifically granted in writing signed by
the Party waiving its rights and unless otherwise expressly provided therein shall:

(a) be confined to the specific circumstances in which it is given;

(b) not affect any other enforcement of the same or any other right; and

(c) (unless it is expressed to be irrevocable) be revocable at any time in writing.

16.13 **Rights not Exclusive**

Any single or partial exercise of any right, power or remedy provided under the Contract shall
not preclude any other or further exercise of it or the exercise of any other right, power or
remedy whether under this Agreement, at law or otherwise.

16.14 **Modification of the Agreement**

Any modification of this Agreement must be in writing and signed by or on behalf of both of
the Parties.

17. **DISPUTE RESOLUTION**

17.1 **Determination by Accountant**

Where a Suitable Accountant is appointed in accordance with clause 14.6(b)(i):

(a) the Suitable Accountant shall be instructed to notify the Parties of its determination in
the English language within twenty five (25) days of the matter being referred to it;

(b) the Suitable Accountant shall act as an expert and not as an arbitrator, and shall provide
a reasoned opinion for its determination, and its determination shall be final and
binding in the absence of manifest error or fraud; and

(c) the Suitable Accountant’s fees and any costs properly incurred by him in arriving at its
determination shall be paid by the Parties in equal proportions.
17.2 **Parties' Right to make Submissions**

The Parties are entitled to make submissions to the Suitable Accountant appointed in accordance with clause 14.6(b)(i) in the English language and shall provide (or procure that others provide) it with such assistance and documents as it reasonably requires for the purpose of reaching a decision. Each of the Parties shall, with reasonable promptness, supply the other with all information and give each other access to all documentation and personnel as each other reasonably requires to make a submission under this clause 17.2.

17.3 **Parties to continue Performance**

For the avoidance of doubt in the period during which any matter is being considered by the Suitable Accountant appointed in accordance with clause 14.6(b)(i) or an arbitration is ongoing in accordance with clause 17.4, the Parties shall continue to perform all of their obligations under this Agreement without regard to any effect on or possible adjustment of such obligations as a result of the possible outcome of any of the former.

17.4 **Arbitration**

Any and all disputes arising out of or in connection with this Agreement ("Disputes") shall be referred to and finally resolved by arbitration in law, under the ICC Rules, which rules are deemed to be incorporated by reference into this clause. The number of arbitrators shall be three lawyers licensed in Panama. Each Party shall appoint one arbitrator pursuant to the ICC Rules of Arbitration, and the third arbitrator, who shall act as President of the arbitral tribunal, shall be appointed by the International Court of Arbitration of the ICC. The seat of arbitration shall be the City of Panama, Republic of Panama and the language to be used in the arbitral proceedings shall be English. The emergency arbitrator provisions under Article 29 and Appendix V of the ICC Rules shall not apply.

17.5 **Exclusive Dispute Resolution Procedure**

Subject to clause 17.1 the arbitration procedure set out under clause 17.4 shall be the sole and exclusive procedure applicable to the resolution of any and all Disputes.

17.6 **Waiver of Immunity**

The Concessionaire:

(a) unconditionally and irrevocably agrees:

(i) to the submission of any Dispute for binding resolution under clause 17.4 and not to claim any right it may have under the laws of any jurisdiction to hinder, obstruct or nullify the submission of any Dispute for such resolution; and

(ii) to accept any award rendered by the arbitrators as final and binding; and

(b) represents and warrants that the Concessionaire is not and shall not be entitled to claim immunity from legal proceedings with respect to itself or any of its assets on the grounds of sovereignty or otherwise in any jurisdiction, provided that the
Concessionaire may in any jurisdiction claim for itself or its assets immunity from jurisdiction, suit, action, execution, attachment or other legal process (whether in aid of execution, before judgment or otherwise) or to the extent that in any such jurisdiction there may be attributed to itself or its assets such immunity (whether or not claimed), the Concessionaire unconditionally and irrevocably agrees not to claim and unconditionally and irrevocably waives any such immunity to the full extent permitted by the laws of such jurisdiction.

17.7 **Acceptance of Agreement**

The Parties agree and confirm that they accept all the terms and conditions of the Contract including this Agreement.

**IN WITNESS WHEREOF**, the Parties have executed this Agreement by their duly authorized officers as of the date hereof.

![Signature]

**AUTORIDAD DEL CANAL DE PANAMA**

By: Name: Jorge Luis Quijano
Title: Administrator
Date:

By: Name:
Title:
Date:
APPENDIX 1
DETAILS OF CONCESSION AREA

PART A - CONCESSION AREA

1. **Scope of Area**

1.1 The Concession Area comprises the land area and water area described below and which are shown in the following map (Phase 1 Area SK-T-1589B).

1.2 The land area comprises sixty nine (69) ha + 4,689.40m² of land, including:

   (a) an area of land of sixty seven (67) ha + 98.34m², which covers parts of property No. 426687, No. 196273 and No. 196292, duly registered in the Property Section of the Panamanian Public Registry; and

   (b) an area of water that will become land of two (2) ha + 4,591.06m², which covers part of property No. 196761, duly registered in the Property Section of the Panamanian Public Registry.

1.3 The water area comprises seven (7) ha + 9,650.00m² of water and sub-aquatic bottom alongside the berth, based on a berth alignment at 112.84m from the East prism line of the navigational channel: (1,350m of berth length multiplied by 59 meters), which covers parts of properties No. 196761 and No. 196273, duly registered in the Property Section of the Panamanian Public Registry.
2. **Land Boundary Data**

(69 ha + 4,689.40 m²)

2.1 Starting at point P1, with coordinates North 992650.95 and East 657175.58, measure a distance of 29.62 m bearing S 32° 31' 12" E, to reach point P2.

2.2 Starting at point P2, with coordinates North 992625.97 and East 657191.51, measure a distance of 93.71 m bearing S 54° 51' 04" W, to reach point P3.

2.3 Starting at point P3, with coordinates North 992572.02 and East 657114.89, measure a distance of 44.40 m bearing of S 48° 35' 32" W, to reach point P4.

2.4 Starting at point P4, with coordinates North 992542.66 and East 657081.59, measure a distance of 43.04 m bearing S 44° 50' 56" W, to reach point P5.

2.5 Starting at point P5, with coordinates North 992512.14 and East 657051.24 measure a distance of 39.68 m bearing S 16° 34' 06" E, to reach point P6.

2.6 Starting at point P6, with coordinates North 992474.10 and East 657062.56 measure a distance of 86.36 m bearing S 43° 55' 39" W, to reach point P7.

2.7 Starting at point P7, with coordinates North 992411.90 and East 657002.65 measure a distance of 559.50 m bearing S 32° 46' 23" E, to reach point P8.

2.8 Starting at point P8, with coordinates North 991941.46 and East 657305.51 measure a distance of 601.12 m bearing S 24° 39' 36" W, to reach point P9.

2.9 Starting at point P9, with coordinates North 991448.28 and East 656961.79 measure a distance of 113.27 m bearing S 24° 39' 36" E, to reach point P10.

2.10 Starting at point P10, with coordinates North 991345.34 and East 657009.07 measure a distance of 29.70 m bearing S 40° 19' 19" W, to reach point P11.

2.11 Starting at point P11, with coordinates North 991322.69 and East 656989.85 measure a distance of 16.51 m bearing S 24° 39' 36" E, to reach point P12.

2.12 Starting at point P12, with coordinates North 991307.69 and East 656996.74 measure a distance of 24.22 m bearing S 38° 16' 40" W, to reach point P13.

2.13 Starting at point P13, with coordinates North 991288.68 and East 656981.73 measure a distance of 5.73 m bearing S 01° 23' 16" E, to reach point P14.

2.14 Starting at point P14, with coordinates North 991282.95 and East 656981.87 measure a distance of 68.02 m bearing S 34° 02' 12" E, to reach point P15.

2.15 Starting at point P15, with coordinates North 991226.58 and East 657019.94 measure a distance of 192.69 m bearing S 70° 26' 44" W, to reach point P16.
2.16 Starting at point P16, with coordinates North 991162.09 and East 656838.36 measure a distance of 1350.00 m bearing N 19° 37' 51" W, to reach point P17.

2.17 Starting at point P17, with coordinates North 992433.62 and East 656384.82 measure a distance of 546.26 m bearing N 71° 19' 49" E, to reach point P18.

2.18 Starting at point P18, with coordinates North 992608.49 and East 656902.34 measure a distance of 146.04 m Bearing S 55° 58' 26" E, to reach point P19.

2.19 Starting at point P19, with coordinates North 992526.77 and East 657023.37 measure a distance of 196.44 m bearing N 50° 47' 30" E, to reach point P1.

3. **Seabed Boundary Data**

   (7 ha + 9,650.00m²)

3.1 Starting at point P1, with coordinates North 992433.62 and East 656384.82 measure a distance of 59.00 m bearing S 70° 22' 09" W, to reach point P2.

3.2 Starting at point P2, with coordinates North 992413.80 and East 656329.25 measure a distance of 1350.00 m bearing S 19° 37' 51" E, to reach point P3.

3.3 Starting at point P3, with coordinates North 991142.27 and East 656782.70 measure a distance of 59.00 m bearing N 70° 22' 09" E, to reach point P4.

3.4 Starting at point P4, with coordinates North 991162.09 and East 656838.36 measure a distance of 1350.00 m bearing N 19° 37' 51" W, to reach point P1.

**PART B – EXPANSION AREA**

1. **Scope of Area**

1.1 The Expansion Area comprises the land area and water Area described below and which are shown in the following map (Phase 2 Area SK-T-1589B).

1.2 The land area comprises forty nine (49) ha + 7,888.83m² of land, which covers part of property No. 196292, duly registered in the Property Section of the Panamanian Public Registry.

1.3 The water area comprises four (4) ha + 3,129.00m² of water and sub-aquatic bottom alongside the berth, based on a berth alignment at 112.84m from the East prism line of the navigational channel (731m of berth multiplied by 59 meters), which covers parts of the properties No. 196761 and No. 196292, duly registered in the Property Section of the Panamanian Public Registry.
2. **Land Boundary Data**

(49 ha + 7,888.83m²)

2.1 Starting at point P1, with coordinates North 992650.95 and East 657175.58 measure a distance of 114.71 m bearing N 32° 31' 12" W, to reach point P2.

2.2 Starting at point P2, with coordinates North 992747.67 and East 657113.92 measure a distance of 332.65 m bearing N 36° 34' 35" W, to reach point P3.

2.3 Starting at point P3, with coordinates North 993014.81 and East 656915.69 measure a distance of 128.01 m bearing N 48° 37' 12" W, to reach point P4.

2.4 Starting at point P4, with coordinates North 993099.43 and East 656819.64 measure a distance of 81.18 m bearing N 58° 09' 43" W, to reach point P5.

2.5 Starting at point P5, with coordinates North 993142.25 and East 656750.68 measure a distance of 17.56 m bearing S 40° 29' 19" W, to reach point P6.

2.6 Starting at point P6, with coordinates North 993128.90 and East 656739.28 measure a distance of 74.47 m bearing N 51° 26' 27" W, to reach point P7.

2.7 Starting at point P7, with coordinates North 993175.32 and East 656681.05 measure a distance of 88.47 m bearing S 46° 56' 09" W, to reach point P8.

2.8 Starting at point P8, with coordinates North 993114.91 and East 656616.42 measure a distance of 37.30 m bearing N 29° 19' 32" W, to reach point P9.

2.9 Starting at point P9, with coordinates North 993147.43 and East 656598.15 measure a distance of 15.58 m bearing N 32° 45' 37" E, to reach point P10.

2.10 Starting at point P10, with coordinates North 993160.53 and East 656606.58 measure a distance of 433.73 m bearing S 76° 47' 35" W, to reach point P11.

2.11 Starting at point P11, with coordinates North 993179.95 and East 656668.97 measure a distance of 6.56 m bearing S 71° 19' 31" W, to reach point P12.

2.12 Starting at point P12, with coordinates North 993219.95 and East 656568.97 measure a distance of 19.39 m bearing N 19° 47' 24" W, to reach point P13.

2.13 Starting at point P13, with coordinates North 993217.84 and East 656562.76 measure a distance of 433.73 m bearing S 76° 47' 35" W, to reach point P14.

2.14 Starting at point P14, with coordinates North 993236.08 and East 656556.19 measure a distance of 746.77 m bearing S 19° 37' 51" E, to reach point P16.
2.16 Starting at point P16, with coordinates North 992433.62 and East 656384.82 measure a distance of 546.26 m bearing N 71° 19' 49" E, to reach point P17.

2.17 Starting at point P17, with coordinates North 992608.49 and East 656902.34 measure a distance of 146.04 m bearing S 55° 58' 26" E, to reach point P18.

2.18 Starting at point P18, with coordinates North 992526.77 and East 657023.37 measure a distance of 196.44 m bearing N 50° 47' 30" E, to reach point P1.

3. **Seabed Boundary Data**

   (4 ha + 3,129.00m²)

3.1 Starting at point P1, with coordinates North 992433.62 and East 656384.82 measure a distance of 59.00 m bearing S 70° 22' 09" W, to reach point P2.

3.2 Starting at point P2, with coordinates North 992413.80 and East 656329.25 measure a distance of 731.00 m bearing N 19° 37' 51" W, to reach point P3.

3.3 Starting at point P3, with coordinates North 993102.32 and East 656083.66 measure a distance of 59.00 m bearing N 70° 22' 09" E, to reach point P4.

3.4 Starting at point P4, with coordinates North 993122.13 and East 656139.23 measure a distance of 731.00 m bearing S 19° 37' 51" E, to reach point P1.
PART C - RAIL SPUR ACCESS AREA

The Rail Spur Access Area is shown in the drawing below (orange area). The purpose of this drawing is only for depicting the access area.
## APPENDIX 2

### DIVISIONS AND SECTIONS

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**END OF DIVISIONS AND SECTIONS**
SECTION 01 10 00 – GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1  **STRUCTURE AND INTENT:** This section 01 10 00 (General Requirements) of the design – construction technical specifications, is intended to provide general requirements and an overview of the technical requirements that are addressed in detail in other sections. The Concessionaire shall conduct the work to meet the general performance criteria specified herein, as well as the additional detailed performance and design criteria provided in other sections.

1.2  **MAIN REQUIREMENTS:** This paragraph 1.2 (Main Requirements) identifies the main requirements for the work, which may be further specified in other paragraphs of this section and in other sections of the design – construction technical specifications. The Concessionaire shall prepare designs (drawings and specifications), and build facilities to meet the following main requirements.

1.2.1  **Design Vessel:** The transshipment port facilities shall be designed and constructed to handle container vessels of various types, sizes and shapes. However, a Neopanamax container vessel is the design vessel that shall be considered in the design in accordance with the design – construction technical specifications. The design vessel is characterized as follows:

1.2.1.1  A beam of 49 meters (160.72 feet);

1.2.1.2  A length overall (LOA) of 366 meters (1,200.48 feet);

1.2.1.3  A draft of 15.2 meters (49.87 feet).

1.2.2  **Vessel Capacity:** The facilities shall be able to accommodate at least three design vessels. The facilities shall be designed and constructed for safe berthing operations and simultaneous transshipment operations. The wharf berthing length shall be at least 1,350 m.

1.2.3  **Berthing Considerations:** Berthing design and dimensions shall be determined according to good industry practices; e.g. the Port Designer’s Handbook (Carl A. Thoresen). The design shall address water depth, under keel clearance (UKC), and design wave.

1.2.3.1  **Water Depth:** The water depth in the berthing approach channel, harbor basin, in front and alongside of the berth shall be based on the draft of the maximum loaded design vessel, tidal variations, movement of berthed vessels due to waves, trim, squat, atmospheric pressure, character of the bottom, error in dredging and possible silt up. The design shall also address future probable rise of sea level. The minimum water depth in the berthing area shall be at least -18 m MLWS.

1.2.3.2  **Under Keel Clearance (UKC):** The gross UKC shall be designed to allow for waves, trim, squat, atmospheric pressure, tides and shall include a safety margin for unevenness of the bottom.

1.2.3.3  **Design Wave:** The port structure design shall account for a design wave of at least 100 years, but not less than the design life of the structure; refer to paragraph 1.2.8 (Service Life). The design shall take into account the hydrodynamic effects caused by passing vessels on the port structure. The design shall be prepared so the effect of passing vessels on moored vessels is limited, and allows for a 95 percent cargo handling efficiency (see PIANC Criteria for the (Un)Loading of Container Vessels, Report No. 115 - 2012).

1.2.4  **Facility Planning:**

1.2.4.1  It is required from the outset that the principles of life-cycle management (LCM) be embraced in the design of the port. PIANC reports, Inspection, Maintenance and Repair of Maritime Structures
Exposed to Damage and Material Degradation Caused by the Salt Water Environment, published in 1991 and revised in 2004, and Life Cycle Management of Port Structures – General Principles, published in 2007, provide a useful background to the application of LCM. The Concessionaire shall apply LCM to make a realistic contribution to the maintenance policy of a port, including decision-making, planning, budgeting, and funding of inspection and repair activities during the lifetime of the facilities.

1.2.4.2 Facility planning shall address all elements of transshipment port facilities and appurtenant structures in the concession area, as well as off-site access facilities, for efficient ingress and egress. The Concessionaire shall use PIANC Report No. 135 - 2014, Design Principles for Small and Medium Marine Container Terminals for the port infrastructure planning.

1.2.4.3 The Concessionaire shall prepare base plans for development of the terminal concepts.

1.2.4.4 Goals for the port include:

   (a) Ensure efficient access;
   (b) Enable efficient and economical future expansion;
   (c) Provide terminal layout and fixed facilities adaptable to future operations;
   (d) Minimize or eliminate off-site access roadway queues;
   (e) Identify infrastructure conditions and required improvements;
   (f) Maintain project and adjacent operations during construction.

1.2.4.5 Requirements for the Concessionaire include:

   (a) Ability to meet projected operation capacity;
   (b) Maximize land usage;
   (c) Minimize truck turn-around time;
   (d) Maximize density and throughput without sacrificing efficiency;
   (e) Ensure industry standards or above;
   (f) Provide efficient gate complex designed for economical, and future expansion.

1.2.5 **Sustainability**: The design shall be prepared to efficiently use resources (energy, water and construction materials), whilst minimizing the facilities’ impacts on human health and on the environment, during the complete life cycle of the facilities: planning, design, construction, operation, maintenance and demolition.

1.2.6 **Interactions**: The design and construction work shall also include sound and sustainable environmental practices to prevent, reduce and minimize environmental and social impacts over surrounding areas considering but not limited to air, noise, emissions, illumination, pollution, vibrations and traffic issues. Design and construction work shall be carried out to comply with Environmental Impact Study included in Appendix 10 of the Concession Agreement.

1.2.6.1 **Canal Operations**: The design shall be prepared so the construction work of the transshipment port facilities does not interfere with Canal operations. The design shall be prepared so the operations of the transshipment port facilities do not interfere with Canal operations. Transshipment port facilities fixed structures shall be offset at least 110 m from the east prism line. Transshipment port facilities fixed
structures shall be designed so berthed vessels are offset from the east prism line in a manner that berthed vessels do not interfere with Canal operations. Canal operations are indicated in Appendix 5 “Canal Restrictions” of the Concession Agreement.

1.2.6.2 Rail Access: The design shall be prepared to provide intermodal rail services from the completion of the construction work. The Concessionaire shall coordinate intermodal rail services facilities design and construction with the concessionaire of the railroad: the Panama Canal Railway Company (PCRC). If the design of the intermodal rail services facilities require the use of railroad concession area, the relocation of buildings assigned to the railroad concession, or both, the Concessionaire shall coordinate these matters with the railroad concessionaire, and keep the ACP informed.

1.2.6.3 Road Overpasses: The design shall be prepared to avoid traffic congestion, which may be due to terminal operations, on roads in the vicinity of the port facilities. The design shall be prepared to provide efficient access and egress, to and from the port facilities. Therefore, the Concessionaire shall design and construct one vehicular overpass to provide access to the Concession Area from Avenida Omar Torrijos Herrera, nearest the Altos de Jesus community (Diablo Heights). If the ACP determines to expand the Concession Area (Option Right), the Concessionaire shall design and construct a second vehicular overpass to provide access to the expansion area from Avenida Omar Torrijos Herrera. The design shall be prepared in compliance with the laws of the Republic of Panama: that is all applicable legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted authority having jurisdiction including but not limited to the Republic of Panama’s “Ministerio de Obras Públicas” (MOP). The Concessionaire shall be responsible for meeting the requirements of authorities having jurisdiction.

1.2.6.4 Sound Barrier: The Concessionaire shall design and construct a sound barrier that meets the requirement in section 32 35 16 (Noise Pollution Control), paragraph 1.3.7 (Sound Barrier).

1.2.6.5 Gates: The construction of gates to use the internal roads of the Altos de Jesus (Diablo Heights) is prohibited.

1.2.7 Safety and Efficiency: The facilities shall provide for the berthing and transshipment operations in a safe and efficient manner, without causing structural damage to the vessels nor to the facilities. The berthing structures shall be designed to safely receive vessels and allow for the unloading and loading of containers under all foreseeable conditions including but not limited to the tides of the Pacific Ocean and the passing effect of transiting vessels.

1.2.8 Service Life: The facilities shall have a functional lifetime of 50 years.

1.2.9 Design for Operations, Safety, and Maintenance:

1.2.9.1 The Concessionaire shall prepare designs (drawings and specifications) for the transshipment port facilities and their complementary facilities that are functional, reliable, and able to operate 24 hours a day, every day of the year. Important design objectives are to, optimize operational efficiency, reduce noise and emissions and keep to a minimum facility downtimes required for maintenance or replacement of operating components.

1.2.9.2 The Concessionaire shall furnish a design that provides access to all above-ground structures for maintenance and operation, access for emergency-response vehicles, and an overall layout for operating conditions that protects the safety of facility operations and of personnel working on the transshipment port facilities and their complementary facilities.

1.2.9.3 The Concessionaire shall prepare designs for port facilities that can meet specifications according to Annex V of MARPOL and its appendix, and identify areas to comply with IMO requirements and guidelines such as ballast water reception facilities (G5), sediment reception facilities (G1), and other
applicable Maritime Conventions or guidelines. The Concessionaire shall provide collection, storage, and transfer and/or treatment services, and facilities of sufficient capacity and type for all wastewater generated by vessels at the port in accordance with MARPOL and national regulations.

1.2.9.4 The Concessionaire shall design, provide, install, and commission all plant (equipment) necessary for control and function of the transshipment port facilities and their complementary facilities. This shall include, but not be limited to, electric power system, process-control systems; visual, audio, and electronic surveillance systems; command and control communication systems; real-time condition sensors for mobile equipment location; spare parts; and spare operating equipment for damaged components. Process-control systems shall include but not be limited to centralized monitoring and control of transshipment operations, truck appointment system, and container movement monitoring system.

1.2.9.5 The Concessionaire shall provide designs that ensure durability without loss of functionality throughout the required design life and reduce maintenance requirements to the lowest practical level in terms of required outages, and maintenance and repair costs and consider full life-cycle costs.

1.2.9.6 The Concessionaire shall incorporate the following design concepts to ensure that the transshipment port facilities and their complementary facilities are maintainable:

(a) Corrosion prevention by design shall be applied during all design phases. Materials shall be selected with corrosion and wear resistance adequate for the environment and service, and dissimilar metals that are near each other shall be protected against galvanic corrosion. Should a corrosion-resistant design element not be available, the susceptibility shall be mitigated with coatings appropriate for the environment.

(b) Electronic components shall be protected against power fluctuations and electrical discharges.

(c) The Concessionaire shall design systems with sufficient redundancies in critical components, which will allow maintenance and repair without adversely affecting transshipment operations. The design shall include features and redundancies to allow routine and preventive plant maintenance to be accomplished without outages. The Concessionaire shall address these features in the operation and maintenance manuals.

1.2.9.7 The Concessionaire shall provide all designs to ensure ease of maintenance.

1.2.9.8 The Concessionaire shall carry out all design work so as to mitigate the impacts during the construction and operation phases and reduce the environmental impact of possible breakdowns or failures and shall also include measures to mitigate any such impact. The design shall address plant reliability and the probability of failure, together with the economic costs of mitigation.

1.2.9.9 The Concessionaire shall provide designs that address visual impacts, including excessive background illumination, in a manner that prevents adverse visuals impact to Canal operations and surrounding communities. The Concessionaire shall consider natural visual barriers such as vegetation or light shades.

1.2.10 **Suitability of Plant (Equipment):**

1.2.10.1 All components and equipment of electronic, electrical, mechanical, and hydraulic systems shall be suitable for the conditions prevailing at the work site. The Concessionaire shall provide temperature-controlled and/or humidity-controlled environments as recommended by the manufacturer or as indicated in the program for each building.
1.2.10.2 Degrees of protection against the intrusion of foreign substances, such as dirt, water, and particles, shall be provided by enclosures for all electrical components such as motors, cubicles, junction boxes, switches, sockets, and miscellaneous electrical devices.

1.2.10.3 Equipment installed with anti-condensation heaters shall be provided with suitable safeguards to permit operation without damage should the heaters be left on continuously.

1.2.11 Appurtenances: The Concessionaire shall provide all features required for the overall operation and maintenance of the transshipment port facilities and their complementary facilities, including, but not limited to, the following:

1.2.11.1 The Concessionaire shall provide all operation facility buildings and shall efficiently locate the wharfs, container storage areas, internal roads, railroad rungs, various buildings, staging areas, access roads, and parking facilities to achieve efficient operations and low maintenance requirements. The Concessionaire shall include unused outdoor spaces in the layout. These unused outdoor spaces shall be graded to provide visibility and access for operation and maintenance of the transshipment facilities and container storage areas and landscaped to provide pervious vegetated areas around roads and buildings where appropriate.

1.2.11.2 The Concessionaire shall provide public areas with access provisions for persons with disabilities.

1.2.11.3 The Concessionaire shall provide specialized parking for persons with disabilities in all parking areas.

1.2.11.4 The Concessionaire shall provide all appurtenances required for a complete job.

1.2.11.5 Safety and protection features for the facilities shall include provisions for and identify appropriate location of safety rails, machinery and equipment supports, power and communication lines and poles, marine fender systems, and other related appurtenances.

1.2.12 Aesthetic Design:

1.2.12.1 The structures for the transshipment port facilities and their complementary facilities shall blend in with the setting. The structures shall have neat and clean lines and shall adhere to functionality, and efficiency.

1.2.12.2 The design shall utilize architectural techniques and resources, including solar orientation, prevailing winds and landscape features to provide occupant comfort, energy-efficient buildings, and functionality of the transshipment port facilities and their complementary facilities resulting in efficient operations and low maintenance requirements.

1.2.13 Environmentally Responsible Design:

1.2.13.1 Green Port Requirements: The Concessionaire shall to design and construct facilities so as to enable the Concessionaire to obtain a green certification as prescribed in clause 8.9(b) of the Concession Agreement.

1.2.13.2 Environmental Impact: The Concessionaire shall adhere to the environmental impact study (“Estudio de Impacto Ambiental” (EsIA), as included in Appendix 10 of the Concession Agreement and the Concessionaire shall develop an Environmental Management Plan (EMP).

1.2.13.3 The Concessionaire shall prepare the designs, and conduct the construction work, for transshipment port facilities in a manner that prevent, mitigate and reduce environmental and social impacts.
1.2.13.4 The Concessionaire shall prepare designs that minimize adverse effects on the exterior environment; enhance the quality of the indoor environment; and minimize the consumption of energy, water, construction materials, and other resources. Designs shall consider an operational and environmental efficient load and transportation system for the movement of goods and people including but not limited to materials, structures, equipment, traffic plan and others components of the transportation system in order to minimize noise, emissions, traffic issues and other impacts in connection with the transportation system within the concession area and in the vicinity of the concession area.

1.2.13.5 The Concessionaire shall take into account, starting during the design phase, the impact of construction and operation activities on the environment and existing infrastructure. This shall include the control of:

(a) Noise and vibration during construction and operation.

(b) **Rainwater Runoff**: The Concessionaire’s design shall address key issues associated with management of storm water, including but not limited to: separation of clean and dirty water, minimizing run-off, avoiding erosion of exposed ground surfaces, avoiding sedimentation of drainage systems and minimizing exposure of polluted areas to storm water. The Concessionaire shall consider the timely implementation of best practices including but not limited to: slope reduction, minimization, runoff velocity limitation and appropriate drainage installations to reduce erosion in the area. The facilities shall be designed for the full hydraulic load, including contributions from upstream catchments. The storm water systems shall be directed to the ocean side. The Concessionaire shall protect storm water drains, ditches, and stream channels against erosion through measures including but not limited to: a combination of adequate dimensions, slope limitation techniques and revegetation of disturbed areas including seeding; these measures shall be performed in a timely manner to avoid erosion issues. Storm water shall be treated to comply with applicable laws before its discharge to the ocean side.

(c) **Water Conservation and Reuse**: The Concessionaire shall design and construct the facilities considering the implementation of water conservation measures. Measures to be implemented shall include but not be limited to: installation of water measuring system in areas where greatest water use is expected, installation of water saving equipment in lavatories (such as low flow toilets), installation of self-closing taps, automatic shut off valves, spray nozzles, pressure reducing valves, and water conserving fixtures (e.g. low flow shower heads, faucets, toilets, urinals, and spring loaded or faucets equipped with sensors).

(d) Groundwater lowering and dewatering of excavations (the Concessionaire shall be aware that there is a risk that existing structures may settle as a consequence of groundwater lowering and shall make all necessary provisions to avoid damage to existing facilities).

(e) Industrial and other types of runoff.

(f) Excess excavation material (which shall be disposed of).

(g) **Landscaping and Erosion**: The Concessionaire’s design shall address the restoration of affected areas as practical considering the visual aspects of the surrounding landscape. The final design shall take into consideration the proximity to public viewpoints and the visual impact over the area.

(h) **Emissions**: The design shall include shore power along the berth, and electric cranes (STS and RTG). The design shall also consider renewable energy sources to such as solar, or any other way to reduce the greenhouse gases emissions, using low energy and energy efficient terminal and operational equipment. The Concessionaire shall also ponder the use of alternative cleaner and less greenhouse intensive fuels for cargo handling equipment, vehicles and other operational requirements and the use of energy efficient vehicles and equipment.
(i) **Social Aspects:** The Concessionaire’s design shall provide for operational procedures to avoid disturbance to nearby communities, including those associated to construction work traffic, traffic associated to the operation of the facilities, avoidance of public roads use as parking or waiting areas, diminishing traffic impact associated to employee’s transportation through the establishment of dedicated transport services, working schedules and or activities schedule to avoid disturbances.

1.2.14 **Support Facilities:** The work includes the design and construction of support facilities in the concession area as required according to good industry practices. These facilities shall include but not be limited to the following.

1.2.14.1 Gatehouse;
1.2.14.2 General parking area;
1.2.14.3 Staging area for trucks;
1.2.14.4 Administration building;
1.2.14.5 Administration and visitor car park facilities;
1.2.14.6 Terminal equipment parking facilities;
1.2.14.7 Electrical main and substations;
1.2.14.8 Workshop and associated facilities;
1.2.14.9 Open equipment repair area (based upon operational solution);
1.2.14.10 Equipment washing area;
1.2.14.11 Rubber tired gantry cranes (RTG) service area;
1.2.14.12 Fuel station;
1.2.14.13 Bus stop locations for terminal transportation activities;
1.2.14.14 Fire station and emergency services facilities;
1.2.14.15 Refrigerated container genset mounting and dismounting facility;
1.2.14.16 Area for hazardous storage of leaking containers;
1.2.14.17 CCTV poles and other security support facilities.

### 1.3 **GENERAL DESIGN CONSIDERATIONS**

#### 1.3.1 **Ambient Conditions:** The design shall be adequate for the following ambient outdoor design conditions at the work site:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average maximum dry bulb</td>
<td>35.0 degrees Centigrade (1)</td>
</tr>
<tr>
<td>temperature</td>
<td></td>
</tr>
<tr>
<td>Extreme minimum dry bulb</td>
<td>18 degrees Centigrade (1)</td>
</tr>
<tr>
<td>temperature</td>
<td></td>
</tr>
</tbody>
</table>
1.3.2 Structural Design Requirements

1.3.2.1 General: The structural requirements with respect to the analysis and design given herein are minimum requirements, and compliance with them does not relieve the Concessionaire of his obligation to comply with the fitness for purpose requirements and design life requirements.

1.3.2.2 Design Codes: All structural analysis, design, design loads and load combinations, for the new buildings, structures and facilities, shall be in accordance with the requirements of the “Reglamento Estructural de Panamá – 2014 (REP-14)” and the latest edition of the following documents, where/when applicable:

(a) American Concrete Institute ACI 318, Building Code Requirements for Structural Concrete and Commentary;

(b) ACI 357, Guide for Design and Construction of Waterfront and Coastal Concrete Marine Structures;

(c) American Association of State Highway and Transportation Officials (AASHTO) Standard Specifications for Highway Bridges;

(d) American Institute of Steel Construction (AISC) Code of Standard Practice for Structural Steel Buildings and Bridges;

(e) AISC Steel Construction Manual;

(f) American Society of Civil Engineers ASCE 7, Minimum Design Loads of Buildings and Other Structures;

(g) American Welding Society AWS D1.1/D1.1M, Structural Welding Code – Steel;

(h) International Code Council (ICC) International Building Code;

(i) U.S. DOD Unified Facilities Criteria UFC 4-152-01, Design: Piers and Wharves;

(j) U.S. DOD Unified Facilities Criteria UFC 4-159-03, Design: Moorings;
1.3.2.3 **Wind:** The minimum design wind (3 second gust) velocities shall be as follows:

(a) **Pacific Region of Panama:** 115 km/h.

(b) The analysis and design procedures related to the application of these minimum design wind velocities, shall be in accordance with the “Reglamento Estructural de Panamá – 2014 (REP-14)”, ASCE 7, and good industry practices.

1.3.2.4 **Live Loads:** The minimum design live loads shall be in accordance with the values in the “Reglamento Estructural de Panamá – 2014 (REP-14)” or ASCE 7, whichever is more critical.
1.3.2.5 **Seismic Loads:** The minimum design seismic loads shall be in accordance with section 01 81 16.13 (*Seismic Design Criteria*), the provisions and requirements of capítulo 5 (*Requisitos de Diseño Sísmico*) of the “Reglamento Estructural de Panamá – 2014 (REP-14)’’ and ASCE 7. The analysis and design procedures related to the application of these minimum design seismic loads, shall be in accordance with REP-14.

1.3.3 **Mechanical Design Requirements:** Mechanical design and construction shall conform to standards prepared by the following authorities.

1.3.3.1 ACGIH, American Society of Governmental Industrial Hygienists (Dust Control);

1.3.3.2 AFBMA, Antifriction Bearing Manufacturers Association;

1.3.3.3 AGMA, American Gear Manufacturer’s Association;

1.3.3.4 ASHRAE, American Society of Heating, Refrigerating and Air-Conditioning Engineers;

1.3.3.5 ANSI, American National Standards Institute;

1.3.3.6 ASME, American Society of Mechanical Engineers;

1.3.3.7 ASTM, American Society for Testing and Materials International;

1.3.3.8 CEMA, Conveyor Equipment Manufacturer’s Association;

1.3.3.9 FM, Factory Mutual;

1.3.3.10 ISO, International Standards Organization;

1.3.3.11 MPTA, Mechanical Power Transmission Association;

1.3.3.12 NFPA, National Fluid Power Association;

1.3.3.13 NFPA, National Fire Protection Association;

1.3.3.14 UL, Underwriters Laboratories;

1.3.3.15 RMA, Rubber Manufacturing Association.

1.3.4 **Utility Line Separations:** Without in any way limiting the Concessionaire’s obligations as set out elsewhere in these design - construction technical specifications, the Concessionaire shall design and construct underground utilities to meet the requirements included in the following table.

<table>
<thead>
<tr>
<th>Utility</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>All utilities</td>
<td>New utility lines shall not be aligned directly above nor below existing utility lines.</td>
</tr>
<tr>
<td>All utilities</td>
<td>New utility lines shall not be aligned directly above nor below other utility lines.</td>
</tr>
<tr>
<td>Energy / telecommunications bare cables</td>
<td>Minimum separation shall be the more stringent requirement included in IEEE NESC or 915 mm (3 feet) in well-compacted backfill.</td>
</tr>
</tbody>
</table>
### Utility Requirement

<table>
<thead>
<tr>
<th>Utility</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil / water / gas / vapor pipelines</td>
<td>Minimum horizontal separation shall be 7 m (22.97 feet) from exterior surface of existing pipes. For piping on the same side of streets or railways, minimum horizontal separation shall be 5 m (16.4 feet) from exterior surface of existing pipes. Minimum vertical separation shall be 1 m (3.28 feet) from exterior surface of existing pipes.</td>
</tr>
<tr>
<td>Energy raceways</td>
<td>Minimum separation shall be the more stringent requirement included in IEEE NESC or in concrete, 100 mm (4 inches); in concrete masonry unit walls, 100 mm (4 inches); in tunnels, 1,220 mm (4 feet); in well-compacted backfill, 0.305 m (1 foot). Multiple terminations at the same post shall be avoided.</td>
</tr>
<tr>
<td>Telecommunications ductlines</td>
<td>Minimum separation shall be the more stringent requirement included in IEEE NESC or for ductlines embedded in concrete, 305 mm (1 foot) for crossings, and 610 mm (2 feet) for parallel alignments; for ductlines not embedded in concrete, 460 mm (18 inches) for crossings, and 915 mm (36 inches) for parallel alignments.</td>
</tr>
</tbody>
</table>

**1.3.5 Temporary Work:** Where temporary structures may affect the permanent structures, the analysis and design requirements for permanent structures, shall apply to the temporary structures as well. Otherwise, temporary structures may be designed in accordance with the reduced safety factors specified in the “Reglamento Estructural de Panamá – 2014 (REP-14)”.

**1.4 WORK TO BE PERFORMED BY THE CONCESSIONAIRE:**

**1.4.1 Design:** Design work includes the preparation drawings and specifications for the construction of transshipment port facilities and their complementary facilities. The Concessionaire shall scrutinize and diligently examine the work site, the Concession Agreement requirements, and the reference documents to prepare the design. The Concessionaire shall determine the extent of the demolition work. The Concessionaire shall undertake additional geotechnical investigations as required to determine and prepare earthwork, dredging work and foundation design. Design work shall address the following items and other items as required for complete job.

**1.4.1.1 Dredging:** Dredging for berthing pool and its vessel accesses, that is not included in work to be performed by others as prescribed in paragraph 1.5.1 (Dredging), shall be as required to meet Concession Agreement requirements. Berth pool along the wharf shall be dredged to at least -18 m MLWS and 70 m wide.

**1.4.1.2 Berthing Structures:** Berthing structures shall include earthwork, wharf structures, fenders, shore protection structures and other necessary marine construction work.
1.4.1.3 **Container Storage Areas:** Container storage areas shall include earthwork, pavements, roads, and drainage systems.

1.4.1.4 **Terminal Equipment:** Equipment shall include electric STS cranes (gantry cranes), electric RTG cranes, loaders and other equipment required for transshipment port operations.

1.4.1.5 **Complementary facilities:**

(a) **Buildings and other Facilities:** This item includes buildings and facilities required for the operation, maintenance, personnel and security of the transshipment port facilities. The buildings and facilities shall be appropriately designed to house all needed plant, controls and machinery, equipment and personnel requirements.

(b) **Site and Infrastructure:** This item includes all heavy civil work and utility considerations, as well as site construction including, but not limited to, the following:

(1) **Earthwork:** This item includes excavation and fill, grading the areas to drain with no standing water evident within 30 minutes of a rainfall.

(2) **Exterior Improvements:** This item includes walkways, fences and other exterior improvements. Exterior improvements shall include a staging area for trucks.

(3) **Utilities:**

a. **Utilities for Transshipment Port Facilities:** The Concessionaire shall procure utility services for transshipment port facilities from utility companies authorized to provide utility services in the Republic of Panama. This item includes the design of utilities within the concession area and utilities connecting the concession area with the existing infrastructure of utility companies authorized to provide utility services in the Republic of Panama. Within the concession area, the work includes the design of all utilities to feed the required operational buildings and facilities and for maintenance, security and personnel buildings and facilities. The design includes sizing for future demand. The design for the proposed maintenance, security and personnel buildings and facilities shall be prepared to avoid demolitions to make future connections.

b. **Utilities for Vessels:** The Concessionaire shall procure utility services for vessels from utility companies authorized to provide utility services in the Republic of Panama. The Concessionaire shall provide the following utilities for vessels through transshipment port facility infrastructure: water and energy. This item includes the design of utilities within the concession area and utilities connecting the concession area with the existing infrastructure of utility companies authorized to provide utility services in the Republic of Panama. The design includes sizing for future demand. The design shall be prepared to avoid demolitions to make future connections.

c. **Fuel:** At the Concessionaire’s sole discretion, the Concessionaire may the provide fuel for vessels from ACP facilities; the Concessionaire shall not the provide fuel for vessels from other facilities. This item includes the design of systems to provide fuel to vessels within the concession area from a point on the perimeter of the concession area to be determined by the ACP. The design includes sizing for future demand. The design shall be prepared to avoid demolitions to make future connections.

d. **Third Party Utilities:** The Concessionaire shall ensure that the services provided by third party utility infrastructure are not interrupted during the construction and operation sub-phases of the work. The ACP has identified an IDAAN sanitary sewer line that runs across the concession area, an IDAAN sanitary sewer line that runs across the rail spur access area, and a MOP storm drainage line that runs across the rail spur access area; refer to drawing SK-57-2. Afforested lines that run across the rail spur access area also run across the expansion of the concession area; refer to drawing SK-57-2.
The Concessionaire retains full responsibility for and shall satisfy itself and make its own inquiries as to all third party utilities present at or near the work site. The Concessionaire shall upgrade affected third party utility infrastructure to comply with applicable laws. The Concessionaire shall coordinate the design parameters for third party utility infrastructure with the corresponding utility provider. The Concessionaire shall complete new third party utility infrastructure before affecting existing third party utility infrastructure. The Concessionaire shall copy the Contracting Officer on all communications with affected third party utility providers.

(4) **Transportation.** This item includes roads within the port complex and railroad spur.

(c) **Facility Services:** This item includes, but is not limited to, all work addressing fire suppression, plumbing, ventilating, air conditioning, integrated automation, electrical systems, communications, compressed air, and electronic safety and security in the required operational buildings.

(d) **Process Equipment (Plant):** This item includes, but is not limited to, all work addressing process integration, wastewater treatment plants (WWTP), pollution-control equipment, and electrical-power generation.

(e) **Communications, Control, Security, and Safety (CCSS) Systems:** This item includes the design of fire-fighting control systems (FFCSs), electrical-distribution control systems (EDCSs) and other CCSS systems.

1.4.2 **Construction.** The Concessionaire shall build the complete transshipment port facilities and their complementary facilities according to the Concessionaire’s design.

1.5 **WORK PERFORMED BY OTHERS:**

1.5.1 **Dredging:** The ACP will perform dredging as stated in clause 5.1 of the Concession Agreement. Reference drawings 6121-362 are provided for information purposes. In general, this dredging will be to a depth of -16.3 m MLWS at the navigational channel, and to provide a 550 m diameter turning basin.

1.5.2 **Demolition:** The ACP will perform the demolition of the pier at Diablo assigned to the ACP’s Sección de Administración de Flota e Inversiones (OPMA); this includes the demolition of Building 6007 located on the pier.

1.5.3 **Removals:** Next to Building 446, the ACP will remove an asphalt tank assigned to the ACP’s “Sección de Mantenimiento de Instalaciones y Obras Civiles” (OPEM); an unused tank assigned to the ACP’s “Sección de Prevención y Control de Derrames” (OPPD). The ACP will remove transformers and other electrical equipment assigned to the ACP’s “Sección de Alto Voltaje” (EAEA) in and around Transformer House 436.

1.5.4 **Connections:** The ACP will perform the final connections to ACP utilities lines for fuel in the case that the concessionaire chooses to provide this service to vessels. The Concessionaire shall complete all required work and provide all required products prior final connection work by the ACP.

END OF SECTION
SECTION 01 14 00 - WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SCOPE: This section details the programming, coordination, and scheduling obligations of the Concessionaire with respect to existing ACP and third party operations.

1.2 APPLICABLE PUBLICATIONS: The publications listed below, but referred to hereinafter by designation only, are part of these requirements to the extent referenced.

1.2.1 ACP Publications:

<table>
<thead>
<tr>
<th>Publication</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMOCP</td>
<td>Reglamentos Marítimos para la Operación del Canal de Panamá; the RMOCP comprises Reglamento de Arqueo de Buques para la Fijación de Peajes por el Uso del Canal de Panamá, Reglamento sobre Procedimiento para el Cambio de las Reglas de Arqueo y de los Peajes del Canal de Panamá, Reglamento para la Navegación en Aguas del Canal de Panamá, Reglamento de la Junta de Inspectores de la Autoridad del Canal, and Reglamento de Sanidad y Prevención de Enfermedades Contagiosas, including all amendments</td>
</tr>
<tr>
<td>OP Notice to Shipping No. N-1-2016</td>
<td>Vessel Requirements</td>
</tr>
<tr>
<td>OP Notice to Shipping No. N-2-2016</td>
<td>Harbor Operations</td>
</tr>
<tr>
<td>OP Notice to Shipping No. N-9-2016</td>
<td>Marine Accident Investigations</td>
</tr>
<tr>
<td>OP Notice to Shipping No. N-10-2016</td>
<td>Operational Equipment Tests</td>
</tr>
<tr>
<td>OP Notice to Shipping No. N-11-2016</td>
<td>Operation of Commercial and Non-Commercial Small Craft in Panama Canal Waters</td>
</tr>
<tr>
<td>OP Notice to Shipping No. N-12-2016</td>
<td>Panama Canal Shipboard Oil Pollution Emergency Plan (PCSOPEP) Requirements</td>
</tr>
<tr>
<td>2600SEG-313</td>
<td>Normas de Seguridad Marítima sobre Condiciones de Navegabilidad y Equipos de Navegación Requeridos a Bordo de los Equipos Flotantes, (1-Apr-09 revision)</td>
</tr>
<tr>
<td>1410SAL130(R5)</td>
<td>Norma de Seguridad de Buceo Industrial</td>
</tr>
</tbody>
</table>
1.3 PROGRAMMING AND SCHEDULING REQUIREMENTS:

1.3.1 Potential interruptions: The work requires special attention to the scheduling, programming, and implementation of all activities that may affect the ACP’s, third party operations and nearby communities at the work site and surrounding areas. The Concessionaire shall identify on all schedules each event that constitutes a potential interruption to ACP’s, third party operations; also, the Concessionaire shall identify on all schedules each event that constitutes a potential interruption to ACP and third party roads, utilities, navigational and terrestrial traffic.

1.3.2 Aids to Navigation:

1.3.2.1 Existing ACP navigational aids, such as fluorescent bank lights, in the concession area and in the way of the execution of the work will be removed by the ACP after written notification by the Concessionaire. The Concessionaire shall identify the navigational aids in the way of the execution of the work and notify immediately the Contracting Officer, so that a reasonable amount of time is allowed for the ACP for their removal.

1.3.2.2 The Concessionaire shall coordinate the removal of existing aids to navigation with the Contracting Officer, both in the work schedule review and 28 days prior to the desired removal date. The Concessionaire shall not block the line of sight along the line of range targets when performing the work and shall consider this restriction when planning the work.

1.3.3 Rail Access Considerations: The design of the rail access corridor in the rail spur access area requires the approval of the Contracting Officer. This design shall be prepared and corresponding construction work shall be performed at the Concessionaire expense taking into account the following considerations.

1.3.3.1 Access to and Circulation within Corozal Oeste: Neither the design nor the construction work shall hinder the access to ACP facilities in Corozal Oeste nor adversely affect travel times between ACP facilities in Corozal Oeste. Travel times between facilities shall remain unchanged or be reduced. Emergency services response time to reach each ACP facility in Corozal Oeste shall not increase. If required, new access facilities shall provide equal or better vehicular capacity and geometry with respect to existing access facilities.

1.3.3.2 Relocations:

(a) The Concessionaire shall determine facilities to be demolished resulting from rail access considerations. The Concessionaire shall submit facilities that require demolition works allowing the ACP a timeframe for relocation and/or free occupancy for up to eighteen (18) months prior to the initiation of the demolition works by the Concessionaire. The demolition plan and schedule of these facilities requires the approval of the Contracting Officer. The Concessionaire shall complete the design of utilities that require relocation and/or protection, before commencing corresponding relocation/modification works. Also, the Concessionaire shall commence modification of utility services only after the ACP has accepted corresponding temporary or permanent work required to provide uninterrupted utility services.

1.4 COORDINATION PRIOR TO ACCESS TO THE SITE AND USE OF PREMISES:

1.4.1 Obstacle Removal:

1.4.1.1 The Concessionaire shall coordinate with the Contracting Officer regarding the commencement of the work at the work site so that any obstacles therein that will remain the property of the ACP can be removed by the ACP. For this purpose, the Concessionaire shall give written notice to the Contracting Officer at least 28 days in advance of his intended date to start the construction work.
1.4.1.2 Properties that belong to the ACP or third parties and that are to remain within the work site shall be protected from damage that might otherwise result from the execution of the work. If any such property is in the way of the execution of the work, the Concessionaire shall coordinate with the Contracting Officer and allow a reasonable amount of time for the ACP or affected third party to remove it.

1.4.2 Working Hours: Construction work at the work site will be permitted 24 hours every day and 7 days a week. The Concessionaire shall provide sufficient area lighting for the work to proceed safely and efficiently during hours of darkness. The Concessionaire shall submit the proposed specification and location of the lights for the Contracting Officer’s review; lighting shall not affect the ACP pilots nor surrounding communities. Work shall not produce excessive noise as defined in section 32 35 16 (Noise Pollution Control), paragraph 1.3.3 (Noise Limits) within the periods established in section 32 35 16, paragraph 1.3.3.

1.5 OCCUPIED BUILDINGS: The Concessionaire shall be working near and around existing buildings. The Concessionaire shall not enter these buildings without prior approval of the Contracting Officer. The Concessionaire shall take all necessary actions to avoid damage to buildings. Any needed repair costs will be charged to the Concessionaire.

1.6 FLOATING EQUIPMENT:

1.6.1 General Requirements:

1.6.1.1 The Concessionaire’s operations and activity coordination shall comply with the ACP’s Maritime Regulations for Operations at the Panama Canal (also known under its Spanish designation “Reglamentos Marítimos para la Operación del Canal de Panamá” (RMOCP)) and all other prevailing ACP regulations. Concessionaire’s floating equipment and vessels, which the Concessionaire schedules for use in the Canal operation compatibility area, require prior ACP inspection and approval for operation in accordance with requirements specified in the ACP’s RMOCP and all amendments, OP Notice to Shipping No. N-1-2016 (Vessel Requirements) and all revisions thereof, and norm 2600SEG-313. These documents are available through URLs http://micanaldepanama.com/servicios/canal-servicios-maritimos/reglamentos-maritimos/, http://micanaldepanama.com/servicios/canal-servicios-maritimos/avisos-a-navieras/, and http://micanaldepanama.com/servicios/canal-servicios-maritimos/normas-de-seguridad-maritima/, respectively. The English translation of the RMOCP is available through URL https://www.pancanal.com/eng/maritime/regulations/index.html; the official version of the RMOCP is in Spanish; the English translation is intended solely for the purpose of facilitating an overall understanding of the content of the original version.

1.6.1.2 The Concessionaire shall be deemed to have obtained all necessary information as to on-site conditions which may influence or affect the work, including but not limited to waves, bank suction and thrust generated by vessel traffic, tugs, recreational and work launches and barges, currents, heavy rain; fog; thunderstorms; swells; and the proximity to anchorages, beaching areas, moorings, marinas and shallow waters. The Concessionaire shall monitor such on-site conditions and be prepared to address them.

1.6.1.3 Dredges, leveling devices, drilling and blasting barges, any other support floating equipment shall be fully equipped and manned to safely and effectively operate, move, navigate, moor or be spudded to bottom; otherwise, ACP authorities may require the Concessionaire to implement corrective actions including designating additional skilled labor. Floating equipment shall be able to raise or lower spuds in approximately 5 minutes and to accomplish make-up and cast-off maneuvers and be ready to get under way in approximately 10 minutes. Leveling devices referred to in this paragraph 1.6.1.3 include but are not limited to bed levelers, heavy drags, plows, and leveling beams. Other support floating equipment referred to in this paragraph 1.6.1.3 include but are not limited to tugboats, work or multipurpose launches, barges, and pontoons.
1.6.1.4 The Concessionaire’s floating equipment shall display the day shapes and lights for the vessel and activity being performed, in compliance with the RMOCP. Day shapes shall be of solid appearance and installed where they can better be seen from other vessels. Lights shall be of solid appearance, be installed where they can better be seen from other vessels, and comply with the arc of visibility, range, color and characteristic required according to ACP regulations. The Concessionaire shall ensure that day shapes and lights are not obstructed by any superstructure or operational component that may impair visibility for transiting vessels and vessels in the vicinity.

1.6.1.5 Support equipment shall be fully manned, equipped and possess the necessary horsepower to expeditiously, safely and effectively relocate the assigned floating equipment as required not to interfere with Canal operations. Support vessels shall be required to achieve a speed of 8 knots, but a minimum speed of 5 knots will be accepted when towing or pushing fully laden vessels. Support equipment referred to in this paragraph 1.6.1.5 include but are not limited to tugs, workboats, diver tenders, multipurpose launches, and pontoons. Assigned floating equipment referred to in this paragraph 1.6.1.5 include but are not limited to barges in light or loaded conditions, dredges, and drill boats. Fully laden vessels referred to in this paragraph 1.6.1.5 include but are not limited to dump barges, dredges, barges, and pipeline tows.

1.6.1.6 The Concessionaire shall maintain its vessels and equipment in good operating conditions at all times. If the Contracting Officer determines that the Concessionaire’s vessels or equipment is not in good operating condition, the Contracting Officer may require the Concessionaire’s vessels or equipment to stop work, or the Contracting Officer may require ACP equipment support at the Concessionaire’s expense.

1.6.2 Inspection and Testing:

1.6.2.1 The Concessionaire shall submit vessel documentation at least 28 days prior to each vessel’s arrival at the work site. For each vessel, the Concessionaire shall request its first inspection at least 14 days before the programmed inspection date. The Concessionaire shall notify any changes in the programmed inspection dates to the Contracting Officer 48 hours in advance of the programmed date. The Concessionaire shall submit documentation and certifications required and issued by the Republic of Panama’s “Autoridad Marítima de Panamá” (AMP) to the Contracting Officer at least 14 days before the programmed first inspection date. The Concessionaire shall submit a valid Navigation Permit (Permiso de Navegación para Naves Comerciales) to the Contracting Officer on the inspection day; the Concessionaire shall submit an additional valid Navigation Permit to the ACP Marine Safety Inspector. Concessionaire’s vessels shall not start operations at the work site until after ACP’s approval of vessel documentation. Vessels documentation referred to in this paragraph 1.6.2.1 shall be documentation required by ACP, AMP and other authorities having jurisdiction, and includes but is not limited to licenses, load line certificates, register certificates, and inspection papers.

1.6.2.2 For vessels with gross registered tonnages (GRTs) over 3,000, the required documentation and certificates include, but are not limited to:

(a) Cargo ship safety radio certificate.

(b) Cargo Ship Safety Construction Certificate (SAFCON).

(c) Cargo Ship Safety Equipment Certificate.

(d) Safety Management Certificate (SMC) and Document of Compliance.

(e) International Load Line Certificate.

(f) International tonnage certificate.

1.6.2.3 For other vessels, the required documentation and certificates include, but are not limited to:
(a) Tonnage certificate for vessels under 24 m in overall length.
(b) Cargo ship safety certificate for non-conventional vessels.
(c) Cargo ship safety radio certificate for vessels with GRTs under 3,000.
(d) Minimum safe manning certificates (MSMC).
(e) Certificate of Inspection of Crew Accommodation.
(f) Garbage record book.
(g) Oil record book.

1.6.2.4 Inspections shall be coordinated through the Contracting Officer and will be performed by the ACP’s “División de Operaciones de Tránsito” (OPT); “División de Dragado” (OPD); “Unidad de Seguridad Marítima” (OPXI-S); “Sección de Salud, Bienestar y Salud Ocupacional” (RHSS); “División de Ambiente” (EAC); and other specialized units, depending on the type of equipment or activity.

1.6.2.5 For the purpose of verifying compliance with ACP regulations, the Concessionaire shall allow specialized ACP personnel to embark and inspect the Concessionaire’s floating equipment at all times. These visits may be scheduled or may be at random, but in all cases, inspections shall be coordinated with the Contracting Officer. Whenever non-compliances are found in vessels or excessive delays are incurred to correct these non-compliances, authorization for these vessels to operate will be subject to temporary suspension or termination.

1.6.2.6 ACP inspection may include vessel structural components, hull, operational components, anchoring system, cranes or hoisting equipment, equipment and instrumentation, void tanks, hoisting devices, firefighting system, rescue and emergency equipment, engine room, sanitary installations, deck, accommodations, ventilation systems, environmental measures and other matters addressed under ACP regulations.

1.6.2.7 All necessary clean-up, ventilation and preparatory work needed to prepare vessels for inspection shall be at the Concessionaire’s expense. Inspections shall be conducted jointly by ACP and Concessionaire’s personnel. Non-compliances found will be notified to the Concessionaire for corrective actions. Once the non-compliances have been corrected, the Concessionaire shall request a final inspection. The ACP will only cover ACP’s inspection service fee the first inspection; if additional inspections are necessary, they will be conducted at the Concessionaire’s expense. The ACP service fee for inspection of commercial vessels is B/.90.00 per hour.

1.6.2.8 If ACP specialists determine or suspect that a vessel or other floating equipment does not have the necessary capacity to perform the duties assigned or that its complexity may require additional inspections, the Concessionaire shall allow the ACP to test the vessel or equipment. Depending upon the test results, restrictions for the operation of the vessel or equipment may be imposed; in such case, the Concessionaire shall agree to comply with those restrictions or replace the vessel or equipment with one that meets the established requirements.

1.6.2.9 Any vessel or equipment previously approved that later undergoes major repairs, dry-docking, or replacement of main components or instrumentation, shall be subsequently inspected by ACP specialists before receiving an authorization to operate.

1.6.3 Personnel Requirements:

1.6.3.1 The Concessionaire shall submit its officer’s qualifications for approval. In addition to requirements prescribed elsewhere in the Concession Agreement and in order to operate the
Concessionaire’s vessels and equipment in Canal waters, the Concessionaire’s officers assigned to the Concessionaire’s vessels and equipment shall comply with the requirements included in this paragraph 1.6.3 (Personnel Requirements). The Concessionaire’s officers referred to in this paragraph 1.6.3.1 are the operators, masters and captains assigned to the Concessionaire’s vessels.

1.6.3.2 The Concessionaire shall assign officers to operate Concessionaire’s vessels with the following characteristics and/or under the following conditions.

   (a) Over 20 meters (65 feet) and under 38.1 m (125 feet) length overall (LOA).

   (b) Gross tonnage over 1,000.

   (c) LOA less than 125 feet or gross tonnage under 1,000 and assigned to perform maneuvers or operations that restrict them in their ability to maneuver.

1.6.3.3 The Concessionaire shall submit its officers’ documentation to the ACP’s Port Captain’s office through the Contracting Officer at least 14 days prior to the date the Concessionaire’s officers are scheduled to report for duty on board the Concessionaire’s vessels or equipment. At the time of submittal, the Concessionaire shall formally request the evaluation and certification, including the pilot-exemption process. The Concessionaire’s officers’ documentation referred to in this paragraph 1.6.3.2(c) include but is not limited to licenses, certificates, AMP license or validation, and curriculum vitae.

1.6.3.4 After the Concessionaire’s officers’ documentation and the formal pilot-exemption application have been submitted, and after their assigned vessels and equipment have been inspected and approved for work in Canal waters, the Concessionaire’s officers will be allowed to operate the assigned vessels and equipment under the direction and supervision, for navigation purposes, of ACP-provided pilots or other specialized maritime personnel as required according to the type of operation, for a maximum of 240 hours, in order to obtain the necessary experience in Canal waters. Once this period elapses, the ACP will evaluate the Concessionaire’s officers.

1.6.3.5 ACP personnel assigned to each of the Concessionaire’s vessels and equipment according to paragraph 1.6.3.3 will be free of charge to the Concessionaire, until the assigned Concessionaire’s officers have successfully completed the evaluation, courses and tests as scheduled by ACP. If Concessionaire’s officers fail to attend the courses or examinations or fail to pass them, then the Concessionaire will be charged the commercial rate for pilotage services or for the services of any other ACP personnel assigned to the Concessionaire’s vessels and equipment.

1.6.3.6 Generally, ACP evaluation and certification process for the Concessionaire’s officers includes the following.

   (a) Each Concessionaire’s officer candidate shall attend a maritime and Canal operations orientation course at the ACP training unit for a total of 8 to 16 hours; course duration will depend on the ACP’s evaluation of Concessionaire’s officer candidate’s documentation and performance during the evaluation and certification process. Courses will be taught in English or Spanish, as per the Concessionaire’s preference.

   (b) Each Concessionaire’s officer candidate shall pass a theoretical (written and/or oral) test at the ACP training unit.

   (c) Each Concessionaire’s officer candidate shall pass a hands-on-training and/or practical test on board the assigned Concessionaire’s vessel or equipment, which shall include, in addition to standard navigation maneuvers, additional specific maneuvers required to comply with the proposed operations. The number of sessions will depend on the complexity of the maneuvers and the Concessionaire’s officer candidate performance; and sessions last approximately 2 to 5 days.
(d) Each Concessionaire’s officer candidate shall demonstrate capacity to maintaining direct and effective communication with the rest of the crew and perfectly communicating with ACP units. This implies that the candidate shall fluently speak, understand and write in English.

1.6.3.7 For each of the Concessionaire’s officer candidate proposed for pilot exemption certification, the Concessionaire shall submit the following for the vessel and / or equipment to be operated the candidate.

(a) Vessel number.

(b) Ship identification number (SIN).

(c) Routes in which the vessel will operate.

(d) All types of operation that the vessel will carry out.

(e) Commercial license for the vessel (must be original and will be returned once verified and copied).

(f) Names of the operators of the vessel, as they appear on the current and valid licenses issued by the AMP and ACP.

(g) Details on the owning company, including office telephone number and fax. The Concessionaire shall be responsible for vessels and their officers/operators.

(h) Name and cellular telephone number of the person responsible for the vessel during non-working hours and on weekends and holidays (24-hour contact information).

(i) The Concessionaire shall submit other documentation depending on the vessel or equipment. The Concessionaire shall scrutinized ACP requirements to determine other documentation required.

1.6.4 ACP Certifications for Concessionaire’s Personnel:

1.6.4.1 The ACP requires the renewal of each of the Concessionaire’s officers’ certification every year. Concessionaire’s officers certified by ACP shall only be authorized to operate the vessels or equipment for which they were tested and authorized. Concessionaire’s officers certified by the ACP will be allowed to navigate within navigational channel boundaries only for the approved type of operation. The Concessionaire’s officers will not be allowed to transit vessels through the Panama Canal locks, unless approved by the ACP Port Captain.

1.6.4.2 The Concessionaire’s officers shall coordinate navigation within navigational channel boundaries with the ACP’s “Unidad de Control de Tráfico Marítimo” (OPTC-T). Navigation within navigational channel boundaries shall be according to the ACP’s RMOCP, and the ACP’s coordination and communication protocols. In general, the Concessionaire’s officers navigating within navigational channel boundaries shall follow the instructions from ACP Port Captains, OPTC-T, ACP pilots assigned to other Concessionaire’s vessels and aboard transiting vessels. The Concessionaire’s officers shall request access to the navigational channel from OPTC-T, and coordinate with those responsible for the navigation of other vessels in the vicinity, follow the practices of good seamanship and avoid maneuvers that may adversely impact Canal operations.

1.6.4.3 If for any reason, a certified Concessionaire’s officer is no longer able to operate its assigned vessel or equipment in a safe manner, or is rejected from continuing operations for another valid reason (such as violating the certification terms), the ACP will charge the Concessionaire for pilotage services at the prevailing commercial rates. If the Concessionaire formally request ACP to provide pilotage
service in order to supersede this certification or for a specific operation, the Concessionaire will be charged at the commercial rate.

1.6.5 **Small Craft:** In addition to requirements specified elsewhere in the Concession Agreement, vessels less than 20 meters (65 feet) in length shall comply with Notice to Shipping N-11-2016. If the characteristics of the Concessionaire’s vessels fall within the definition of small craft as stated in the RMOCP, but are normally used for towing or assisting in dredging operations, the ACP will evaluate and inspect the equipment to determine the applicable regulations.

1.6.5.1 **Licenses.** The Concessionaire’s small craft operators (including tug masters) shall hold valid licenses or other validations of their approval to operate from the AMP and the ACP. The Concessionaire shall take in consideration the time it takes to obtain the above-mentioned licenses or validations so the Concessionaire takes all steps required to obtain them before the beginning of his scheduled duties.

1.6.5.2 The Concessionaire shall submit its proposed small craft operators’ curricula vitae, which shall include police records, education, formal training, degrees and experience.

1.6.5.3 The Concessionaire shall pay a B/.500.00 fee for evaluation and license issuance for each small craft operator, plus B/.250.00 for an orientation and training course. Each course will be scheduled upon petition and must have a minimum of 6 participants. In the event of having less than 6 participants a B/.95.00 fee per hour will be applied for each participant. Course duration is 16 hours. The Concessionaire shall annually renew its small craft operator licenses. The ACP Board of Inspectors will provide the evaluation test in English or Spanish, depending upon the preference of the participants. Training will be provided by the ACP’s “Unidad de Adiestramiento Marítimo” (RHSM).

1.7 **PILOTAGE:** The Concessionaire shall comply with “Chapter V – Pilotage” of the ACP’s RMOCP. An ACP pilot or a transit advisor will be required whenever the Concessionaire is operating in Canal waters, except as provided in the second section of chapter V of the RMOCP or in the ACP’s OP Notice to Shipping No. N-2-2016 (Harbor Operations), or in any subsequent revisions. The ACP will waive pilotage or transit-advisor fees to the Concessionaire when incurred in the execution of the Concession Agreement. Tolls and other transit-related fees will be charged to the Concessionaire.

1.7.1 The Concessionaire shall submit a pilotage fee waiver justification to the Contracting Officer for approval 28 days in advance of when the Concessionaire will need ACP pilotage service. Once requested and coordinated with the Contracting Officer, pilotage services will be scheduled depending on the Concessionaire’s vessel or equipment. Pilot scheduling requires requests to be made 24 hours in advance.

1.7.2 Changes to the confirmed pilot-assignment schedule (due to rescheduling, temporary suspension of work, equipment damages or any such situation attributable to the Concessionaire’s personnel or operations) that do not comply with the 24-hour notification requirement will be charged to the Concessionaire at the ACP applicable rate.

1.7.3 The ACP pilot assigned on board the Concessionaire’s vessels or equipment shall represent the maximum authority on maneuvering and coordination with the ACP’s port captain, marine-traffic control center, and other vessels in the vicinity. The Concessionaire’s officers shall immediately and effectively follow the ACP pilot’s instructions at all times. The Concessionaire’s officers on board the Concessionaire’s vessels shall communicate with and inform ACP pilots concerning activities to be and being performed, capabilities/disabilities of the equipment, response time and all other relevant information about the procedures being carried out. ACP inspectors, representatives of the Contracting Officer and transit advisors assigned on board will assist the Concessionaire’s personnel and ACP pilots in coordinating operations.
1.7.4 The Concessionaire shall review daily transit schedules that show estimated vessel transiting times in Balboa Reach as reference when planning his work. The Concessionaire shall obtain this information through the Contracting Officer from the ACP’s “Sección de Tráfico Marítimo y Arqueo” (OPTC).

1.8 SPECIAL REQUIREMENTS DURING CONSTRUCTION:

1.8.1 Protection of Existing Roads and Property:

1.8.1.1 The Concessionaire shall take necessary precautions against injury to ACP personnel working at the work site and against damage to any property of the ACP and public or private property, during the period that work is being performed under this Concession Agreement. The Concessionaire shall take necessary precautions in order to protect all existing roads, bridges and structures during transportation and delivery to the site, and during the period that work is being performed under the Concession Agreement; the use of the internal roads of Altos de Jesus Community (also known as Diablo Community) is prohibited for construction and operational work. The Concessionaire shall conduct his operations to provide and maintain at all times of the day and night a safe passage of traffic along all highways, bridges, driveways, roads and detours within the limits of the concession area. Damage done by the Concessionaire shall be rectified at the expense of the Concessionaire and to the satisfaction of the Contracting Officer. The Concessionaire shall remove from roads, debris related to work to be performed under the Concession Agreement.

1.8.1.2 The Concessionaire shall maintain in operation the sanitary and drainage utilities that serve areas adjacent to the concession area, showed in the drawing SK-57-2 – Existing Site Conditions. The potential relocation or changes to these utilities shall be designed in accordance with applicable laws and section 01 89 19 (Sanitary Sewer and Wastewater). Design and construction work affecting third party utility infrastructure shall be coordinated with the corresponding utility provider.

1.8.1.3 Any conditions resulting from the Concessionaire’s operations, which hinder utilization of the land or endangers persons or property during and following the course of the work under this Concession Agreement shall be corrected promptly.

1.8.1.4 The Concessionaire shall avoid impounding or impeding the flow of the water in drainage canals, water supply channels, brooks, streams, etc., if they should lie within the construction area.

1.8.2 Outages: Requests for power outage shall be submitted in writing to the corresponding utility provider keeping in copy the Contracting Officer at least 28 days in advance.

END OF SECTION
SECTION 01 25 00 – PRODUCT-SUBSTITUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE: This section establishes the general requirements related to suppliers, equipment and materials as well as the substitution of such equipment and materials.

1.2 CHARACTER OF WORK: The Concessionaire shall provide equipment and materials that conform to the requirements of the Concession Agreement, are the most suitable grade for their intended uses, and are current products from manufacturers regularly engaged in the production of such equipment or materials.

1.3 SUGGESTED SUPPLIERS:

1.3.1 References to manufacturers listed in the Concession Agreement, are intended to indicate the type, style, and quality of the equipment and materials to be used or furnished, and are not intended to represent a preference of the ACP for any particular manufacturer’s product. However, in selecting any given manufacturer, full responsibility shall be assumed by the Concessionaire for furnishing equipment and materials equivalent to those that are referred to and compliant with the Concession Agreement. The quality and capacity of the equipment and materials supplied shall in no way be inferior to those referred to. Sufficient information shall be documented and maintained by the Concessionaire to allow the ACP determine that the proposed equipment and materials are equivalent to those named.

1.3.2 The names of manufacturers and addresses listed in this Appendix are furnished only as possible sources for equipment and materials named. The Concessionaire is not relieved of his responsibilities because these names or addresses may have changed. The Concessionaire shall have no right to additional payment or extension of time that may subsequently become necessary in the event the equipment and materials fail to perform adequately.

1.4 “OR EQUAL” OR “OR APPROVED EQUAL”:

1.4.1 A detailed comparison of significant qualities of the proposed product to those required by the work specified. Significant qualities may include factors such as performance, weight, size, durability, and visual effect.

1.4.2 Product data, including drawings and descriptions of products and fabrication and installation procedure.

1.4.3 The Concessionaire’s certification that the proposed product conforms to and complies with the requirements of this Appendix in every aspect and is appropriate for the applications indicated.

END OF SECTION
SECTION 01 31 19 – MEETINGS AND REPORTS

PART 1 - GENERAL

1.1 SCOPE: Notwithstanding meeting and reports prescribed elsewhere in the Concession Agreement, this section 01 31 19 (Meetings and Reports) addresses meetings and reports for the design and construction phases of the work.

1.2 PRECONSTRUCTION CONFERENCE: The Concessionaire shall attend a preconstruction conference scheduled by the Contracting Officer. The Concessionaire shall bring its contractor’s representatives to preconstruction conference. At this meeting, evidence shall be shown by the Concessionaire that he will be able to perform the work in a safe manner, in accordance with section 01 35 23 (Safety Requirements) and the ACP security requirements available through URL http://micanaldepanama.com/nosotros/sobre-la-acp/fundamentos-legales/seguridad-y-salud-ocupacional/. Discussion shall also address personnel contact, safety and environmental issues, permits, deficiencies, time table for works to be performed by the ACP, issues related to communities and stakeholders and the location of the Concessionaire’s office. The Concessionaire shall bring to this conference the draft version of the environmental management system manual and environmental plans of any field activity to be initiated prior to the approval of final version of the EMS manual.

1.3 OTHER MEETINGS: The Concessionaire shall attend other meetings scheduled by the Contracting Officer. The Concessionaire shall bring its contractor’s representatives to those other meetings. Discussion shall address the design - construction work schedule, potential factors of delay, deficiencies, product delivery schedules, submittals, safety and environmental issues, etc.

1.4 MEETING MINUTES: The Concessionaire shall prepare and submit meeting minutes to the Contracting Officer within 3 days after the meeting is held.
SECTION 01 33 00 – DOCUMENTATION FOR THE RECORD AND SUBMITTALS

PART 1 – GENERAL

1.1 SCOPE: The Concessionaire shall responsible for documentation for the record and submittals as further detailed in this section and in other sections of this Appendix. In general design documents and construction methodologies shall be classed as documentation for the record.

1.1.1 Documentation for the Record: The Concessionaire shall prepare documentation for the record to comply with this Appendix and further to comply with applicable laws and regulations. Documentation for the record shall be adequate and complete to evidence compliance with the Concession Agreement. The Concessionaire shall maintain documentation for the record in fit-for-purpose facilities within the concession area. Documentation for the record shall be readily available for review by authorities having jurisdiction and by ACP personnel designated by the Contracting Office; documentation for the record shall be available for review throughout the duration of the Concession Agreement.

1.1.2 Submittals: Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with this Appendix. All submittals shall be for comments by the ACP unless otherwise specifically stated.

1.1.2.1 Overall Submittals: The work includes the submittal of two overall design sets of documents for comments by the ACP: the intermediate design presentation and the final design presentation.

1.1.2.2 Particular Submittals: In addition to overall submittals, the work includes particular submittals as prescribed in other sections of this Appendix; e.g.: the Concessionaire shall submit for approval fender systems STS cranes, and the RTG cranes, to evidence compliance with the design and construction parameters prescribed in this Appendix.

1.2 REFERENCES:

1.2.1 American National Standards Institute (ANSI) Standards:


   Y32.9-72 Graphic Symbols for Electrical Wiring and Layout Diagrams Used in Architecture and Building Construction, (IEEE)

1.2.2 National CAD Standard Project Committee (NCSPC) / National Institute of Building Sciences (NIBS) Publication:


1.2.3 American Society of Mechanical Engineers (ASME) Standards:

   Y14.5-09 Dimensioning and Tolerancing
1.2.4 **Construction Specifications Institute (CSI) Publication:**

Master Format 2014

1.2.5 **Institute of Electrical and Electronics Engineers, Inc. (IEEE) and American Society for Testing and Materials (ASTM) International Standard:**

SI 10\textsuperscript{TM}-10 American National Standard for Metric Practice

1.2.6 **Cited Applicable Legislation:**

<table>
<thead>
<tr>
<th>Ley No. 52 de 11 de diciembre de 2007</th>
<th>Asamblea Nacional</th>
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<td>Que regula las actividades metrológicas en la República de Panamá, y modifica el numeral 3 del artículo 97 y deroga el Capítulo V del Título II de la Ley 23 de 1997.</td>
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| Gaceta Oficial 25943 |}

1.3 **GENERAL REQUIREMENTS:** Designs shall be prepared by qualified designers who are registered engineers or other professionals who comply with the criteria stated in the specifications and requirements of the Concession Agreement. The Concessionaire shall prepare all design documents based on the requirements of the Concession Agreement, showing the conditions of the existing structures, surface, subsurface, overhead structures, and adjoining structures. Such drawings shall be full-size (refer to paragraph 1.5.4.2) and shall be drawn to scale showing in detail all dimensions and types of materials, as well as their quality. Notwithstanding requirements prescribed elsewhere in this Appendix, the overall intermediate design and the final design shall include at least the items listed in the following table.

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<td>7. Earthwork plan views, elevations, sections and details</td>
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**Ventilation**

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**Electricity**

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<td>4. Locations of access control system equipment</td>
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<td>5. Locations of intrusion detection system equipment</td>
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<td>1. Existing conditions report</td>
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### QUALITY REQUIREMENTS

The Concessionaire shall prepare documentation for the record and submittals following good industry practices. As a minimum, when preparing design documents the Concessionaire shall:

1. **Check and verify all field measurements.**
2. **Review for completeness and for coordination of the work among contractors.**
3. **Ensure that all elevations on all drawings are referenced to PLD.**
4. **Ensure that the design documents include design loads and stresses, calculations, and procedures.**
5. **Ensure that the drawings show complete design details, types of materials, and locations at which the structures will be used.**

### DOCUMENTATION REQUIREMENTS:

1. **Number of Copies:** Unless stated otherwise, the Concessionaire shall provide two printed copies for each submittal. Additionally, the Concessionaire shall provide submittals in electronic media; at the Concessionaire’s discretion and depending on the nature and size of the item to be submitted, the electronic version shall be written to a removable data storage media and delivered with the hard copies to the Contracting Officer. Electronic version shall include CADD and Microstation drawing files (if applicable), including all background and reference files. Additionally, the Concessionaire shall provide electronic files for all other design documents including.

2. **Written Text Format:** Text shall be in size-11 Times New Roman font. Paper size shall be 216 by 279 mm (8-1/2 x 11 inches), with 20 pound paper used, unless otherwise specified.

3. **Submittal Storage Media:** For documents to be submitted via removable data storage media, the Concessionaire shall use DVD or the latest disc storage-media format approved by the Contracting Officer. Each disk shall be properly labeled and shall include Concessionaire’s name, date, title of the Concession Agreement, Concession Agreement number, and description of contents.

4. **Drawings:**

1.4.1.1 Drawings prepared by the Concessionaire shall include design drawings, and all as-built drawings and shall be accompanied by any relevant calculations.
1.5.4.2 The Concessionaire shall use the NCS for all drawings. Additionally, mechanical engineering drawings shall be prepared in accordance with ANSI/ASME Y14.100, ASME Y14.24, ASME Y14.34M, ANSI/ASME Y14.5M, and ANSI/ASHRAE 134. Electrical engineering drawings shall be prepared in accordance with ANSI Y32.9. Instrumentation drawings shall be prepared in accordance with ANSI/ISA 5.1.

1.5.4.3 The format for printed copies of CADD generated drawings that are submitted by the Concessionaire shall be the standard “D” size with outside cut-line dimensions of 24 inches by 36 inches; except for drawings for which the content will be better conveyed by a larger standard size, such as standard “E” size with outside cut-line dimensions of 34 inches by 44 inches for topographic drawings.

1.5.4.4 Printed copies of final as-built drawings submitted by the Concessionaire shall be on high-quality paper, with the line work and text of such quality as to allow digital reproduction and readable prints from the original prints, copies, and digitized files. Paper shall be Mylar (film type) double matte, erasable, and with a thickness of 4 mil (0.1016 mm).

1.5.4.5 CADD drawing files shall be computer-generated drawing files in the latest version of AutoCAD or a version approved by the Contracting Officer. The Concessionaire shall submit all drawings in AutoCAD format with the exception of excavation drawings, which shall be provided in a Microstation V8 version or later. Each submittal shall include the work’s standard cell of blocks and font libraries and reference files used to generate the CADD drawing files and the CADD format shall be clearly noted. Vendor and shop drawings for systems work (signals) shall use the latest AutoCAD version.

1.5.4.6 In addition to requirements for CADD drawing files, all drawings shall be processed into Adobe PDF files.

1.5.4.7 All elevations on all drawings shall be referenced to precise-level datum (PLD).

1.5.4.8 All drawings and information furnished shall be in the English or Spanish language. Either one is acceptable, once one language is agreed with the Contracting Officer it must be consistent throughout all the drawings and specifications. Notwithstanding the foregoing, the Concessionaire shall prepare drawings and information for review, approval or both by authorities having jurisdiction in the Spanish language; in general, work outside the concession area may require review, approval or both by authorities having jurisdiction.

1.5.4.9 All drawings shall be scaled and contain all details, dimensions, assemblies and subassemblies of the equipment, including complete material specifications, welding-symbol legends, manufacturer’s information, equipment schedules, and a bill of materials.

1.5.5 Certified Professional License: The final design drawings, final construction specifications, design calculations, models, simulations, computer runs, manuals, photographs, digital videos, reports, schedules, and other similar items submitted by the Concessionaire, including those for temporary structures, signs and traffic signal supports, etc., shall bear the seal of a professional engineer. The engineer shall be a professional who has a license certified in a discipline appropriate to the work involved, in accordance with Ley Número 15 [(de 26 de enero de 1959) dictada por la Asamblea Nacional por la cual se regula el ejercicio de la profesiones de ingeniería y arquitectura (Gaceta Oficial Nº 13772)] and with modifications to this law.

1.5.6 Units of Measurement: Measurements in the design documents and other submittals, shall be in the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM) and in accordance with applicable legislation “Ley No. 52 de 11 de diciembre de 2007”. The Concessionaire shall use IEEE/ASTM SI 10 as the basis for establishing metric measurements required for use in submittals. The Concessionaire shall make use of a decimal point (.)
to separate the whole number from the decimal fraction of numbers composed of a whole number and a
decimal fraction, and the Concessionaire shall make use of a comma (,) to separate the thousands,
millions, et al in whole numbers, for example, 1,254,823.68.

1.5.7 **Coordinate System.** The Concessionaire shall prepare drawings and other documents using a
coordinate system based on the UTM system, the horizontal datum shall be NAD 27. Scale factors
appropriate to the location shall be used. The ACP will furnish at least 3 control points close to the
concession area. Data obtained from local authorities or other sources, shall be translated into this unified
system before being used in the work. All levels (elevations) shall be based on the PLD datum provided
by the ACP and verified by the Concessionaire.

END OF SECTION
SECTION 01 35 23 – SAFETY REQUIREMENTS

PART 1 – GENERAL

1.1 SCOPE: The design and construction phases of the work under the Concession Agreement shall be performed taking all necessary steps to safeguard the health and safety of Concessionaire’s personnel, ACP personnel, and other persons in the work site and its vicinity. Without prejudice to the joint and several liability of the Concessionaire for actions of its contractors and service providers at the work site, the Concessionaire shall ensure compliance with this section from contractors and service providers at the work site.

1.2 APPLICABLE PUBLICATIONS: The following publications, of the issues listed below, but referred to thereinafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

1.2.1 Code of Federal Regulations (CFR):

29 CFR 1910 Occupational Safety and Health Administration (OSHA), Department of Labor - Occupational Safety and Health Standards  
29 CFR 1926 Occupational Safety and Health Administration (OSHA), Department of Labor - Safety and Health Regulations for Construction

1.2.1.1 Autoridad del Canal de Panamá (ACP) Publications:

http://micanaldepanama.com/nosotros/sobre-la-acp/fundamentos-legales/seguridad-y-salud-ocupacional/

1410SAL105(R2) Norma de seguridad para la operación de equipo pesado de movimiento de tierra
1410SAL109(R4) Norma de seguridad sobre protección contra caídas
1410SAL112(R5) Norma de seguridad en operaciones de soldadura y corte
1410SAL114(R2) Norma programa de equipo de protección personal
1410SAL118(R4) Norma de trancar y colocar etiquetas en el equipo
1410sal121(R5) Norma de seguridad de señalización y barricadas
1410SAL123(R2) Norma de seguridad para demolición de obras civiles
1410SAL127(R3) Norma de análisis de trabajo seguro
1410SAL141(R2) Norma de seguridad de andamios
1410SAL201(R10) Norma de información sobre materiales peligrosos
1410SAL205(R6) Norma para la protección respiratoria
1410SAL213(R6) Norma sobre ropa protectora
1410SAL215(R7) Norma para la conservación de la audición
1410SAL270(R2) Manual de protección radiológica
1410SAL285(R3) Norma de orden y saneamiento de los sitios de trabajo
2600SEG-306 Norma de Seguridad Marítima de Dispositivos y Medios de Salvamento para Trabajos Cerca o Sobre el Agua, revisión del 1 de abril, 2009

1.2.2 American National Standards Institute (ANSI) Publication:
   B30.5-07 Mobile and Locomotive Cranes

1.2.3 Naval Facilities Engineering Command Document:
   NAVFAC P-300 Management of Civil Engineering Support Equipment

1.2.4 National Fire Protection Association (NFPA) Standard:
   101-15 Life Safety Code

1.2.5 Applicable Legislation:
   Reglamento Técnico DGNTI-COPANIT 44-2000
   Ministerio de Comercio e Industrias, Dirección General de Normas y Tecnología Industrial
   Higiene y Seguridad Industrial
   Condiciones de Higiene y Seguridad en Ambientes de Trabajo donde se Generen Ruido
   Gaceta Oficial 24163
1.3 DOCUMENTATION FOR THE RECORD:

1.3.1 Safety Program: The Concessionaire shall complete safety program documentation at least 10 days after receipt of the Concession Area Rights Date. The safety program shall address safety, health, and industrial hygiene issues which may arise as a result of the work and include comprehensive and detailed procedures to be implemented in each operation, including work by contractors and other Concessionaire’s agents.

1.3.1.1 Content: The Concessionaire shall determine the scope of the program; however, the program shall address the following parts and requirements.

(a) Objectives

(b) Scope

(c) Organizational chart (including responsibilities of the Concessionaire’s representative, construction work manager, supervisors, foremen, general workforce, safety supervisor, safety officers and industrial hygienist)

(d) Upper management leadership and commitment

(e) Safety, health, and industrial hygiene policies

(f) General rules for safety and occupational health

(g) Training:

(1) New employees inductions (procedures and topics for discussion)

(2) Routine health/safety/hygiene training (including matrix: topics, frequency, person responsible, others)

(3) Critical activities, including but not limited to drilling and blasting and dredging operations
(h) Inspections and audits (frequency, forms, documentation, follow up, etc.)

(i) Incident reporting, investigation and follow up (including investigation methodology and incident recordkeeping)

(j) Personal protective equipment and safety equipment
   (1) Technical specifications according to tasks
   (2) Distribution and replacement (frequency, person responsible, others)

(k) Occupational risk prevention and control management (as minimum):
   (1) Occupational health (pre-employment and follow up)
   (2) Hazard communication
   (3) Hearing conservation and noise monitoring
   (4) Vibration monitoring
   (5) Dust control
   (6) Illumination plan
   (7) Vectors control
   (8) Housekeeping
   (9) Sanitation (including toilets, potable water, hand washing stations, waste disposal, change rooms, and rest areas)
   (10) Fall protection for workers (at level and at heights including debris net specifications, elements for both temporary and permanent systems, onsite training for pre-engineered systems)
   (11) Hand and power tools (use, inspections, maintenance, guarding, etc.)
   (12) Electrical hazards (ground control, operations adjacent to overhead lines, high voltage, buried fiber optic cables and other buried utilities, etc.)
   (13) Confined space
   (14) Marine and dredging operations
   (15) Diving operations
   (16) Drilling
   (17) Excavation and hauling
   (18) Cranes and hoisting equipment (certification for crane operators, riggers and signal man, personnel qualification, operator training, equipment inspection criteria, critical lifts, and others as established in the ANSI B30 Series)
   (19) Floating cranes/derricks, crane barge, and auxiliary shipboard mounted cranes
(20) Traffic and transportation controls (including, communication, traffic signs, flaggers, berms, speed limits, work at night excessive dust, haul road grades/curves, haul road width, boulders on road, drains etc.)

(21) Heavy equipment maintenance/wash station and parking area (including equipment inspection, maintenance, tire handling, etc).

(22) Fuel handling and storage

(23) Cofferdams (flood control plan, access/egress, others)

(24) Demolition (wall removal, floor removal, steel removal)

(25) Batching plant

(i) Job safety analysis (JSA), as minimum:

(1) Work at heights above 1.80 m

(2) Sloping and benching

(3) Load, transportation and unloading of material

(4) Safe dump point procedures

(5) Piling

(6) Hoisting and moving pile, rebar and concrete structures

(7) Heavy equipment tire changing

(8) Hot work

(9) Manual handling

(10) Work on or near water

(11) Small vehicles and pedestrians around heavy equipment

(12) Vector control

(13) Dust monitoring

(14) Underwater concrete distribution system

(m) Contingency and emergency response plan (including: fires, spills from the safety perspective, medical, site evacuation plans, transportation of injured/ill, as well as resources and site communication).

(n) Positive recognition incentives if applicable.

(o) Management of health and safety requirements of the Environmental Impact Study.

1.3.1.2 The Concessionaire’s safety program shall, in addition to the above requirement, address compliance with health and safety requirements of the environmental impact study contained in Appendix 10 of the Concession Agreement and the environmental management plan (EMP) to be developed.
1.3.2 **Contingency and Emergency Response Plan**: The Concessionaire prepare for the record a firefighting plan, a medical assistance and first aid plan, and spills response plan, as part of the emergency response plans. The plans shall comply with all applicable International Maritime Organization (IMO) and National Fire Protection Association (NFPA) requirements and standards.

1.3.2.1 In the event of an emergency, the Concessionaire shall activate its emergency plan utilizing internal resources and/or coordinating emergency response assistance from and external service (e.g. “Cuerpo de Bomberos de Panamá” and/or a private emergency service provider).

1.3.2.2 The Concessionaire shall inform the Contracting Officer as soon as possible of any emergency including medical, fire, and/or chemical spill.

1.3.2.3 ACP resources or personnel shall not be part of the Concessionaire’s emergency response plan. The ACP’s firefighters (“Seccion de Bomberos” (OPPB) is structured to provide medical assistance to ACP personnel only and will provide resources to assist ACP personnel needing emergency response assistance in Concessionaire facilities and the work site. The ACP, at its own discretion, will make its resources available for good Samaritan response to assist Concessionaire personnel and visitors in case an emergency arises only if contingency measures and resources required in the Concessionaire emergency plan fail to materialize. The ACP’s firefighters and personnel involved, however, will not be liable for any actions as a result of this assistance, which will only be provided whenever Canal operation requirements permit the use of this resource. The Concessionaire shall pay response costs and other established fees for use of ACP resources in case of emergencies.

1.3.2.4 The Concessionaire shall be responsible, liable and charged for the use of ACP personnel, equipment and materials; and shall indemnify and hold the ACP harmless for any damages to ACP property, losses and expenses (including legal fees and expenses), and/or for any claims by injured personnel, and the possible monetary impact to Canal operations if fire or emergency resulted from Concessionaire actions / inactions as a result or related to the performance of the work.

1.3.2.5 **Firefighting**:  

(a) Concessionaire’s personnel shall be trained in the use of fire extinguishing systems and fire drills shall be required as stated in the emergency plan and the ACP’s Safety and Occupational Health Manual, Section 15. The Concessionaire shall have the necessary equipment, as required by the emergency plan, and the necessary trained personnel to assist and coordinate firefighting operations at the work site.

(b) The Concessionaire shall have fire extinguishing systems installed on every piece of equipment and in all temporary facilities (alarms, fire pumps, fire extinguishers, sprinkler systems, etc.) in accordance with applicable standards. The Concessionaire shall be responsible of his own equipment and for coordinating firefighting operations with external services (e.g., “Cuerpo de Bomberos de Panamá”), if required.

1.3.2.6 **Medical Emergency**: The Concessionaire shall prepare for the record the medical assistance protocols that will be used to respond to an emergency situation at the work site. The plan shall include all necessary elements to ensure proper handling of patients and victims for the different possible scenarios at the work site, including the need for evacuation. Contracted or external emergency medical services shall be able to reach the site in an adequate time frame.

1.3.3 **Radiation Protection Manual**: At least 63 days before any equipment using ionizing radiation is brought into Panama, the Concessionaire shall have prepared for the record a radiation protection manual that meets ACP norm 1410SAL270 requirements. This manual shall include procedures for safely using ionizing radiation (per ACP norm 1410SAL270). The procedures shall address equipment usage as recommended by the manufacturer, safety for the source, and protection for users and others.
The Concessionaire shall procure a license to operate the source from the Republic of Panama’s “Ministerio de Salud” (MINSA).

1.3.4 Dust Control Plan: At least 28 days prior to commencement of the corresponding work, for each distinct part of the work, the Concessionaire shall prepare for the record a dust-control plan. The Concessionaire may start the corresponding work only after its dust control plan has been prepared. Dust control plans shall be according to ACP’s norm 1410SAL247. The Concessionaire shall prepare dust control plans based on the guide to prepare dust control plans included in the annexes of ACP norm 1410SAL247.

1.3.5 Noise Control Plan: At least 28 days prior to commencement of any work at the work site, the Concessionaire shall prepare for the record a noise control plan. The noise control plan shall meet the requirements specified in paragraph 1.4.2 (Noise Control). The Concessionaire shall prepare the noise control plan based on the guide to prepare noise control plans included in the annexes of ACP norm 1410SAL215. The Concessionaire shall comply with additional noise control measures and monitoring established in the environmental management plan (EMP) to be developed in accordance with the environmental impact study.

1.3.6 Job Safety Analysis (JSA): The Concessionaire shall prepare for the record JSAs using the up-to-date version of ACP form 2565, available through URL http://micanaldepanama.com/nosotros/sobre-la-acp/fundamentos-legales/seguridad-y-salud-ocupacional/, link “Análisis de Riesgos previos a las Tareas” which points to http://micanaldepanama.com/wp-content/uploads/2012/06/2565.doc. JSAs shall be according to ACP norm 1410SAL127. The Concessionaire shall prepare the JSAs based on the guide to JSAs included in annex A of ACP norm 1410SAL217.

1.3.7 Safety Supervisor: The Concessionaire shall document for the record the safety supervisor qualifications. This documentation to evidence that the candidate has performed the functions required per ACP norm 1410SAL129, annex G and the candidate meets the requirements under paragraph 1.5.1 (Safety Supervisor).

1.3.8 Incident and Accident Reports: In case of incidents or accidents, the Concessionaire shall notify the Contracting Officer within an hour of the event. Additionally and within 48 hours, the Concessionaire shall submit a report of the event. The Concessionaire shall attach his investigation, findings, analysis of root cause, photographs, corrective action plan with assigned responsibilities, and complementary information including but not limited to the event’s partakers’ and witnesses’ statements. Reports shall be according to ACP norm 1410SAL126.

1.3.9 Early Warning and Detection System for Electrical Storms: The Concessionaire shall document for the record the electrical storm early warning and detection system for the work site. The Concessionaire shall include documentation and descriptive information of the system to evidence compliance with ACP norm 1410SAL106.

1.3.10 Demolition Plan: The Concessionaire shall prepare for the record a demolition plan that meets ACP norm 1410SAL123.

1.4 OCCUPATIONAL HEALTH AND SAFETY AT THE WORK SITE:

1.4.1 Standards and Regulations: The Concessionaire shall comply with all ACP safety standards and regulations, and those included elsewhere in the Concession Agreement. ACP safety standards and regulations can be found through URL http://micanaldepanama.com/nosotros/sobre-la-acp/fundamentos-legales/seguridad-y-salud-ocupacional/. The Concessionaire shall comply with additional occupational vibration monitoring established in in the environmental management plan (EMP) to be developed in accordance with the environmental impact study.
1.4.2 **Noise Control:**

1.4.2.1 The Concessionaire shall comply with the stipulations of ACP standard 1410SAL-215. The Concessionaire shall implement engineering and administrative controls that are necessary to prevent exposure of its personnel to a dose of eight hours over 85 dBA. When the application of engineering or administrative controls is not feasible, personnel shall be equipped with hearing protection such as earplugs and/or earmuffs. Earmuffs shall have the Environmental Protection Agency (EPA) label that certifies the required reduction for all the positions in which the earmuffs may be used. The NRR (noise reduction rate) for all hearing protection devices shall be 25 dBA as a minimum.

1.4.2.2 The Concessionaire shall provide training about the effects of noise on hearing, use and care of earplugs and earmuffs. The areas where noise over 85 dBA is produced shall be identified as such and the use of hearing protection devices shall be mandatory.

1.4.2.3 The Concessionaire shall conduct noise exposure monitoring for all areas and/or sources (equipment, etc.) where noise is generated and establish controls to comply with the occupational exposure limit of 85 dBA eight-hour time weighted average. Monitoring shall be conducted initially at the onset of construction activities and/or start up noise generating equipment. Once a baseline is established and analyzed, additional periodic noise exposure monitoring shall be conducted. Initial and periodic noise exposure monitoring shall be in accordance with the frequency and methodology established in the Technical Standard DGNTI-COPANIT 44.

1.4.2.4 Occupational noise monitoring reports shall be prepared by the Concessionaire and be kept filed at the work site, available for ACP review at any time. Occupational noise monitoring reports shall include the following as a minimum: Position or area that is being assessed, task executed during the measurement, location of the position or work area that is being assessed, date, time and duration of the measurement, readings obtained from the measuring instrument, name of personnel performing the measurement, identification of any source that may contribute to the increase of noise in the area, sampling technique used and updated calibration records of the sound level meter or other noise measuring equipment used.

1.4.2.5 When the magnitude of the noise levels exceeds the maximum permissible exposure levels, as defined in the DGNTI-COPANIT 44, a “Hearing Conservation Program” shall be established. To this end, the measures that DGNTI-COPANIT 44 provides for shall be adopted, according to the order defined.

1.4.2.6 The Concessionaire shall comply with additional occupational noise monitoring established in the Environmental Impact Study and audiometric evaluations as required in local regulations.

1.4.3 **Vibration Control:**

1.4.3.1 The Concessionaire shall evaluate occupation exposure to vibration for all areas and/or sources (equipment, etc.) where vibration is generated and/or transmitted with the purpose of analysis and worker protection. Monitoring shall be conducted initially at the onset of construction activities and/or start up vibration generating equipment. Once a baseline is established and analyzed, additional periodic vibration exposure evaluations shall be conducted. Initial and periodic vibration exposure monitoring shall be in accordance with the frequency and methodology established in the Republic of Panama’s technical standard DGNTI-COPANIT 45-2000.

1.4.3.2 When the magnitude of the vibration levels exceeds the maximum permissible exposure levels, as defined in DGNTI-COPANIT 45-2000, a “Vibration Control Program” shall be established. To this end, the measures that DGNTI-COPANIT 45-2000 provides for shall be adopted, according to the order defined.
1.4.3.3 The Concessionaire shall comply with additional occupational vibration monitoring established in the environmental management plan (EMP) of the environmental impact study.

1.5 SAFETY MANAGEMENT:

1.5.1 Safety Supervisor: A safety supervisor shall be employed by the Concessionaire exclusively to lead safety management at the work site. The safety supervisor shall report directly to a Concessionaire’s corporate officer. The Concessionaire shall empower the safety supervisor to make safety related determinations and to enforce Concession Agreement including this Appendix safety requirements. The safety supervisor shall be present at the work site at all times during working hours. The Concessionaire shall provide the safety supervisor with an adequate vehicle to enable the safety supervisor unimpeded access to all parts of the work site. The Concessionaire shall staff the safety management organization at the work site with an adequate number of safety officers under the direction of the safety supervisor to have one safety officer at each area of work during all working hours.

1.5.2 Safety Officers: Safety officers shall be designated by the safety supervisor and employed by the Concessionaire.

1.5.3 Industrial Hygienist: An industrial hygienist shall be employed by the Concessionaire to perform the duties prescribed in ACP industrial hygiene norms and applicable laws; refer to paragraph 1.4.1 (Standards and Regulations). The industrial hygienist shall be familiar with industrial hygiene regulations by the Republic of Panama’s “Ministerio de Comercio e Industrias” (DGNTI-COPANIT), and OSHA.

1.5.4 Inspections: The Concessionaire’s qualified personnel shall carry out safety and industrial hygiene inspections on a daily basis. The Concessionaire shall document these inspections and keep corresponding documentation available for review by the Contracting Officer. The Contracting Officer may require joint inspections, i.e. by ACP and Concessionaire’s personnel.

1.5.5 Medical Facilities: The Concessionaire shall provide an infirmary at the work site.

1.5.6 Evacuation Plan: The Concessionaire shall prepare the evacuation plan. The plan shall include an audible signal for general alarm and partial evacuation, as well as for an emergency fire drill, to be conducted once before any work begins and regularly thereafter.

END OF SECTION
SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS: The Concessionaire shall be responsible for quality and shall establish and maintain an effective quality control and assurance system, in accordance with ISO 9001. The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence. The Concessionaire shall be the party responsible for the quality of the work.

1.2 REFERENCES:

1.2.1 International Organization for Standardization (ISO) Publication:

   9001-15 Quality Management Systems -- Requirements

1.3 QUALITY AND INSPECTION REQUIREMENTS:

1.3.1 The Concessionaire shall institute a quality control and assurance system to demonstrate compliance with the requirements of the Concession Agreement. The ACP shall be entitled to audit any aspect of the system.

1.3.2 Compliance with the quality control and assurance system shall not relieve the Concessionaire of any of the Concessionaire’s duties, obligations or responsibilities under the Concession Agreement.

1.3.3 The Concessionaire shall maintain an adequate inspection and quality control system to guarantee that the work performed is in accordance with the Concession Agreement. The Concessionaire shall maintain complete records of inspection and quality control, and these shall be available at all times for review by the ACP.

1.3.4 The Contracting Officer may designate one or several inspectors to insure faithful compliance of the obligations on the part of the Concessionaire. The inspectors shall have the authority to inspect all work done at the work site, as well as all products that are supplied. These inspections shall cover the entirety of the work, parts of the work, and preliminary work. Said inspectors will inform the Contracting Officer on the progress of the work, the manner in which the work is carried out, and the quality of products provided by the Concessionaire performing the work; also, said inspectors will inform the Contracting Officer on as well as also draw attention to any failure or violation observed. The fact that the inspector does not bring on time to the attention of the Concessionaire any defect in the work shall not constitute grounds for the approval of such defect by the ACP. The ACP may require any tests considered necessary to confirm that the work has been properly performed.

1.3.5 The inspection or lack thereof on the part of the ACP shall not relieve the Concessionaire from his obligation to execute the work in strict conformance with the specification requirements, nor shall this constitute or imply in itself the acceptance of the work, and shall not affect the rights of the ACP after the issuance of the operations commencement certificates. Additionally, the inspection on the part of the ACP shall not relieve the Concessionaire from providing adequate means for quality control, or from the responsibility for damage or loss of materials prior to the issuance of the operations commencement certificates.

1.3.6 The products to be incorporated to the transshipment port facilities shall be new.
1.3.7 The Concessionaire shall provide access for ACP to the Terminal Facilities in order to perform all inspections and testing reasonably indicated by the Contracting Officer, at its own discretion, and that may be accomplished in a timely, safe, and convenient manner for both parties.

**PART 2 – PRODUCTS**

2.1 **QUALITY CONTROL PLAN:**

2.1.1 **General:** The Concessionaire shall furnish for review by the ACP, not later than 45 days after the signing of the Executed Version, the Concessionaire’s quality control and assurance (CQCA) plan proposed to implement the requirements of paragraph 1.3 (*Quality and Inspection Requirements*). The plan shall identify personnel, procedures, control, instructions, tests, records, and forms to be used.

2.1.2 **Content of the CQCA Plan:** The CQCA plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by contractors, manufacturers, suppliers, and purchasing agents:

- A description of the quality control organization, including a chart showing the lines of authority, and confirming that the CQCA personnel will implement the quality control system in every aspect of the specified work. Personnel shall include a CQCA system manager, the person in charge of environmental protection, and the person in charge of security, health, and industrial hygiene.

- The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQCA function.

- Procedures for scheduling, reviewing, certifying, and managing documentation for the record and submittals, including those of contractors, offsite manufacturers, suppliers, and purchasing agents.

- Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.

- Procedures for tracking, verification, and acceptance tests, including documentation.

- Procedures for tracking design and construction deficiencies from the identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected. The procedure shall address the development of a non-conformance report (NCR) process that includes a description of how NCRs are documented, distributed, and tracked until closed. Additionally, the process shall include a disposition schedule that includes a status of reject, rework, repair, and use-as-is.

- Reporting procedures which shall be maintained and available upon ACP’s request.

2.2 **QUALITY CONTROL ORGANIZATION:**

2.2.1 **General:** The requirements for the CQCA organization are a CQCA system manager and sufficient number of qualified personnel to ensure compliance with this Appendix. The Concessionaire shall provide a CQCA organization, which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the Concession Agreement.

2.2.2 **CQCA System Manager:** The Concessionaire shall designate as CQCA system manager an individual within the onsite work organization who shall be responsible for overall management of the
CQCA and have the authority to act in all CQCA matters for the Concessionaire. This CQCA system manager shall be on the work site at all times during construction and shall be employed by the Concessionaire.

2.2.3 The CQCA system manager shall be assigned no other duties. An alternate for the CQCA system manager shall be identified in the plan to serve in the event of the system manager’s absence. The requirements for the alternate shall be the same as for the designated CQCA system manager.

PART 3 – EXECUTION

3.1 CONTROL: The execution of the CQCA shall be in accordance with ISO 9001, ensuring that the design and the construction, including the work of contractors and suppliers, complies with the requirements of the Concession Agreement.

3.2 DOCUMENTATION: The Concessionaire shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of contractors and suppliers.

END OF SECTION
SECTION 01 42 19 – REFERENCE STANDARDS AND DEFINITIONS

PART 1 – GENERAL

1.1 GENERAL:

1.1.1 Technical Specifications References: Throughout the technical specifications, various organizations are identified as references. These organizations publish codes, standards, and other documents, which are either referenced in this Appendix or are applicable to the Concession Agreement. These organizations are listed to indicate standard publishing organizations acceptable to the ACP.

1.1.2 Concessionaire’s Design Documents: The Concessionaire’s design documents, as the case may be, shall identify the standards and technical references upon which the design and its attendant equipment, materials, and workmanship are based and the sampling, testing, and verification methods and procedures necessary to demonstrate compliance with the standards.

1.2 STANDARDS:

1.2.1 Use of Standards: The work shall comply with standards that are widely known and acceptable in the industry.

1.2.1.1 Cited Standards: Where specific standards are cited in the technical specifications, the Concessionaire shall complete the work (or part thereof) to the cited standard or such other standards as to provide a quality equal to or higher than that which would result from using the cited standard.

1.2.1.2 Standard Selection:

(a) Whenever, for a particular material, equipment or part of the work, the Concessionaire wishes to select a standard different from the one specified in this Appendix, the Concessionaire shall document and maintain evidence necessary to support the selected standard and demonstrate that the selected standard will achieve a quality equal or higher than the standard specified.

(b) Whenever the use of certain standards and documents establishing design parameters have been regulated by applicable laws and regulations, per example: REP-2014, NFPA 13, NFPA 20, NFPA 70, NFPA 72, NFPA 101, welding regulation, and others that may apply, then the Concessionaire shall abide such applicable laws and regulations, i.e., substitution will not be allowed.

(c) Consistency: The standards shall be consistent. In this context, consistent means that once the set of standards has been selected, all of the relevant standards from that zone or country shall be adhered to and used in the integrated and interdependent manner in which the appropriate issuing body intended.

1.3 DEFINITIONS: These definitions apply to all sections in this Appendix.

1.3.1 The “PLD” or Precise Level Datum is the zero-point surface-control datum to which all elevations for vertical-control surveying are referred at the Canal. It was established at mean sea level in Cristobal (on the Atlantic side of the Isthmus) during the construction of the waterway (in 1910). Atlantic mean low water (MLW) equals approximately -0.12 meter (-0.38 foot) PLD, Pacific mean low water springs (MLWS) equals approximately -2.32 meters (-7.62 feet) PLD, mean lake level (MLL) for Gatun equals approximately 25.91 meters (85 feet) PLD, and the mean level of Miraflores Lake equals approximately 16.46 meters (54 feet) PLD.
1.3.2 “Prohibited materials” means materials or products which at the date of specification or use (given the state of knowledge generally within the construction industry at that time) are known or reasonably thought to be: (a) deleterious or likely to become deleterious; (b) deleterious if used under certain physical or atmospheric conditions; or (c) likely to degrade prematurely or require an undue level of maintenance within the context of the life expectancy of the project or part thereof. A “deleterious” material or product is a material or product which by itself or combined with other materials or products: (a) poses a threat to the health and safety of those involved in the construction or use of the project or part thereof; (b) poses a threat to the structural integrity durability or performance of the whole or part of the project; (c) will on a balance of probabilities reduce the life expectancy of the project or any part thereof; or (d) will on a balance of probabilities adversely affect the ability of the ACP to insure the project or materially increase the cost of such insurance.

END OF SECTION
SECTION 01 50 00 – TEMPORARY FACILITIES, ACESSES AND CONTROLS

PART 1 – GENERAL

1.1 SCOPE: This section provides requirements for the location, construction, setup, and use of temporary facilities. It includes, but is not limited to, the furnishing and installation of temporary utilities, temporary construction, support facilities, and security and protection facilities.

1.2 REFERENCES:

1.2.1 Autoridad del Canal de Panamá (ACP) Documents:
- 1410SAL121(R5) Norma de seguridad de señalización y barricadas
- 1410SAL285(R3) Norma de orden y saneamiento de los sitios de trabajo
- 1410SAL293(R3) Norma de iluminación

1.2.2 U.S. Department of Transportation Manual:

1.2.3 American Association of State Highway and Transportation Officials (AASHTO) Standards.

1.2.4 Institute Electrical and Electronics Engineers (IEEE) Code:
- C2-12 National Electrical Safety Code

1.2.5 Autoridad Nacional de los Servicios Públicos (ASEP) Regulation:
- PNAF-06 Plan Nacional de Atribución de Frecuencias (PNAF) (National Frequency Assignment Plan)

1.2.6 Ministerio de Obras Públicas (MOP) Specifications:
- Especificaciones Técnicas Generales para la Construcción y Rehabilitación de Carreteras y Puentes
1.2.7 **Applicable Legislation:**

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<th>Legislation</th>
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<th>Description</th>
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<tr>
<td>Reglamento Técnico DGNTI-COPANIT 35-2000</td>
<td>Ministerio de Comercio e Industrias Dirección General de Normas y Tecnología Industrial</td>
<td>Descarga de efluentes líquidos directamente a cuerpos y masas de aguas superficiales y subterráneas.</td>
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<td>Reglamento Técnico DGNTI-COPANIT 39-2000</td>
<td>Ministerio de Comercio e Industrias Dirección General de Normas y Tecnología Industrial</td>
<td>Descarga de efluentes líquidos directamente a sistemas de recolección de aguas residuales.</td>
<td>24115 Inclusive modificaciones</td>
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1.3 **WORK PLAN:** The Concessionaire shall prepare and maintain a work site plan. The work site plan shall indicate the proposed location and dimensions of any area to be fenced and used by the Concessionaire, and avenues of ingress and egress to fenced areas, and details of the fence installation. Specific matters to be addressed in the work site plan shall include, but shall not be limited to the following.

1.3.1 Temporary access roads;
1.3.2 Traffic-maintenance plan (including coordination with the authorities having jurisdiction);
1.3.3 Concessionaire’s temporary facilities, e.g., offices, workshops, warehouses and storage areas, medical and first-aid centers, and other welfare facilities;
1.3.4 Storage areas;
1.3.5 Spoil areas, borrow areas, and areas to stockpile materials;
1.3.6 Security fences and lighting systems;
1.3.7 Temporary electrical distribution systems (including semi-permanent, skid-mounted, or trailer-mounted generators or similar power production systems);
1.3.8 Temporary water-supply systems;
1.3.9 Communications systems;
1.3.10 Relocation of existing facilities.
1.3.11 Temporary sanitary facilities, including collection and disposal systems;
1.3.12 Storm-water management systems; and
1.3.13 Groundwater management systems.

PART 2 – PRODUCTS

Not used in this section

PART 3 – EXECUTION

3.1 FENCE: Within 28 days after the ACP issues the Concession Area Rights Date, the Concessionaire shall furnish and install a fence at the land perimeter of the concession area.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES:

3.2.1 Availability and Use: The Concessionaire shall be responsible for providing all utilities required for the construction of the work. The Concessionaire shall pay all costs associated with the provision of such utilities, including, but not limited to, connecting, converting, generating, and/or transferring the utilities to the work sites. The Concessionaire shall be responsible for keeping temporary services and facilities clean and neat in appearance, operating them in a safe and efficient manner, relocating them as the work progresses, and taking the necessary fire-prevention measures in accordance with NFPA standards. The Concessionaire shall also be responsible for not overloading facilities or permitting them to interfere with progress of the work.

3.2.2 Area Lighting: The Concessionaire shall provide area lighting that complies with technical specification requirements for nighttime work and site operations and, thereby, allows for the work to proceed safely and efficiently during hours of darkness. Lights at the work site shall be shielded to prevent interference with the night vision of ACP pilots and tugboat captains, transiting vessels, and floating equipment in Canal waters. The Concessionaire shall comply with ACP norm 1410SAL293. Lighting shall be directed towards working areas, and avoiding disturbances to nearby residential areas.

3.2.3 Sewage Treatment and Disposal: The Concessionaire shall provide sewage (wastewater) treatment for all sanitary sewage generated on the work site, including treatment of wastes collected in portable toilets, either directly or by contracting out this responsibility. Concessionaire’s sewage treatment facilities shall be designed, constructed, and operated to consistently remove a minimum of 85 percent of the solids in the raw sewage influent flow and to disinfect the effluent before discharge to the point coordinated with the Contracting Officer, to remove pathogenic bacteria and viruses. In addition to the performance standards described in this paragraph, the Concessionaire shall be responsible for meeting all sanitary sewage treatment standards in effect in the Republic of Panama including but not limited to DGNTI-COPNAIT 35-2000 and DGNTI-COPANIT 39-2000 technical regulations and for obtaining any permits or approvals required to construct or operate a sewage-treatment plant. The Concessionaire shall monitor treated sewage discharged from treatment facilities, in accordance with DGNTI-COPANIT applicable technical regulations, to verify the level of compliance with these requirements and shall report this information to the Contracting Officer on a monthly basis.

3.2.4 Temporary Drainage: The Concessionaire shall provide temporary drainage for the work site, commensurate to the local meteorological conditions, to properly and expeditiously drain the work site.
Ditches and culverts shall be provided to direct runoff toward natural drainage channels and to avoid the stagnation of water. The temporary drainage system shall include appropriate erosion-protection and contamination-prevention measures. The Concessionaire shall adequately adapt the temporary drainage system as the work progresses. Existing ditches around the work site shall be cleaned at the beginning of the construction work and shall be kept clean during the execution of the work. Ditches to be cleaned and kept clean shall include both new and existing ditches that are affected by the execution of the work, whether inside or beyond the work area or next to roads.

3.3 ACCESES

3.3.1 Land Access: Access, for construction purposes, throughout internal roads in Altos de Jesus (Diablo Heights) community is prohibited.

3.3.2 Controls and Arrangements:

3.3.2.1 Concessionaire’s Checkpoints: The Concessionaire and/or contractor’s personnel shall access the work site in a disciplined and orderly fashion, using pre-established departure/arrival points. Primary access to construction sites shall be through checkpoints controlled by the Concessionaire.

3.3.2.2 ACP-Controlled Checkpoints: In cases when access is required to other areas within ACP-controlled checkpoints, the Concessionaire shall make arrangements to use vans, buses, or other multiple personnel vehicles.

3.4 PROTECTION AND MAINTENANCE OF TRAFFIC AND EXISTING FACILITIES:

3.4.1 General: The Concessionaire shall maintain and protect traffic on all affected roads and bridges during the construction.

3.4.1.1 The Concessionaire may use existing roads and bridges, with the exceptions on paragraph 3.3.1 (Land Accesses), but shall be responsible for the provision of routine maintenance required for such use. All infrastructure that is used by the Concessionaire and/or contractor’s personnel, as well as the surrounding associated or affected areas, shall be restored to a condition equal to or better than the condition existing at the award, as agreed to by the Contracting Officer.

(a) The Concessionaire shall document and maintain the existing condition of any and all areas and infrastructure to be used prior to such use with photographs and/or video recordings. The evidence shall be submitted to the Contracting Officer for review in order to obtain an agreement on the existing conditions.

(b) Existing and temporary roads and bridges shall be maintained in a state that provides safe traffic movement without presenting a hazard to vehicles.

3.4.1.2 The Concessionaire’s traffic on roads and bridges selected for hauling material to and from the work site shall interfere as little as possible with public traffic. The Concessionaire shall investigate the adequacy of existing roads and bridges and the allowable load limits on these roads. The Concessionaire shall be responsible for the repair of any damage to roads and bridges caused by his operations.

3.4.1.3 Electrical Clearances: The roads shall also have electrical clearances to existing or new lines to be built by the Concessionaire according to the National Electrical Safety Code (NESC). The Concessionaire shall consider heavy traffic with an approximate height of 10.36 meters.

3.5 SECURITY:

3.5.1 Authorization to Enter the ACP-controlled Areas: Concessionaire employees and vehicles, as well as for contractors and service providers that need to enter ACP-controlled areas for work reasons
shall be processed to obtain the necessary permit. Permission to bring vehicles into these areas is limited to the ones strictly required for operations related to the work.

3.5.2 **Responsibility of the Concessionaire**: The Concessionaire shall be responsible for his personnel, contracted or subcontracted, that enter ACP areas of operation. The Concessionaire shall also be responsible for his regular or occasional service providers while they remain within ACP areas of operation. In any case, the Concessionaire shall ensure that all of these groups of people associated with him do not loiter around areas unrelated to the project. The Contracting Officer may demand, and the Concessionaire shall comply with, the removal from the work area of any person, employee, subcontractor, or service provider or any other person related to the Concessionaire that is found loitering around areas that do not correspond to him or are related to situations, handling or complicities that may affect the security of any ACP installation, asset, or contracts under way.

**END OF SECTION**
SECTION 01 81 16 – TRANSSHIPMENT PORT STRUCTURES

PART 1 - GENERAL

1.1 **SUMMARY:** This section covers the requirements for transshipment port facility structures. Transshipment port facility structures shall be safe, structurally sound, economical, practical, and durable, with minimum maintenance costs and fit for a design life of 50 years. This section includes requirements for wharf wall, apron, and for the container storage areas.

1.2 **REFERENCES:**

1.2.1 **American Society of Civil Engineers (ASCE) Publication:**

- ASCE-7-05 Minimum Design Loads for Buildings and Other Structures

1.2.2 **Applicable Legislation:**

- Resolución No-JTIA-187-2015 de 1 de julio de 2015
- Ministerio de Obras Publicas – Junta Técnica de Ingeniería y Arquitectura (Ley 15 de 26 de enero de 1959)
- Por medio de la cual se adopta el Reglamento para el Diseño Estructural Panameño (REP-2014).
- Gaceta Oficial: 27927-A

1.2.3 **British Standards Institution (BSI):**

- BS 6349-0-03 Maritime Structures.

1.2.4 **U.S. Army Corps of Engineers (USACE), Engineering Manuals and Other Documents:**

- EM-1110-1-1804 Geotechnical Investigations.
- ER-1110-2-1150 Engineering and Design for Civil Works Projects.

1.2.5 **Unified Facilities Criteria (UFC):**

- 4-152-01 Design: Piers and Wharves
- Change 1
1.2.6 The World Association for Waterborne Transport Infrastructure (PIANC) Publications:
  Report No. 135-14  Design Principles for Small and Medium Marine Container Terminals

1.3 REQUIREMENTS:

1.3.1 Geotechnical Considerations: The Concessionaire shall conduct additional investigations the Concessionaire deems necessary to properly characterize the work site for the design and construction of the transshipment port facilities. The ACP shall not be liable for any defect or error in the design or construction of the terminal facilities due to unforeseen geotechnical conditions in the Concession Area.

1.4 DESIGN CRITERIA:

1.4.1 General: The Concessionaire shall prepare transshipment port structures design according to good industry practices and the references.

1.4.1.1 Loads: For the transshipment port structure design, the Concessionaire shall consider all possible types of loads, such as: deadweight loads, live loads, wind loads, earthquake loads, crane loads, impact loads, earth pressures loads, and water pressures loads.

1.4.1.2 Bollards: The Concessionaire shall determine bollard design; notwithstanding, the maximum spacing interval shall be 15 m, and the bollards shall be able to withstand pulls of at least 1,500 kN.

1.4.1.3 Vessel Impact: This is the load imposed by the impact of a vessel on the wharf wall due to the vessel impact. Structures shall be designed and built to withstand the vessel-impact loads of the loaded design vessel, including the hydrodynamic added mass of the vessel, its approach velocity and approach angle, its moment of inertia, and any other factor that affects the application of the impact load. The Concessionaire may use an appropriate analytical method to approximate the maximum impact forces, provided that full documentation of the method is provided. The loads shall be consistent with those used in the design of the fender system specified in section 01 81 16.16 (Transshipment Port Appurtenances).

1.4.1.4 Other Loads: The Concessionaire shall investigate loads not described in this section to ensure that they do not produce any unfavorable load condition on the transshipment port structures. These loads may include, but are not limited to, wave pressure, crane and machinery loads, temperature, monolith joint loads, cofferdam tie-in loads, sheet-pile cutoff loads, cyclic loads, etc.

1.4.2 Durability: The design life of the structures shall be at least 50 years. The design and specifications shall address the durability of all elements of the structures, incorporating an assessment of potential deterioration of their exposure, particularly in the marine environment, throughout the design life including, but not limited to:

1.4.2.1 Durability of concrete.
1.4.2.2 Corrosion of metals.
1.4.2.3 Long-term performance of water stops and other components of the waterproofing systems.
1.4.2.4 Long-term performance of sealants, coatings, and other forms of protection.
1.4.2.5 Serviceability of embedded items.
1.4.2.6 Long-term performance of resilient rubber and synthetic bearing pads.
1.4.2.7 Maintenance and replacement of structural bearing pads.
1.4.3 **Structures**: Design and specifications shall adhere to the following general principles.

1.4.3.1 All slabs in the underground structures shall be of reinforced cast-in-place concrete.

1.4.3.2 The minimum thickness of all shaft walls, including ventilation shafts shall be 300 mm.

1.4.3.3 The concrete shall be designed to meet the requirements regarding watertightness specified in section 03 30 00 (*Concrete*).

1.5 **DOCUMENTATION FOR THE RECORD:**

1.5.1 **Draft Intermediate Terminal Design:**

1.5.1.1 **Drawings showing:**

(a) General layout.

(b) Plans and sections.

(c) Location-embedded items.

(d) Plans and sections of trackways for ship loader cranes.

(e) Location and dimensions of shafts and wells required for the installation of equipment specified in other sections.

(f) Reinforcement for typical sections.

1.5.1.2 **Documentation:**

(a) Analysis and design calculations.

(b) Tolerances that will govern the construction.

(c) Means of ensuring watertightness.

(d) Durability of structures.

(e) All relevant specifications.

1.5.2 **Final Terminal Design:**

1.5.2.1 **Drawings showing:**

(a) Plans, sections and details.

(b) Location and installation details for embedded items.

(c) Plans, sections and details of trackways for ship loader cranes, including removal and installation procedures.

(d) Location and dimensions of shafts and wells required for the installation of equipment specified in other sections.

(e) Reinforcement details
1.5.2.2 **Documentation:**

(a) Analysis and design calculations.

(b) Tolerances that will govern the construction.

(c) Means of ensuring watertightness.

(d) Durability of structure.

(e) Methodology for installation and removal of trackways for ship loader cranes, including sequence of activities and required equipment.

(f) All relevant specifications and method statements.

**END OF SECTION**
SECTION 01 81 16.13 – SEISMIC DESIGN CRITERIA

PART 1 - GENERAL

1.1 SUMMARY:

1.1.1 Terminology:

1.1.1.1 Within this section, a “performance objective” states the desired performance level for the structure for the seismic-design level. Performance objectives couple expected or desired performance levels with possible seismic-hazard levels.

1.1.1.2 The “return period” is the inverse of the annual probability of occurrence.

1.1.1.3 Whenever it is more economical to repair structural damage than to rebuild the damaged structure, the term “repairable damage” is used.

1.1.2 Ground Motions: Seismic ground motions for the design earthquakes are defined in annex A (Other Concession Agreement Requirements) as response spectrum in file “Response Spectra-Corozal.pdf”. These ground motions have been developed at 5 percent damping for oscillator periods between 0.01 and 2.5 seconds. The data provided represents La Boca outcroppings.

1.2 REFERENCES:

1.2.1 U.S. Army Corps of Engineers (USACE), Engineering Manuals and Other Documents:

ER-1110-2-1806 Earthquake Design and Evaluation for Civil Works Projects

1.2.2 Applicable Legislation:

Resolución No-JTIA-187-2015 de 1 de julio de 2015 Ministerio de Obras Publicas – Junta Técnica de Ingeniería y Arquitectura (Ley 15 de 26 de enero de 1959)
Por medio de la cual se adopta el Reglamento para el Diseño Estructural Panameño (REP-2014).
Gaceta Oficial: 27927-A

1.3 DESIGN REQUIREMENTS:

1.3.1 Seismic Design Levels and Performance Objectives: Two levels of earthquakes and associated performance objectives shall be considered for the design of the new wharf structure. These levels relate to safety, economics, and the desired performance of the new wharf structures as described below.

1.3.1.1 Level I Earthquake:

(a) The design earthquake represents ground motions for which the essential and normal structures, and critical components and non-critical components of the system are expected to sustain no permanent damage or minor damage, that can be repaired without interruption of operations.
(b) The structural response shall remain elastic under this earthquake loading.

(c) The ground motions used for the Level I design shall correspond to a probability of exceedance of 50 percent during the life-span of the structure, which is assumed to be 50 year. Therefore, the Level I design shall correspond to the 72-year return period ground motions; refer to paragraph 1.1.2 (Ground Motions).

1.3.1.2 Level II Earthquake:

(a) This earthquake represents ground motions for which critical components and equipment of the system may experience damage that requires replacement.

(b) For normal structures, although there is no collapse, permanent offsets may occur. These conditions may require temporary closure of the wharf to repair the damage. The foundations must have sufficient capacity to withstand the earthquake loading without any damage.

(c) The structures shall be checked for a probability of exceedance of 10 percent during the life-span of the structure, which is assumed to be 50 year. Therefore, the structure shall be checked for the 475-year return period ground motions; refer to paragraph 1.1.2 (Ground Motions). This level shall include verification from a near field motion of an event from the Pedro Miguel fault, which is located nearby.

1.3.2 Buildings: The seismic design of building structures and associated mechanical, electrical, and plumbing systems shall be in accordance with REP-2014, using site-specific ground motions. The Concessionaire shall follow the design procedure outlined in REP-2014 using the appropriate values corresponding to the 475 years return period for the construction of the appropriate design spectrum, based on the given accelerations.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY: This section covers the Concessionaire’s design and specifications of miscellaneous equipment and appurtenances required for the operation of the port; and where specified, the fabrication, assembly, transportation, delivery, full installation, and testing. The following items are included.

1.2 REFERENCES:

1.2.1 British Standards Institution (BS) Publication:

6349-4-14 Maritime Works – Part 4: Code of Practice for Design of Fendering and Mooring Systems

1.2.2 Permanent International Association of Navigation Councils (PIANC):

Guidelines for the Design of Fender Systems: 2002

1.2.3 The World Association for Waterborne Transport Infrastructure (PIANC) Publication:

MarCom WG 33-02 Guidelines for the Design of Fenders Systems

1.2.4 Oil Companies International Marine Forum (OCIMF) Publications:

MEG3 Mooring Equipment Guidelines 3rd Edition

Effective Mooring 3rd Edition

Guidelines and Recommendations for the Safe Mooring of Large Ships at Piers and Sea Islands (1978)

1.2.5 American Society for Testing and Materials (ASTM) International Standards.

1.3 GENERAL REQUIREMENTS:

1.3.1 Fenders:

1.3.1.1 General: Fenders are required to prevent damage to vessels and structures when contact between them occurs. The Concessionaire shall design, furnish, and install a fender system to accept the berthing impact of the design vessel and other vessels expected to berth at the port for all possible tide levels, load conditions, vessel configurations and berthing operations; berthing operations shall include but not be limited to berthing at an angle and tug assisted perpendicular berthing. The Concessionaire shall determine the navigation conditions for berthing that will be used for fender system design based on engineering judgment taking into account the exposure and geometry of the berth, hydro-meteorological data, and good industry practices. Fenders shall be adequate to accommodate forces imposed by moored vessels obtained from a suitable mooring analysis. Fender systems components shall be commercially available as off-the-shelf items to the extent possible.
1.3.1.2 **Friction Considerations**: Fender and fender support structure design shall allow for lateral and vertical loads due to friction between the fender and berthing design vessel based on the friction factors stipulated in Table 4 of BS 6349-4. Suitable low friction facings shall be used on the contact faces of fender assemblies.

1.3.1.3 **Safety**: The fender system shall have sufficient energy absorption capacity to ensure the safety of vessels and port structures. Factors of safety stipulated in Table 4.2.5 of PIANC WG 33 shall be applied to the calculated normal berthing energies to allow for abnormal berthing impact cases, except that the factor of safety shall not be less than 2.0 for vessels less than 5,000 DWT.

1.3.1.4 **Durability**: The fender system shall provide required durability and functionality in the marine tropical environment to which it will be exposed. Fender design minimum design life shall be 10 years. Fenders shall be resistant to localized damage due to belting or sponsons on vessels’ hulls, in particular for smaller vessels less than 5,000 DWT.

1.3.2 **Mooring System Components**: The Concessionaire shall design, furnish, and install a mooring system components, including but not limited to bollards, capstans, and quick release hooks (QRH) as required for port operations. Mooring system components shall be located along the mooring dock spaced as required to port operations. Bollards shall be offset from the mooring structure edge a sufficient distance to permit proper anchorage to the structure while still securing the vessel at differing line angles during the various stages of the mooring process. The design shall include provisions to avoid line abrasion or flaking due to contact with the moor edges. Bollard design shall prevent lines from slipping off the top of the bitt as the line angle changes with variations in the water levels. Mooring system components shall be selected to minimize and facilitate their maintenance. Mooring system components shall be commercially available as off-the-shelf items to the extent possible.

1.4 **DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE**:

1.4.1 **Fender System Design Guidelines**:

1.4.1.1 **Energy Capacity of Fenders**: The designed energy capacity of each fender shall in general be at least 50 percent greater than that calculated for normal loading conditions to allow for accidental occurrences such as vessel engine failure, breaking of mooring or towing lines, sudden changes of wind or current conditions and human error. Because of the non-linear energy/deflection and reaction/deflection characteristics of most fender systems, the effects of both normal and abnormal impacts on the fender system and berth structures shall be examined. A minimum vessel berthing velocity of 0.20 m/s shall be used for fender system design calculations.

1.4.1.2 PIANC WG 33 shall be used in the calculation of the berthing energies and in the selection of the fender system.

1.4.2 **Mooring System Component Design Guidelines**

1.4.2.1 The Concessionaire shall determine the minimum loadings that the mooring system components shall be able to resist for the design vessel and other vessels expected to berth at the port. The bollards dimensions and anchoring, and the berth structure itself, shall be designed for this minimum loading. The idea is that if a vessel has too strong of a hawser compared with the design load of the bollard, only the latter will break at its footing, without the berth structure itself being much affected.

1.4.2.2 Mooring line loads shall be determined in accordance with PIANC and OCIMF Guidelines and Recommendations for the Safe Mooring of Large Ships at Piers and Sea Islands. In particular, the required bollard and QRHs capacities for mooring arrangements subject to significant dynamic effects due to wave and current shall be determined by suitable dynamic mooring analyses.

1.4.2.3 Suitable corrosion protection shall be provided for mooring system components.
1.4.2.4 QRHs shall be provided to allow for one mooring line per hook.

1.5 SUBMITTALS: All drawings and other submittals for the fenders shall be submitted for ACP’s approval. For the mooring system components, the Concessionaire shall prepare documentation for the record to evidence to demonstrate compliance with this Appendix.

1.5.1 Draft Intermediate Terminal Design:

1.5.1.1 For Fenders:

(a) Rating specification, which shall be based on material and compression tests.
(b) Reaction-energy-percent compression curve.
(c) Dimensions.
(d) Fender material specifications, including expected design life.
(e) Design calculations.
(f) Drawings showing the locations of the fenders.
(g) Drawings with details on the fenders and their anchorage to the structures.
(h) Maintenance and replacement plans.
(i) The Concessionaire shall make design calculations and drawing for floating fenders (hydrodynamic forces as a result of floating conditions).

1.5.1.2 For Mooring System Components:

(a) Written rating specification and test results for bollards, capstans, and QRHs.
(b) Detailed design calculations demonstrating that the proposed bollards, capstans and QRHs, and their anchorages meet the load requirements.
(c) Drawings showing the location of the bollards, capstans, and QRHs.
(d) Drawings with details on the bollards, capstans and QRHs, and their anchorage to the structures.
(e) Material specifications, including expected design life.
(f) Maintenance requirements.

1.5.2 Final Terminal Design:

1.5.2.1 For Fenders:

(a) Factory Test Reports: Tests shall have been performed on the selected fender within 5 years of submittal of the reports. Test reports shall be accompanied by notarized certificates from the manufacturer certifying that the tested material is of the same type, quality, manufacture, and make as that proposed to be supplied. When applicable, testing shall include:

(1) Minimum tensile strength.
(2) Shore hardness (measured with a durometer).
(3) Modulus at 400 percent elongation.
(4) Maximum Compression Set.
(5) Tear resistance.
(6) Minimum elongation.
(7) Ozone resistance.
(8) Low-temperature impact resistance.
(9) Water absorption.
(10) Heat resistance.
(11) Compression-deflection resistance.
(12) Fender-compression tests.
(13) Angular-fender compression tests.
(14) Friction factors.

(b) Elastomer Property Requirements.

1.5.2.2 For Mooring System Components:

(a) Mill test certificates for each heat number.
(b) Certificates of conformance for line-pull ratings.
(c) Records showing heat numbers and serial numbers.

END OF SECTION
SECTION 01 82 13 – FOUNDATIONS

PART 1 - GENERAL

1.1 SUMMARY: The Concessionaire shall provide foundations as required to support the proposed buildings and other structures, safely and without settlement or movement that would adversely affect their serviceability. Where foundations are integral with elements defined within another element group, meet requirements of both element groups. Foundations comprise the following elements.

1.1.1 Standard Foundations: Includes spread footings below columns, linear spread footings below load bearing walls, and foundation walls.

1.1.2 Other Foundations: All types of special foundation systems, including but not limited to permanent shoring and underpinning, raft foundations, sheet piles, piles, and pile/piers.

1.1.3 Floors on Grade: All elements necessary for slab (mat) foundations, including trenches, beams, pits, sumps, equipment bases, vapor barriers, slab moisture protection, and sub-drainage system.

1.1.4 Other Foundation Elements: Includes high mast foundations, pole foundations, communications tower foundations, storage tank foundations, and retaining walls.

1.2 REFERENCES:

1.2.1 Cited Applicable Legislation:

- Resolución No-JTIA-187-2015 de 1 de julio de 2015
- Ministerio de Obras Publicas – Junta Técnica de Ingeniería y Arquitectura (Ley 15 de 26 de enero de 1959)
- Por medio de la cual se adopta el Reglamento para el Diseño Estructural Panameño (REP-2014).
- Gaceta Oficial: 27927-A

1.2.2 International Code Council (ICC) Code:

- IBC-15
- International Building Code

1.2.3 American Association of State Highway and Transportation Officials (AASHTO) Standards:

1.2.4 **American Society for Testing and Materials (ASTM) International Standards:**

- D 2487-11 Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- D 2488-09(A) Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

1.3 **REQUIREMENTS:**

1.3.1 **Prohibited Products:** The Concessionaire shall not not use any of the following products:

1.3.1.1 Wood foundation systems.
1.3.1.2 Masonry footings.
1.3.1.3 Foam plastic insulation below grade.

1.3.2 **Methods of Construction:**

1.3.2.1 Existing foundation elements found in the way of new work must be removed to perform new construction. Such foundations shall only be removed using methods that will maintain the stability and operational functions of the affected facilities.

1.3.2.2 Do not use any of the following methods and techniques:

   (a) Nuclear related methods.
   (b) Unproven technology (or methods or techniques not successfully used in the last five years).

1.3.3 **Vibration Control:** Use foundation elements that are designed to avoid sympathetic vibration at frequencies within the audible range of 500-4,000 Hz.

1.3.3.1 **Mass:** Not less than 1,200 kg/m³.
1.3.3.2 **Air Space:** Not less than 40 mm wide void within overall foundation element.

**END OF SECTION**
SECTION 01 86 13 - PORT MECHANICAL SYSTEMS AND EQUIPMENT

PART 1 – GENERAL

1.1 SUMMARY: This section covers the design guidelines of the main mechanical systems to be used during day-to-day port operations.

1.2 REFERENCES:

1.2.1 British Standards Institution (BS) Publications:

- 6349-1-3-12 Maritime works. General. Code of Practice for Geotechnical Design
- 6349-1-4-13 Maritime Works. General. Code of Practice for Materials

1.2.2 German Society for Geotechnics (DGGT) Publication:


1.2.3 National Fire Protection Association (NFPA) Standards:

- 1-15 Fire Code
- 10-13 Standard for Portable Fire Extinguishers
- 30-15 Flammable and Combustible Liquid Code
- 307-16 Standard for the Construction and Fire Protection of Marine Terminals, Piers, and Wharves
- 850-15 Recommended Practice for Fire Protection for Electric Generating Plants and High Voltage Direct Current Converter

1.2.4 The World Association for Waterborne Transport Infrastructure (PIANC) Publications:

- MarCom WG 34-01 Seismic Design Guidelines for Port Structures
1.2.5 Interlocking Concrete Pavement Institute (ICPI) Publication:

Heavy Duty Pavements, The Structural Design of Heavy Duty Pavements for Ports and Other Industries, Edition 4

1.2.6 The Oil Companies International Marine Forum (OCIMF) Publication:

Effective Mooring 3rd Edition

MEG3 Mooring Equipment Guidelines, 2008

1.3 REQUIREMENTS: The mechanical systems shall be complete and operational in all aspects and shall comply with the latest standards and regulations being used by port engineering authorities, port organizations and international associations, some of them portrayed in this section. The mechanical systems shall comply with the following requirements, as a minimum:

1.3.1 Meet all applicable standards and codes.

1.3.2 Provide the required durability and reliability in accordance with the applicable and specified standards and codes.

1.3.3 Facilitate maintenance and repair.

1.3.4 Enhance safety operations and health requirements.

1.4 DESIGN GUIDELINES:

1.4.1 General: All selected equipment shall be fitted with standardized operational systems. Selected equipment for rail terminal operations shall be new, and if RTG are used, these shall be fully electric.

1.4.2 Seismic Design Guidelines: Depending on the location, the design of mechanical structures and components to respond to seismic activity shall be carried out in accordance with the PIANC MarCom WG 34.

1.4.3 Ships Fuel Supply System Design Guidelines: If the Concessionaire decides to provide bunker fuel to vessels as an ancillary service in accordance to clause 6.7 of the Concession Agreement, the Concessionaire shall design and construct a fuel dispensing facility in the port for the purpose of loading fuel aboard ships. The design shall include connections in every berth position and shall allow loading fuel in ships while transshipment operations are conducted. Fuel will be supplied from Miraflores Tank Farm via a fuel pipeline, the Concessionaire shall indicate in the design, the proposed point of connection of the this pipeline which shall be at the edge of the concession area. Design shall comply with bunkering and fuel dispensing regulations of the International Maritime Organization (IMO) and design guidelines of UFC 3-460-01, Petroleum Fuel Facilities.

1.4.4 Container Cranes Design Guidelines (Ship to Shore Gantry Cranes – STS Cranes): The number and capacity of STS cranes to be installed shall be determined by the Concessionaire, and shall take into account design vessel capacity, port operation and expected port container handling capacity.

1.4.4.1 Container cranes shall be fit for their intended purpose/design life and according to all relevant port standards.
1.4.4.2 The Concessionaire shall ensure wharves are designed to accommodate the design wheel loads from container cranes in all operating conditions.

1.4.4.3 Uplift load to be assessed for proposed container crane shall be as required for port operations.

1.4.4.4 **STS Cranes Design Requirements:**

(a) STS Cranes shall be new and fully electric, of the rail-mounted type. Cranes shall include container movement monitoring system that includes cameras. The Concessionaire shall furnish cranes that shall be operable and maintainable on a 24-hour per day basis in all weather conditions. All electrical, electronic, and mechanical equipment shall be non-hygroscopic, non-corroding and tropicalized for use. Special considerations shall be given in all aspects of the design for achieving accurate load spotting ability while ensuring full operational capability and safety for round the clock operations, including operations under heavy rain conditions at night.

(b) The Concessionaire shall ensure that a high degree of personnel safety protection is provided around the equipment and fittings at the ground level and passages from ground level to the operator’s cab and from the operators cab to the boom operating station, for all cranes which may be exposed to non-technical personnel. Ease of maintenance and safety of the maintenance staff shall be considered throughout the entire design to minimize total down time of the cranes.

1.4.4.5 **Site Conditions Guidelines for Crane Design:** Refer to section 01 10 00, *(General Requirements)*, paragraph 1.3.1 *(Ambient Conditions).*

1.4.4.6 **Required Minimum Safety Specifications for STS Cranes:** The following table is not all-inclusive, but rather a shortlist of key safety features that are both practical and effective. Based on experience, accident records and insurance claims analysis, this list covers the systems, structures, features, equipment and technology that have been most proven to reduce injury or damage, and which are currently not standard.

<table>
<thead>
<tr>
<th>#</th>
<th>Risk</th>
<th>Safety Feature</th>
<th>Functional Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boom colliding with vessel</td>
<td>Boom anti-collision</td>
<td>A minimum of 2 detection zones: Warning or slow down, and stop. Detection range shall be such that it will allow enough time for the crane to come to a “normal” stop. Suitable electronic sensors designed specifically for this application shall be used. Lanyard or tripwire systems are not adequate.</td>
</tr>
<tr>
<td>2</td>
<td>Crane colliding with objects on rail tracks or near vicinity</td>
<td>Crane travel anti-collision</td>
<td>A minimum of 2 detection zones: Warning or slow down, and stop. Detection range shall be such that it will allow enough time for the crane to come to a “normal” stop.</td>
</tr>
<tr>
<td>3</td>
<td>Adjacent cranes colliding</td>
<td>Crane to crane anti-collision</td>
<td>A minimum of 2 detection zones: Warning or slow down, and stop. Detection range shall be such that it will allow enough time for the crane to come to a “normal” stop.</td>
</tr>
<tr>
<td>#</td>
<td>Risk</td>
<td>Safety Feature</td>
<td>Functional Requirement</td>
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<tr>
<td>4</td>
<td>Crane drivers adversely affected by vessel stack emissions or other air pollutants</td>
<td>Operator cabin air conditioning</td>
<td>The cabin shall be provided with a proven positive pressurized air filtration system with high efficiency particulate and gas absorbers, or similar, to protect the operator from harmful emissions from vessels’ stacks or other air pollutants.</td>
</tr>
<tr>
<td>5</td>
<td>Damage and injury caused by operating the crane in high winds</td>
<td>Wind speed detection and alarm to enable driver to stop the operation, park and shut down the crane safely</td>
<td>An anemometer shall be installed in clear air at the top of the crane, giving an indication in the driver’s cab, both audible and visual, that the safe operating wind limit has been reached. An audible alarm shall also be installed to indicate to persons on the berth that this limit has been reached. The anemometer shall be capable of recording well over the expected worst case windstorm. The wind speed, direction and time shall be recorded. The recommended maximum operating wind speed shall be set at 22 m/s. Crane shall not shutdown automatically, even if the alarm sounds continuously. This allows the crane to travel to the storm pin/tie-downs.</td>
</tr>
<tr>
<td>6</td>
<td>Cranes being blown along the crane rails</td>
<td>Means to engage the crane horizontally on rails</td>
<td>Crane storm pins shall be installed at the center of the crane under the sill beams on both waterside and landside and one or more corresponding locking positions on dock in distance reachable within the expected time to high wind condition. The storm pins, the mounting on the crane and also the pin sockets in the quay structure shall all be designed to withstand the maximum forecast forces exerted.</td>
</tr>
<tr>
<td>7</td>
<td>Cranes being blown over</td>
<td>Means to engage the crane vertically to prevent wheels being detached from rails</td>
<td>Substantial crane tie-downs on each corner and one or more corresponding locking positions on dock in distance reachable within the expected time to high wind condition. The tie-down connections on the crane and also the anchor points in the quay structure shall all be designed to withstand the maximum forecast forces exerted.</td>
</tr>
<tr>
<td>#</td>
<td>Risk</td>
<td>Safety Feature</td>
<td>Functional Requirement</td>
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<tr>
<td>8</td>
<td>Runaway crane due to sudden high wind condition</td>
<td>Gantry braking</td>
<td>Gantry drive braking system shall be designed to stop and hold the crane with a wind speed of 40 m/s from behind. Design shall take into account uneven weight distribution so that the braking force transfers to the crane rails. This means no wheel skidding under normal braking.</td>
</tr>
<tr>
<td>9</td>
<td>Structural or lifting system damage caused by snagged spreader or container</td>
<td>Hoist snag load protection</td>
<td>Detection system to activate “fast stop” of the lifting system and a system to absorb or isolate the kinetic energy in the lifting system, to prevent the excess of designed load in the lifting system.</td>
</tr>
<tr>
<td>10</td>
<td>Electrical or machine room fire</td>
<td>Temperature and smoke detection in the electrical and machinery rooms</td>
<td>Temperature and smoke detection alarm systems inside the electrical control and machinery rooms which give audible and visual alarms in the driver’s cabin, electrical and machinery rooms, outside the machinery house access door and on the landside sill beam.</td>
</tr>
<tr>
<td>11</td>
<td>Electrical room fire</td>
<td>Fire suppression</td>
<td>A fully automatic fire suppression system mounted inside the electrical cubicles.</td>
</tr>
<tr>
<td>12</td>
<td>Falling or jamming between movable parts of the crane while personnel entering enclosed non access or operating areas</td>
<td>Prevent unintended access to risk areas</td>
<td>Spring set self-closing gates with positive means to open. Any access gates to risk areas (i.e., boom/trolley, cabin/boom etc.) shall be interlocked to prevent access when not in parked positions, or when in operation, and to prevent crane operation when open.</td>
</tr>
<tr>
<td>13</td>
<td>Overloaded or misdeclared container weights and eccentrically loaded containers causing risks: trucks overturning; road damage; vessels sinking; containers collapsing</td>
<td>Measure the weight and eccentricity of each container</td>
<td>System to measure, indicate and record the actual weight and eccentricity of each container. Data to be capable of being transferred to the terminal operating system (TOS).</td>
</tr>
<tr>
<td>14</td>
<td>Crane monitoring</td>
<td>Crane overall operation</td>
<td>On-board and remote monitoring from TOS, via fiber optic cable.</td>
</tr>
</tbody>
</table>
1.4.5 **Stacking Operations**: The Concessionaire shall determine stacking operation methodology, and consequent equipment selection.

1.4.6 **Horizontal Transfer Operations**: The Concessionaire shall determine horizontal transfer operation methodology, and consequent equipment selection.

1.4.7 **Rail Terminal Operations**: The Concessionaire shall determine rail terminal operation methodology, and consequent equipment selection.

1.4.8 **RTG Runways**:

1.4.8.1 If RTG are to be used, at least 6-foot wide reinforced concrete runways shall be provided in container stacking areas served by RTG cranes. The geometric and wheel loading data for the RTG equipment intended to be used shall be taken into account in order to design the runways for such equipment.

1.4.8.2 In general, the design of pavement structures shall be in accordance with the project-specific criteria and port operations, and the guidelines given in ICPI Structural Design of Heavy Duty Pavements for Ports and Other Industries shall be used.

1.4.9 **Guidelines for Mobile Equipment Design Life**: Typical values for minimum economical design life are given below. A routine maintenance system is required in order to monitor the structure and have a long service life rather than unknown deterioration during the operation period. A good maintenance system will discover deviations, permitting a simple repair at an early stage instead of a major and costly repair later.

1.4.9.1 **Mobile Container Cranes (RTG)**: 15 years.

1.4.9.2 **Fork-lift and Reach Stackers**: 10 years.

1.4.9.3 **Straddle Carriers**: 5 to 10 years.

1.4.9.4 **Road Tractors**: 10 years.

1.5 **SUBMITTALS**: Whenever data, as required below, is for review of the ACP, the results of the review will be communicated to the Concessionaire within 28 days of receipt of the required data.

1.5.1 **Final Design Data**: After completion of the design and prior to the procurement of materials or equipment, the Concessionaire shall submit to the ACP, 2 sets of final design data. The final design data shall include, but shall not be limited to, the following:

1.5.1.1 **Final Design Analysis**: The design analysis shall include a written explanation of the mechanical systems, and equipment selection. It shall contain a summary of the used criteria, including codes, references, and safety requirements. The justification for each major selection and design decision shall be clearly stated, and include supporting calculations, when applicable.

1.5.1.2 **Final Design Drawings**: The final design drawings shall include, but shall not be limited, to the general arrangement of mechanical equipment, equipment schedule, terminal layout describing present and future port operations, sections and all the details deemed necessary for the construction and installation of the mechanical systems depicted in this Section.

1.5.1.3 **Technical manuals**: A copy of all the operation and technical manuals of the Terminal Equipment with a value of more than two hundred fifty thousand US Dollars (US$250,000.00) shall be kept by the concessionaire available upon ACP’s request.
END OF SECTION
SECTION 01 88 13 - CORROSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY: This Section contains the performance and prescriptive specifications for corrosion-control coatings for metals and equipment, transformers, electrical equipment, buildings, furnishings and other structures. Where not specified in other sections, coating system shall be factory applied to exterior and interior as applicable, suitable for a 25 year life cycle, resistance to UV, for service environments Types C5-I and C5-M according to ISO 12944-2. Corrosion protection shall be in accordance with applicable standards and recommended practices of the Society for Protective Coatings (SSPC) and National Association of Corrosion Engineers (NACE) International, or equivalent international standards. Manufacturer’s standards shall comply with the below referenced standards or equivalent international standards.

1.2 REFERENCES:

1.2.1 American Institute of Steel Construction (AISC) Publications:

- 325-05 LRFD Manual of Steel Construction

1.2.2 American Petroleum Institute (API) Publication:


1.2.3 American Society for Testing and Materials (ASTM) International Standards:

- B 117-11 Practice for Operating Salt Spray (Fog) Testing Apparatus
- B 418-12 Standard Specification for Cast and Wrought Galvanic Zinc Anodes
- D 344-11 Relative Hiding Power of Paints by the Visual Examination of Brushouts.
- D 522-13 Mandrel Bend Test of Attached Organic Coatings
- D 660-11 Evaluating Degree of Checking of Exterior Paints
- D 661-11 Evaluating Degree of Cracking of Exterior Paints
- D 714-09 Evaluating Degree of Blistering of Exterior Paints
- D 772-11 Evaluating Degree of Flaking (Scaling) of Exterior Paints
- D 1653-13 Water Vapor Transmission of Organic Coating Films
- D 2197-13 Adhesion of Organic coatings by Scrape Adhesion
- D 2247-11 Water Resistance of Coatings in 100% Relative Humidity
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<th>Code</th>
<th>Description</th>
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<td>D 2583-13</td>
<td>Indentation Hardness of Rigid Plastics by Means of Barcol Impessor</td>
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<tr>
<td>D 2794-10</td>
<td>Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)</td>
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<tr>
<td>D 3273-12</td>
<td>Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber</td>
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<td>Abrasion Resistance of Organic Coatings by the Taber Abrasion</td>
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<td>Evaluating Degree of Chalking of Exterior Paint Films</td>
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<td>Surface Burning Characteristics of Building Materials</td>
</tr>
<tr>
<td>E 96/E 96M-14</td>
<td>Water Vapor Transmission of Materials</td>
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**1.2.4 National Association of Corrosion Engineers (NACE) Publication:**

RP-01.69(83) Control of External Corrosion on Underground or Submerged Metallic Piping Systems

**1.2.5 International Organization for Standardization (ISO) Standards:**

12944-2 Paints and varnishes – Corrosion protection of steel structures by protective paint systems

Part 2: Classification of environments

**1.2.6 National Association of Corrosion Engineers (NACE) Standard:**

RP 0188-1990 Discontinuity (Holiday) Testing of Protective Coatings

**1.2.7 National Electrical Manufacturers Association (NEMA) Standard:**

Z535.1-2006 Safety Color Code
1.2.8 **National Sanitation Foundation (NSF) Standard:**

NSF/ANSI 61-07  Drinking Water System Components – Health Effects

1.2.9 **Steel Structures Painting Council (SSPC) Publications:**

- PA 2-04  Paint Application Specification No. 2
  Measurement of Dry Paint Thickness with Magnetic Gages (Steel Structures Painting Manual, Ch 5 - Paint application Specs)
- 97-07  The Inspection of Coatings and Linings, a Handbook of Basic Practice for Inspectors, Owners, and Specifiers.
- Vis 1-02  Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs)

1.3 **REQUIREMENTS:**

1.3.1 **Corrosion Protection Requirements:** Design and apply corrosion control coatings that shall protect metal surfaces from corrosion and deterioration caused by the environment and service.

1.3.1.1 For exterior and interior service, use coatings system suitable for a 25 year life cycle, resistance to UV, for service environments Types C5-I and C5-M according to ISO 12944-2.

1.3.1.2 Use preconstruction primers or primer coatings which shall minimize undercutting corrosion.

1.3.1.3 Use coating systems with sufficient number of coats to minimize direct contact of the substrate with the environment.

1.3.2 **Adherence Requirements:** Design corrosion control coating systems that shall comply with the following adherence requirements:

1.3.2.1 Adhesion to the metal surfaces shall be minimum 3,447 kPa on steel surfaces except that for surfaces subject to foot or wheel traffic, adhesion shall be minimum 4,826 kPa, as measured in accordance with ASTM D 2197. Intercoat adhesion shall be not less than 2,068 kPa, as measured in accordance with ASTM D 2197. Where field adhesion testing is required, tests shall be in accordance with ASTM D 4541.

1.3.2.2 At faying surfaces of bolted structural joints, friction type slip-critical connections, use coatings which are approved for such use by AISC 325.

1.3.2.3 Schedule and apply coatings to avoid any type of surface contamination, including salts, water, dust, oil or grease, which may affect adherence of the coatings. Where such contamination is suspected, adhesion of thin coating systems shall be tested by the tape test, in accordance with ASTM D 3359.

1.3.2.4 Compatibility between coats of different materials. In general, primers, intermediate coats and finish coats shall be compatible products from the same manufacturer. Products from different manufacturers shall be patch tested for compatibility.

1.3.2.5 After application, coatings shall not show any adhesion-related failures such as blisters, peeling or flaking or intercoat delamination. Applied coatings shall not show visible evidence of entrapped
solvents or humidity between the substrate and primer or between coats. Blistering shall be evaluated in accordance with ASTM D 714. Flaking shall be evaluated in accordance with ASTM D 772.

1.3.2.6 Coatings for underground service and in general coatings for structural metals shall be applied on surfaces with a surface anchor profile as recommended by the coating system manufacturer. Surface anchor profile of blast cleaned surfaces shall not be smaller than 50 microns as measured in accordance with ASTM D 4417. Surfaces requiring abrasive blast cleaning shall be cleaned to degree specified in accordance with the corresponding surface preparation specification and visual standard SSPC Vis 1.

1.3.3 **Integrity Requirements**: Finished coatings shall be free from mudcracking, wrinkling, cracking, chalking and other coating failures or deterioration. Use surface preparation, pretreatment, primers, intermediate coats, and finish coats that shall, as a system, meet the requirements for the environment and service.

1.3.4 **Thickness Requirements**: Coating Thickness shall be appropriate for the environment and service. Coatings for underground and underwater service shall be minimum 0.508 mm thick.

1.3.5 **Chemical Resistance Requirements**: Provide coatings with chemical resistance adequate for the environment in which the metal is to perform its service. As a minimum, corrosion control coatings shall be resistant to:

1.3.5.1 Acids from acid rain or fog which may form from electrical thermal generation, vehicular and ship exhaust.

1.3.5.2 Alkalis from salts in the coastal environment

1.3.5.3 Coatings used in areas where fuels and oils, grease or other lubricants are used and may be subject to splash or spillage shall be resistant to hydrocarbons.

1.3.5.4 Coatings used in tank interiors shall be resistant to continuous immersion in the type of liquids contained.

1.3.5.5 Coatings used on zinc, galvanized steel, or aluminum shall have adequate adhesion on such surfaces, and shall not be subject to saponification.

1.3.5.6 Coatings subject to solvent splash or spillage of solvents, or to cleaning with solvents, shall have a high solvent resistance.

1.3.5.7 Coatings used on metal surface that are in contact with wood, shall be resistant to wood treatment chemicals and wood acids.

1.3.6 **Water Resistance Requirements**:

1.3.6.1 Design and apply corrosion control coatings that shall be impermeable, resistant to rain water, and low pressure water cleaning at 1,724 kPa.

1.3.6.2 The finish shall allow free drainage of water to minimize time of wetness.

1.3.6.3 Coatings shall have low water permeability. Water vapor transmission rate shall not exceed 0.25 perms when tested in accordance with ASTM D 1653.

1.3.6.4 Coatings shall have an excellent humidity resistance, as tested by either humidity cabinet in accordance with ASTM D 2247.

1.3.7 **Flexibility Requirements**: 
1.3.7.1 Coatings applied on metals exposed to thermal expansion and contraction, or bending, shall be adequate for such service. Such coatings shall pass the mandrel bend test performed in accordance with ASTM D 522.

1.3.7.2 Coatings used on underground pipes or steel structures shall be resistant to thermal expansion and contraction as well as stresses imposed on the steel surfaces as the soil contracts and expands as water contents varies.

1.3.7.3 Coatings after full cure and exposure to the actual service environment shall show no signs of cracking, as evaluated by ASTM D 661.

1.3.8 Temperature Resistance Requirements:

1.3.8.1 Design and apply corrosion control coating systems that shall meet performance requirements in the full temperature range of the service environment.

1.3.8.2 Coatings for use on metals which will be at high temperatures shall be adequate for such service. Application and curing of such coatings shall be in accordance with the manufacturer instructions.

1.3.9 Fire Resistance Requirements: Coatings applied to structural metal or doors where fire retardant is required by code and public access metal structures shall have fire retardant rating, in terms of flame spread, fuel contribution, and smoke density equal to or greater than the NFPA 101 requirement, as tested in accordance with ASTM E 84.

1.3.10 Abrasion Resistance Requirements: Floor coatings shall be resistant to the expected foot or wheel traffic.

1.3.11 Slip Resistance Requirements: Floor coatings on metal stairs steps and landings, and horizontal covers at floor level shall contain non-skid pigments to produce slip resistance for pedestrians.

1.3.12 Hardness Requirements:

1.3.12.1 Each coating system after full cure shall have sufficient hardness to sustain its integrity under the expected service and operational environment.

1.3.12.2 The hardness shall not be less than that stated in the manufacturer technical documentation, as measured by the pencil hardness test per ASTM D 3363 or the Barcol hardness test per ASTM D 2583.

1.3.12.3 For coatings where abrasion is a concern, the hardness shall not be less than that stated in the manufacturer technical documentation as measured by the Taber wheel abrasion test per ASTM D 4060.

1.3.13 Impact Resistance Requirements: Coatings that will be subject to impact shall pass ASTM D 2794.

1.3.14 Durability Requirements: Design and apply corrosion control coatings that have a service life of minimum 25 years without maintenance, in the environment in which the metal will function.

1.3.14.1 Weathering: Design and apply coatings that have superior weathering resistance, and resistance to degradation from ultraviolet radiation.

1.3.14.2 Apply coatings on metal surfaces that have been properly prepared, to the degree specified, in accordance with the surface preparation standards found in the SSPC Steel Structures Painting Manual, Systems and Specifications:

(a) SSPC SP1 Solvent Cleaning

(b) SSPC SP2 Hand Tool Cleaning
(c) SSPC SP3  Power Tool Cleaning
(d) SSPC SP10  Near White Metal Cleaning
(e) SSPC SP11  Power Tool Cleaning to Bare Metal

1.3.15  **Biological Resistance Requirements:** Design and apply corrosion control coatings that are resistant to bacteria, fungus, and other forms of biological attack, leading to premature coating breakdown.

1.3.15.1  Fungicides shall not be in the ACP prohibited substances list, and shall be the type and quantity recommended by the coatings manufacturer. Resistance to growth of mold on the coating surface shall be high, as tested in accordance with ASTM D 3273.

1.3.15.2  Coatings for underground pipes and steel structures shall be resistant to biological attack by sulfate reducing bacteria or fungus.

1.3.16  **Uniformity Requirements:**

1.3.16.1  Apply corrosion control coatings in such a manner as to produce a protective, continuous film of uniform thickness and consistency.

1.3.16.2  Exposed metal surfaces of items which are galvanized, where the galvanizing has been removed for welding purposes, or where the item has been cut exposing non-galvanized surfaces, or where the galvanizing has been damaged for any reason, shall be repaired by coating with a suitable cold galvanizing compound of minimum 95% zinc content in the dry film. The cold galvanizing coating shall be of a thickness comparable to the adjacent, galvanized surfaces.

1.3.17  **Service Life:** Design and apply corrosion control coatings which will extend the service life of the metal items with minimum maintenance.

1.3.17.1  Coatings for metal structures shall have a minimum service life of 25 years for exterior, atmospheric exposure in a tropical, coastal marine environment.

1.3.17.2  Coatings for metal structures which are not hydraulic structures shall have a minimum service life of 30 years for underground exposure in trenches with proper backfill.

1.3.18  **Dielectric Strength Requirements:**

1.3.18.1  1.  Coatings for underground service, with or without cathodic protection shall have a high dielectric strength and shall be free from porosity or holidays (an area left uncovered during the application of paint) as tested in accordance with NACE RP 0188 and ASTM D 5162.

1.3.19  **Appearance Requirements:**

1.3.19.1  Finished coatings shall not show evident contamination by dust or abrasives, brush marks or fibers, runs or sags, dry overspray, holidays or missed spots, spattering or cratering.

1.3.19.2  Corners and edges, welds, plate overlaps, hardware, and other irregular surfaces shall show complete covering by coatings.

1.3.19.3  Finished coatings shall be free from pinpoint rusting, checking, discoloration, chalking and other coating failures. Chalking shall be evaluated in accordance with ASTM D 4214. Checking shall be evaluated in accordance with ASTM D 660.

1.3.20  **Health and Environmental Protection Requirements:** Design corrosion control coating systems that shall minimize impact on health and the environment.
1.3.20.1 **Solvents**: Use high build, high solids coatings or solventless coatings that shall emit only small quantities of solvents to the atmospheres. Do not use coating solvents or cleaning solvents which are in the ACP’s Prohibited Substances List.

1.3.20.2 **Contents**: Use coatings which do not have ingredients which are considered carcinogenic or hazardous to human health or the environment. Do not use coatings that contain lead and other heavy metals. Do not use coating materials that when removed would be considered hazardous waste.

1.3.20.3 Where in contact with potable drinking water, use coatings that are NSF 61 compliant.

1.3.21 **Maintenance Requirements**:

1.3.21.1 Design and apply coating finishes that shall prevent dirt pickup and that may be low pressure water washed without damaging the coating.

1.3.21.2 Use coatings which may be touch-up repaired without requiring complete removal or complicated surface preparation.

1.3.22 **Color Requirements**: Color designation used for safety purposes shall be in accordance with NEMA Z535.1.

1.3.22.1 For corrosion protection of metals in exterior locations, design and apply coating finishes that shall retain color and gloss during its required service life.

1.3.22.2 Design and apply coating finish materials with complete hiding characteristics. If required, hiding shall be evaluated in accordance with ASTM D 344.

END OF SECTION
SECTION 01 89 16 – SITE CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY: This section relates to the design and construction of exterior pavements and surfacing, exterior site enclosures, and landscaping.

1.1.1 Appurtenances: Also, the work includes the design and construction of appurtenances for roadways and driveways, including curbs, gutters, guardrails, pavement markings, and parking bumpers.

1.1.2 Signs: Also, the work includes the design and construction of signs, including traffic signals, “ALTO”, “CEDA EL PASO”, and directional signs, and parking space marking and identification.

1.1.3 Sound Barrier: Sound barriers to shield neighboring communities shall be as prescribed in section 32 35 16 *(Noise Pollution Control)*.

1.2 REFERENCES:

1.2.1 Code of Federal Regulations (CFR):

29 CFR 1926 Occupational Safety and Health Administration (OSHA), Department of Labor - Safety and Health Regulations for Construction

29 CFR 1910 Occupational Safety and Health Administration (OSHA), Department of Labor – Occupational Safety and Health Standards, Subpart D

1.2.2 American Society for Testing and Materials (ASTM) International Standards:

B 211-12 Aluminum and Aluminum-Alloy Bar, Rod, and Wire

B 211M-12 Aluminum and Aluminum-Alloy Bar, Rod, and Wire [Metric]

D 2047-11 Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine

1.2.3 International Code Council (ICC) Code:

IBC-15 International Building Code

1.2.4 National Fire Protection Association (NFPA) Codes:

101-15 Life Safety Code

1.2.5 American National Standards Institute (ANSI) Standard:

ICC A117.1-09 Accessible and Usable Buildings and Facilities
1.2.6 Ministerio de Obras Públicas (MOP):
Especificaciones Técnicas Generales para la Construcción y Rehabilitación de Carreteras y Puentes

1.2.7 American Welding Society (AWS) Codes:
D1.1/D1.1M-15 Structural Welding Code Steel
D1.3/D1.3M-08 Structural Welding Code- Sheet Steel

1.2.8 Federal Specifications:
RR-F-191K/GEN Fencing, Wire and Post Metal (and Gates, Chain-link Fence Fabric, and Accessories) (General Specification)
RR-F-191/1F Fencing, Wire and Post, Metal (Chain-link Fence Fabric) (Detail Specification)
RR-F-191/2E Fencing, Wire and Post, Metal (Chain-link Fence Gates) (Detail Specification)
RR-F-191/3E(1) Fencing, Wire and Post, Metal (Chain-link Fence Posts, Top Tails and Braces) (Detail Specification)
RR-F-191/4F Fencing, Wire and Post, Metal (Chain-link Fence Accessories) (Detail Specification)

1.2.9 American Association of State Highway and Transportation Officials (AASHTO) Standards:
GDHS-6-11 A Policy on Geometric Design of Highways and Streets, 6th Edition; including November 2013 Errata

1.2.10 Chain Link Fence Manufacturers Institute (CLFMI) Publications.

1.3 REQUIREMENTS:

1.3.1 Pavements and Surfacing: Where pavements and surfacing are integral with elements defined within another element group, the Concessionaire shall meet requirements of both element groups.
1.3.1.1 **Safety of Pedestrian Surfaces:**

(a) **Slip Resistance:** The Concessionaire shall provide walking surfaces of exterior stairs, ramps, and walkways with a minimum static coefficient of friction of 0.80, measured in accordance with ASTM D 2047.

(b) **Stairs:**
   (1) **Risers:** Closed.
   (2) **Treads:** Maximum bevel or radius on leading edge of 12.8 mm.
   (3) Shall meet the requirements of 29 CFR 1910.24.

(c) **Guards, Guardrails, or Protective Walls:**
   (1) Shall meet the requirements of 29 CFR 1910.23(e) for standard railings.
   (2) Railings shall not be made of wood or materials that will be subject to degradation due to the effects of the rain or sun.

1.3.1.2 **Safety of Vehicular Areas:** The Concessionaire shall provide highly visible traffic signs and signals as necessary, in both the temporary and permanent situation, to regulate traffic for safety and convenience. They shall comply with requirements of the ACP and MOP for placement and design. Refer to URL http://www.mop.gob.pa/servicios/contratistas/, under heading “Manuales para los contratistas”, hyperlink “Manual de especificaciones técnicas”.

(a) Use of the following is not permitted for pedestrian areas:
   (1) Decorative concrete topping
   (2) Brick pavers
   (3) Asphalt pavers
   (4) Concrete pavers
   (5) Stone pavers
   (6) Turf reinforcement paving system
   (7) River-washed gravel over compacted sub-base
   (8) Crushed stone over compacted sub-base

1.3.1.3 **Exterior Handrails, Guards, and Guardrails:** Capable of resisting forces in excess of those required by code and meet the requirements, as follows:

(a) **Uniform Load:** Minimum 0.75 kN/m applied in any direction at the top.

(b) **Concentrated Load:** Minimum 890 N applied in any direction at any point along the top.

(c) **Normal Load to Intermediate Rails or Guard:** Minimum 220 N horizontally applied to area of not more than 305 mm square.
(d) Shall be designed for the design life in the marine tropical environment of the Site.

1.3.1.4 Roadways and Driveways:

(a) Comply with recommendations of AASHTO GDHS-5.

(b) **Minimum Widths**: Traffic lanes not less than 3.65 m wide.

(c) **Maximum Slopes**: 1:10.

(d) **Curbs**: Minimum 150 mm mountable curbs at all roadways and driveways.

(e) **Gutters**: Minimum 300 mm width, designed in accordance with AASHTO recommendations, located on one side of all roadways and driveways. Water from gutters shall flow into the system.

(f) **Traffic Lanes and Directional Markings**: Permanent and highly visible, minimum width of 100 mm.

(g) Roadways shall be continuous around buildings and structures to permit access by the shortest possible routes.

(h) Use of the following is not permitted for vehicular paving:

   (1) Decorative concrete topping

   (2) Brick pavers

   (3) Asphalt pavers

   (4) Concrete pavers

   (5) Stone pavers

   (6) Turf reinforcement paving system

   (7) River-washed gravel over compacted sub-base

   (8) Crushed stone over compacted sub-base

(i) Roads that will be subject to high volume traffic or used by heavy equipment (20T trucks, cranes) shall be designed utilizing concrete pavement.

(j) The design of roads leading to the main entrance shall be designed to ensure that vehicles cannot approach the guard booth at high speeds. The purpose is to ensure that the vehicles do not constitute a threat to the security of the area.

(k) All pavements in the vicinity of operations buildings shall be designed to support the loads imposed by the equipment required for operations and maintenance activities.

1.3.1.5 Parking Areas Other than the Temporary Areas for the Concessionaire or ACP Personnel:

(a) **Minimum Width of Parking Spaces**: 2.75 m.
(b) **Bumpers or Wheel stops**: Located and sized to prevent damage to fixed objects, or excessive encroachment on pedestrian walkways.

(c) **Space Markings**: Permanent and highly visible (day and night), minimum width of 100 mm.

(d) **Parking Signage**: As required by code and project program.

1.3.1.6 The Concessionaire shall design all paved surfaces for service life span of paved surfaces: 20 years, under daily use.

1.3.1.7 The Concessionaire shall design pavement to accommodate traffic as follows, based on procedures in AASHTO GDPS-4 and GDPS3-V2, Guide for Design of Pavement Structures.

1.3.2 **Exterior Site Enclosures**:

1.3.2.1 **Fences and Barriers Other Than Building Exterior Walls**:

   (a) **Weather Resistance**: Design and select materials to minimize deterioration due to precipitation, sunlight, ozone, normal temperature changes, salt air, and atmospheric pollutants.

      (1) **Deterioration**: Includes corrosion, shrinking, cracking, spalling, delamination, abnormal oxidation, decay, and rot.

      (2) **Surfaces Exposed to View**: Deterioration adversely affecting aesthetic life span includes color fading, crazing, and delamination of applied coatings.

      (3) **Coating Performance**: AAMA 2605, minimum.

      (4) **Coating Salt Spray Resistance**: No deterioration when tested in accordance with ASTM B 117 for 1,000-hour exposure with 5 percent salt fog at 35 degrees C.

      (5) **Service Temperature**: High temperature equal to that expected due to any combination of air temperature and heat gain from solar and other sources.

      (6) **Corrosion Resistance**: In locations exposed to the outdoor air or in potential contact with moisture inside shell assemblies, use only corrosion-resistant metals.

END OF SECTION
SECTION 01 89 19 - SANITARY SEWER AND WASTEWATER

PART 1 - GENERAL

1.1 SUMMARY: This section establishes the minimum requirements for the design, specification and construction of the sanitary wastewater collection system, pretreatment units and the wastewater treatment plant and disposal facilities.

1.1.1 Sanitary Wastewater Collection System: The wastewater collection system shall convey all concession area wastewater from the point of generation to the final point of treatment. This waste shall be conveyed by gravity, unless site conditions and expected operational and maintenance cost prevent its use. Industrial and commercial wastewater, if any, shall also be collected within this system after the appropriate pretreatment has been accomplished. Combined systems are not allowed.

1.1.2 Pretreatment Units: Pollutants contained in wastewater flow which may interfere with operation of the sewage treatment plant or pass through such a plant untreated shall require the installation of a pretreatment unit. Additionally, pretreatment of industrial wastewater shall be appropriate for the chosen sewage treatment plant process.

1.1.3 Wastewater Treatment Plant and Disposal Facilities: The treatment system shall be based on extended aeration/activated sludge and treatment requirements shall be determined on the basis of meeting stream and effluent requirements set either by COPANIT standards.

1.1.4 Treatment Units: When site conditions and expected operational and maintenance cost prevent connecting buildings or facilities to the wastewater collection system, isolated treatment units shall be provided. Treatment requirements shall be determined on the basis of meeting stream and effluent requirements set either by COPANIT standards.

1.1.5 Outfalls: Design of the sanitary sewer outfalls shall take into account the existing water quality conditions of receiving water body and the recommendations of the Environmental Impact Study. Mass balance calculations shall be performed to ensure that discharge quality standards of COPANIT are met.

1.2 REFERENCES:

1.2.1 American Water Works Association (AWWA) Standards.

1.2.2 American National Standard Institute (ANSI) Standards.

1.2.3 Ductile Iron Pipe Research Association (DIPRA) Standards.

1.2.4 American Society for Testing and Materials (ASTM) International Standards.

1.2.5 American Welding Society (AWS) Publications.

1.2.6 American Association of State Highway and Transportation Officials (AASHTO) Standards.

1.2.7 International Organization for Standardization (ISO) Standards.
### Applicable Legislation:

<table>
<thead>
<tr>
<th>Document</th>
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<tr>
<td>Reglamento Técnico DGNTI-COPANIT 24-99</td>
<td>Ministerio de Comercio e Industrias, Dirección General de Normas y Tecnología Industrias Agua. Reutilización de las aguas residuales tratadas. Gaceta Oficial 24008</td>
</tr>
</tbody>
</table>
1.2.9  **American Concrete Institute (ACI) Publications:**

- **SP-66(04)***  
  Detailing Manual

- **350-06***  
  Code Requirements for Environmental Engineering Structures

1.2.10  **American Institute of Steel Construction (AISC) Publication:**

- **325***  
  Steel Construction Manual, 14th Edition

1.2.11  **American Society of Civil Engineers (ASCE) Manuals:**

- Manual of Engineering Practice No. 76  
  Design of Municipal Wastewater Treatment Plants (2009)

- Manual of Engineering Practice No. 60  

1.2.12  **Autoridad del Canal de Panamá (ACP) Publication:**

- **2610 EAC-101***  
  Norma para la reducción de la contaminación ambiental por ruido.
1.3 REQUIREMENTS:

1.3.1 The plants may consist of a patented modular package system or Concessionaire designed system. Patented modular package systems shall have more than 5 years of proven operation in the market. The plant may be constructed of concrete, steel or other corrosion resisting material. Concessionaire shall ensure constant flow to the plants during any given 24 hours period of operation. A regulating and homogenizing tank may be required. The following are specific requirements for the wastewater treatment plants (WWTP) and disposal sites:

1.3.1.1 WWTP shall be designed to treat all wastewaters produced in the transshipment port facilities during their design life.

(a) No discharge without treatment shall be permitted.

(b) Wherever required pretreatment shall be provided.

(c) The toxicity, coliform count, biochemical oxygen demand, chemical oxygen demand, settleable solids, and nutrient load of the waste stream shall be considered in determining its impact on the receiving waters and the appropriate treatment system.

(d) Dimensioning of the plants shall be determined taking into account the characterization of the wastewaters to be treated.

1.3.1.2 The WWTP shall be capable of working in a continuous fashion, even in the case of normal maintenance operation and outages. As a minimum, two treatment modules shall be required with their corresponding interconnection in order to fulfill this condition; each module shall have the capacity to treat half of the influent plus additional 20 percent.

1.3.1.3 The Concessionaire shall design each treatment unit in the proposed system to avoid potential problems caused by tropical weather, such as, high temperature, torrential tropical rain, and local sewage characteristics variations.

1.3.1.4 A potable water supply and sanitary facilities (toilet and lavatory), shall be provided for each plant. The potable water line shall incorporate an approved backflow prevention device to prevent the contamination of the water supply.

1.3.1.5 Equipment required to maintain the 24 hour operation of the plants shall be connected to the transshipment port facilities’ emergency power system.

1.3.1.6 Sludge Handling: Treatment and disposal shall be according to applicable local regulations. The disposal plan shall be considered as part of the wastewater treatment plant design. Sludge handling and dehydratation facilities at the sites shall be designed by the Concessionaire.

(a) An area shall be available for the temporary deposit of dehydrated sludge that is accessible by the equipment required for its removal.

(b) If final disposal of dehydrated sludge is located within the concession area it shall be designed by the Concessionaire.

1.3.1.7 Odor Control: If routing of exhaust air from the structures is required, a compost filter bed for odor scrubbing shall be implemented.

1.3.1.8 Safety Features in Plant Design: The safety features listed below are minimum general requirements and are not intended to be all-inclusive.
(a) Assure adequate ventilation in wet wells and dry wells.

(b) The design shall include adequate provisions for make-up air.

   (1) Positive mechanical ventilation shall be ample in grit and screening chambers as well as in the wet and dry wells.

   (2) Wet well ventilation for continuous operation shall provide at least 12 air changes per hour. For intermittent operation, at least 30 air changes per hour shall be provided.

   (3) Dry well ventilation for continuous operation shall provide at least 6 air changes per hour. For intermittent operation, at least 30 complete air changes per hour shall be provided.

(c) Stairs shall be used for access to pump rooms in preference to vertical ladders when feasible. The design shall prevent the accumulation of potentially explosive gases generated by the plant and processes, or by the chemicals, materials, water and sludge handled. Machinery, pumps, ventilation system, and other equipment and electrical wiring and devices installed where such gases may accumulate shall be explosion proof.

(d) Guards shall be provided for all exposed, moving parts of pumps and equipment.

(e) Hoists and rails for removal of heavy equipment shall be provided for operation and maintenance purposes.

(f) The plant shall be enclosed by a fence to protect the public and the facility.

(g) The water supply shall be protected to eliminate the possibility of contamination by cross connections with sewage or sludge piping.

   (1) This shall be achieved by a vertical, positive air gap of no less than 2 inches between the inlet and the outlet levels of a fixture.

   (2) The water line utilized for plant wash down will be provided with a backflow-prevention device.

(h) Flood lights with local control shall be provided for night-time inspection and maintenance.

(i) A suitable facility for quick drenching or flushing of the eyes and body shall be provided within areas where chemicals are handled, stored or used except when water presence is a hazard with the chemical.

(j) The noise levels at the plants shall not exceed the maximum allowed by applicable laws for the work environment.

(k) **Safety Equipment**: Facilities for the following safety equipment shall be provided for at the plant:

   (1) First-aid kit.

   (2) Fire extinguishers (type suitable for anticipated fires).

   (3) Hydrogen sulfide and carbon monoxide indicators.

   (4) A portable air blower.
(5) Rescue floatation equipment.

1.3.2 The following are general requirements for the work specified under this section:

1.3.2.1 The water supply lines shall be protected to eliminate the possibility of contamination by cross connections with sewage or sludge piping, hence a minimum horizontal and vertical clearance shall be attained. This is:

(a) **Horizontal Clearance**: A separation of 3.00 m is required.

(b) **Vertical Clearance**: When sewage or sludge pipes cross water supply lines, these shall be installed in such manner that the lower part of the water pipe is separated a minimum of 460 mm over the sewage or sludge pipe.

(c) Whenever not possible to attain the minimum clearance distance above indicated, provisions shall be made to prevent contamination of water lines.

1.3.2.2 Except at crossings, sewage and sludge piping shall be separated from storm drains or other sewer mains with a minimum horizontal clearance of 1.5 m.

1.3.2.3 Except at crossings, sewage and sludge piping shall be separated from other utilities (including underground electric and telecommunications cables) with a minimum horizontal clearance of 1.2 m.

1.3.2.4 Sewer mains shall be designed to run parallel to the street or road centerline. All mains shall have a horizontal clearance from all structures of at least 1.5 m.

1.3.2.5 Clear vehicle access roads are required to every structure in the sewer system and the design of access roads shall be included with the sewer system design plans. All equipment with significant noise generation shall be enclosed within buildings or shrouded within sound attenuation structures.

1.3.2.6 Sewage and waste water pipelines shall be constructed of: Ductile Iron (DIP), Polyvinyl chloride (PVC), High Density Polyethylene (HDPE), Glass Reinforced Pipe (GRP), or Concrete Pipe (CP).

1.4 DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE:

1.4.1 The design, specification and construction of sanitary sewers in the transshipment port facilities and sanitary sewers and sewage treatment plants and units for the transshipment port facilities shall be in accordance with good engineering practice. The work shall comply with the standards, publications and manuals listed.

1.4.1.1 **Sewerage**: All sewage shall reach the system by gravity flow, in an unadulterated condition susceptible to conventional sewage treatment processes. If gravity flow is not physically feasible, a sewerage pumping station may be installed. No pumping facilities shall be incorporated in sewer plans without approval of the Contracting Officer.

1.4.1.2 Design, specification and construction of gravity sewers, force main, pump stations and treatment plant shall be in accordance with “Normas técnicas para aprobaciones de planos de los sistemas de acueducto y alcantarillado sanitario” issued by IDAAN (latest version).

1.4.1.3 All pumping stations shall be of the below ground type utilizing submersible pumps, unless otherwise approved by the Contracting Officer.

(a) Pumping stations shall have a minimum of two equal capacity submersible pumps.
(b) Pumps shall be sized such that with any one pump off-line the remaining pump(s) can handle the design flow.

(c) Pumps shall be designed to pass a sphere 75 mm in diameter.

(d) Pump suction and discharge shall be at least 100 mm in diameter.

(e) Pumps shall be designed to operate under a positive suction head.

(f) Pump motors shall be explosion proof where required by code.

1.4.1.4 Wastewater treatment plants (WWTP) shall be designed to achieve effluent quality standards stipulated in applicable laws. Specifically, the plants shall:

(a) Be easy to operate and maintain.

(b) Require minimum operating personnel.

(c) Utilize efficient diffusers at the air/water interchange for maximum reduction in energy.

1.4.1.5 Equipment for indicating, totalizing and recording the effluent wastewater flow shall be provided for all treatment plants.

(a) Recording and totalizing equipment shall be provided as required to assure effluent limitations within parameters required under applicable laws.

(b) Monitoring equipment shall be used to indicate and record flow quantities, as well as, pressure, temperature, liquid levels; and various quality parameters such as dissolved oxygen, Ph, and turbidity.

(c) **Monitoring at pumping stations**: In sewage pumping stations, flow measurement is necessary to control periodic pump operation. Watt-hour meters and pump-time meters shall be used to ensure uniform pump wear in multiple-pump installations.

(d) **Monitoring of primary treatment**: Flow measurement and recording as well as grit-level monitoring are the only primary treatment monitoring processes that shall be required.

1.4.1.6 Provisions for sampling sites shall be included in the plant design. The type of sampling provisions (flow proportional, composite, or grab-sample collection) shall be dictated by the type of sampling required by the Contracting Officer.

1.4.1.7 Treatment plants shall be located a minimum of 30 m from the closest building.

1.4.1.8 Provisions shall be made for standby equipment or bypass piping for situations where process equipment failures are encountered or during routine maintenance.

1.4.1.9 The design, specification and selection of the process equipment shall consider ease of operations and consistency of treatment performance. Specifically, the Concessionaire shall not consider equipment that requires considerable operator attention. Operator-free equipment is desirable.

1.4.1.10 Provisions shall be made for access, maintenance, and removal of process equipment.

1.4.1.11 Stairs, walkways, man ways, and other structures shall be included in the facility design to enhance the routine functions of the operator.
1.4.1.12 **Documentation:**

(a) At least two sets of the WWTP operating manual shall be maintained by the Concessionaire upon completion of the work and testing. The WWTP operating manual shall contain the following information:

1. Approved design report;
2. Hydraulic Profile;
3. Basic electrical schematic;
4. Basic plant piping schematic;
5. Unit operating theories and procedures;
6. Recommended operating ranges;
7. Maintenance check list;
8. Program for residuals disposal;
9. Parts list;
10. Copies of all warranties and guarantees;
11. Trouble-shooting guide;
12. Permit requirements;
13. Laboratory requirements and testing schedule;
14. Operator requirements and hours;
15. Emergency or breakdown procedures;
16. All documentation required by this Appendix regarding the operation and recommended maintenance programs relating to the various elements of the construction work.

(b) A revised version of the final operation and maintenance manual shall be prepared and maintained, including any changes resulting from the first year of operation.

(c) Updated calculations due to changes during construction.

**END OF SECTION**
DIVISION 02 – EXISTING CONDITIONS

SECTION 02 30 00 – GEOTECHNICAL INVESTIGATIONS

PART 1 – GENERAL

1.1 SCOPE: The Concessionaire shall determine the scope of the geotechnical investigations, including but not limited to depth and location of boreholes, and tests required. Geotechnical investigations shall be as required for the design of transshipment port facilities and its appurtenant structures according to good industry practices. The Concessionaire shall perform all subsurface investigations necessary for the design.

1.2 REFERENCES: The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

1.2.1 American Society for Testing and Materials (ASTM) International Standards:

D 854-14     Specific Gravity of Soil Solids by Water Pycnometer
D 422-63(07)  Particle-size Analysis of Soils
D 1586-11    Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils
D 1587/D 1587M-15 Thin-Walled Tube Sampling of Soils for Geotechnical Purposes
D 2216-10    Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
D 2435/D 2435M-11 One-Dimensional Consolidation Properties of Soils using Incremental Loading
D 2487-11    Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D 2850-15    Unconsolidated-Undrained Triaxial Compression Test on Cohesive Soils
D 3080/D 3080M-11 Direct Shear Test of Soils Under Consolidated Drained Conditions
D 4318-10    Liquid Limit, Plastic Limit, and Plasticity Index of Soils
1.3 **GEOLOGY OF THE WORK AREA:** Refer to annex C *(References)*, Geotechnical Data Report

1.4 **PROTECTION OF EXISTING UTILITY LINES AND STRUCTURES:**

1.4.1 **Abandoned Pipelines:** If an abandoned pipeline or pipeline not identified on the drawings is encountered, and is identified as conduit or former conduit of a flammable product, the Concessionaire shall contact the corresponding authority for control of the situation before proceeding with any excavation work.

1.4.2 **Construction Machinery:** Movement of construction machinery and equipment over pipes and utilities during the work shall be at the Concessionaire’s risk. The Concessionaire shall excavate by hand, for work immediately adjacent to or for excavations exposing a utility or other buried obstruction, or for ductile or water line crossings. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Report damage to utility lines or subsurface construction immediately to the corresponding utility provider keeping in copy the Contracting Officer.

**PART 2 - PRODUCTS**

2.1 **CORE BOXES:**

2.1.1 **General:** Each core box shall be heavy duty, light weight, constructed with high grade moulded polypropylene, or approved equal, in order to preserve its integrity against humidity and termites. All boxes shall be between 1,070 mm and 1,100 mm long. The core separators shall be of the same material as the core box and shall allow the marking of the core run. The lid shall be of the same material as the core box, with heavy duty closing clips, and shall allow labeling in the inner and outer faces of the lid and at both ends.

2.1.2 **Size:** Each core box shall be sized to receive standard core samples and shall not weight more than 3.10 kg.

2.1.3 **Label:** The size of the letters for the lid label shall be approximately 254 mm (1 inch) high, and for the ends, 13 mm (1/2 inch). The Concessionaire shall be responsible for labeling the core boxes. The label shall be as follows.
PART 3 - EXECUTION

3.1 ENVIRONMENTAL PROTECTION REQUIREMENTS: The work shall be executed in compliance with the Environmental Impact Study included in Appendix 10 of the Concession Agreement, applicable ACP regulations available in Spanish through URL (http://micanaldepanama.com/proveedores/ambiente-agua-y-energia/), and the laws of the Republic of Panama: that is all applicable legislation, statutes, ordinances and other laws, and regulations and by-laws of any legally constituted public authority having jurisdiction including but not limited to the Republic of Panama’s “Ministerio de Ambiente”. Paths shall have the minimum width required for the Concessionaire to mobilize and demobilize from the site.

3.2 ACCESS ROADS:

3.2.1 The Concessionaire shall, at its own expense, construct access roads necessary for proper prosecution of the work. Access roads shall have safe widths, grades, drainage infrastructure as required (ditches, drainage culverts, etc.) and sight distances for the equipment to be used; sharp curves, blind corners, and dangerous cross traffic shall be avoided. Arbitrary cutting of trees will not be allowed.

3.2.2 The use of the internal roads of Altos de Jesus (Diablo Heights) community for geotechnical investigations work access is prohibited.

3.2.3 Access roads shall be free draining. The roads shall also have electrical clearances to existing lines according to IEEE C2.

3.2.4 The Concessionaire shall provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The Concessionaire shall pay particular attention to signage and safe sight distances at all locations where construction vehicles will enter or exit access roads. The method of dust control shall be adequate to ensure safe operation at all times. Lighting shall be adequate to ensure full and clear visibility for the full width of the access roads and work areas during any night work operations. The method of dust control shall be adequate to ensure safe operation at all times.

3.2.5 To prevent accidents on access roads, smaller vehicles shall use a strobe light or flagpole with flag, so they can be easily seen by operators of heavier and/or larger equipment.

3.2.6 Upon completion of the work, access roads shall be removed.

3.3 WORKING PLATFORM: The Concessionaire shall construct working platforms for drilling equipment as required to perform the work. Working platforms shall have safe grades, shall be free draining, shall be provided with drainage infrastructure as required for the local weather and shall be of adequate size for the equipment to be used.

3.4 DRILLING AND CORING:

3.4.1 General: The ACP authorizes the Concessionaire to use water from the Canal for drilling operations without charge, but only for the performance of the work. However, the ACP does not assume
any responsibility for the quality of such water. Only biodegradable fluids are permitted in this job to avoid the permanent sealing of the fractures and contamination of the underground waters. The Concessionaire shall provide core of good quality, using adequate bits, tools and drilling methods; if the materials to be drilled are too soft and clayey, they shall be recovered in good condition using the appropriate drilling techniques, materials, equipment and drilling fluids to avoid recovering them as clay.

3.4.2 Driller’s Log: The Concessionaire shall maintain a driller’s log after completion of each boring, specifying the driller’s runs, the distance drilled in each run, the color of water return, the type of drilling fluid, bit and core barrel used, the condition of the rock, the depth where the drilling fluid was lost (if it is the case), the depth where the drilling fluid was recovered, the depth of casing, and any other remark(s) which may be pertinent to the drilling operation and the rock characteristics.

3.4.2.1 Geological Core Log Content: The Concessionaire shall maintain a geological core log after completion of each boring. The Concessionaire shall describe the soil and rock cores according to ACP logging standard: “Core Logging Standards for the Canal Area Soils and Rocks”, refer to annex C (References), file “ACP-Core Logging Standards(May-2003).pdf”. The core logs shall describe, in addition to the driller’s information required in paragraph 3.4.2 (Driller’s Log), the following:

3.4.2.2 For Soils: Soils type, material consistency, material strength, plasticity, dry strength, water content, origin, color, drilling characteristics and field tests (if any); and

3.4.2.3 For Rocks: Material name, hardness and strength, degree of weathering, fractures, bedding, grain size, alterations and color.

3.4.3 Methodology: The Concessionaire shall provide the core boxes to accommodate core diameters (NQ or HQ). The cores shall be labeled and carefully placed in the core boxes and transported to the consolidation site instructed by the Contracting Officer, which is located at Summit in the former Antenna Field at the East Bank of the Canal in the Pacific Side. The cores shall be logged by the Concessionaire’s geologists as soon as they are extracted. However, if the Concessionaire’s geologist is not available to log any core as soon as they are extracted, the Concessionaire’s geologist may log these cores the following day; in these cases, when the cores are extracted, the Concessionaire shall accommodate the samples in their respective boxes and protect the cores by wrapping them in rags impregnated in water or similar material covering them with a protective plastic film to prevent evaporation until the Concessionaire’s geologists arrives the next day to perform logging of the samples. The Concessionaire shall photograph, with a digital color camera of a minimum resolution of 16 megapixels, each core box and shall include photographs with the respective core log. The cores shall be carefully accommodated and packed for their transportation to the site specified by the Contracting Officer. The Concessionaire shall provide labor for loading and transporting core boxes to the designated area by the Contracting Officer. The core boxes shall be under a protective shade while in the field. The Concessionaire shall also be responsible for delivering core samples to the ACP’s “Unidad de Laboratorio de Suelos y Materiales” (IAIG-LAB), located in Corozal West, Building 721A. After completion of core holes in land, the Concessionaire shall fill them with pea gravel.

3.4.4 Minimum Amount of Borings per Structural Element: The Concessionaire shall determine the number of boreholes required for the design.

3.5 Final Results: The Concessionaire shall prepare a final report within four weeks after completion of all the drilling, coring and in-situ testing. The report shall describe the method used to perform the pressuremeter - dilatometer tests, standard penetration tests, as well as the final results of each test. Likewise, laboratory test results shall be included in the draft report. The Concessionaire shall maintain the final report including the core logs, the driller’s reports, the photos of all the core boxes and the in-situ tests and laboratory test results in digital files and hard copies, which should be available upon ACP’s request.
3.5.1 **Core Hole Location:** Core hole location shall be maintain in a 3D topographic file CAD (computer-aided design) format. This file shall include the locations of the core holes made by the Concessionaire. Locations shall be defined by UTM coordinates and PLD elevation. The horizontal datum shall be NAD 27. Additionally, the Concessionaire shall include a MS Excel table that correlates core hole identification, UTM coordinates, and PLD elevation.

END OF SECTION
SECTION 02 83 33.16 – LEAD-BASED PAINT TREATMENT

PART 1 – GENERAL

1.1 WORK INCLUDED: The work may include the demolition of old buildings and structures located in the Concession area, which have components that are made of concrete, masonry, wood, and steel; and which may have lead-based painted surfaces. This section includes the lead-based paint abatement requirements for buildings and structures components for which the Concessionaire determines demolition. This section includes requirements to neutralize the lead in the paint on buildings and structures components, the lead in dust and the lead in wastes before their final disposal, in order to protect human health and natural resources.

1.2 APPLICABLE PUBLICATIONS: The following publications, of the issues listed below but referred to thereinafter by basic designation only, form a part of this specification to the extent indicated by the references thereto:

1.2.1 Code of Federal Regulations (CFR):
- 29 CFR 1926.62 Lead
- 49 CFR 178.504 Standards for Steel Drums

1.2.2 Autoridad del Canal de Panamá (ACP) Norms:
- 1410SAL230(R10) Norma para la exposición al plomo
- 2610EAC-111 Descarga de efluentes y metodología para su verificación

1.2.3 International Organization for Standardization (ISO) Standard:
- ISO 17025 General requirements for the Competence of Testing and Calibration Laboratories

1.3 DEFINITIONS:

1.3.1 Substance with Lead: Any substance that has a lead content above 0.1 mg/cm² or 0.06 percent of the solids of the sample (600 ppm by dry weight).

1.3.2 Hazardous Lead Wastes: Any lead waste with a TCLP greater than 5 mg/L.

1.3.3 Action Level: Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period in an occupational/industrial environment.

1.3.4 Lead Permissible Exposure Limit (PEL): Refers to fifty micrograms per cubic meter (µg/m³) of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8 hours in a work day, the PEL shall be determined by the following formula, according to 29 CFR 1910.1025:

\[
\text{PEL (µg/m}^3\text{ of air)} = \frac{400}{\text{the number of hours worked in the day}}
\]

1.3.5 TCLP: Refers to toxicity characteristic leaching procedure.
1.3.6 **Competent Person (CP):** As used in this section, refers to a qualified person employed by the Concessionaire who is trained in the recognition and control of lead hazards in accordance with current regulations of the ACP and the Republic of Panama.

1.3.7 **High Efficiency Particulate Air (HEPA) filter equipment:** HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead-contaminated paint dust. A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron or larger size particles.

1.4 **DOCUMENTATION FOR THE RECORD:**

1.4.1 **Lead Management Plan (LMP):** The Concessionaire shall prepare a comprehensive LMP. The LMP shall be prepared by the CP. The LMP shall be job specific and address the requirements of ACP norm 1410SAL230, including its annexes, lead treatment and neutralization procedures, and resulting residue or waste disposal. The LMP shall include but not be limited to the following.

1.4.1.1 Detailed description of the site improvements that the Concessionaire plans to prepare the work areas wherein the Concessionaire programs to perform lead related work.

1.4.1.2 Detailed description of air sampling and monitoring methodology, including frequency.

1.4.1.3 Detailed description of methodology for TCLP tests, including number of times that the Concessionaire programs to perform TCLP tests before disposal of components. The methodology shall include sketches to show the exact locations where the Concessionaire programs to take samples.

1.4.1.4 Detailed description of methodology for treatment to neutralize lead in existing paint. The methodology shall include all the steps that will be implemented allow for disposal of components as non-hazardous wastes or residues.

1.4.1.5 Lead related work tasks sequence and lead related work interphases with other work.

1.4.1.6 Signage for lead related work areas. The Concessionaire shall include sketches to show the boundaries of the areas wherein lead related work will be performed, the location of Concessionaire and/or contractor’s personnel facilities for changing clothes, including decontamination areas, containers, and provisions to prevent contamination of surrounding natural ground and water resources.

1.4.1.7 Description of the Concessionaire and/or contractor’s personnel protective equipment, including respirators.

1.4.1.8 Procedure for the containment, collection and treatment of surface water which may be generated within the lead related work areas.

1.4.1.9 Procedures for tagging, processing, and temporary storage.

1.4.1.10 Concessionaire and/or contractor’s personnel lead related work orientation and training program.

1.4.1.11 Disposal procedures, including transportation. Disposal procedures shall include steps to segregate hazardous wastes and residues separate from non-hazardous wastes and residues.

1.4.1.12 **Contingency Plan:** The Concessionaire shall detail engineering controls to contain spills lead from tanks that contain hazardous lead wastes.
1.4.2 **Daily Reports**: The Concessionaire shall maintain daily reports prepared by the CP. Daily reports shall address lead related work abatement, treatment, disposal, work area preparation, and work area cleaning and decontamination at the end of each work shift.

1.4.3 **TCLP Results**: The Concessionaire shall maintain TCLP test results from a qualified laboratory.

1.4.4 **Air Sampling Results**: For lead related work, the Concessionaire shall submit air monitoring results; the Concessionaire shall include descriptions of the actions taken to maintain exposure below the PEL. The Concessionaire shall describe the NIOSH analysis for 8-hour shifts, instruments, and sampling locations.

1.5 **MEDICAL EXAMINATIONS**: The Concessionaire shall conduct blood lead analysis tests and other tests required to determine good health, before the start, and at the end of lead related work, for each member of the Concessionaire and/or contractor’s personnel assigned to lead related work. Additionally, Concessionaire shall conduct blood lead analysis tests during the execution of lead related work, for each member of the Concessionaire and/or contractor’s personnel assigned to lead related work. During the execution of lead related work, frequency of blood lead analysis tests shall be as required in ACP norm 1410SAL230, paragraph 6.5 (*Vigilancia Médica*). If the level of lead in blood is 40 μg or more per deciliter of blood or if another condition is detected which may worsen with continued exposure to lead, the Concessionaire shall remove the affected member of the Concessionaire and/or contractor’s personnel away from lead related work.

1.6 **CP REQUIREMENTS**:

1.6.1 **CP Qualification**: The CP shall have completed a Supervisor lead based paint (LBP) abatement course by an EPA Training Center or an equivalent certification course.

1.6.2 **CP Responsibilities**: The Concessionaire shall empower the CP to take prompt corrective actions to control a lead hazard in connection to any Terminal Construction or Terminal Operations works. The CP shall be designated by the Concessionaire to ensure that the Contractor’s personnel adheres to Concession Agreement requirements, applicable ACP norms, applicable Republic of Panama legislation, good work practices for all lead related work. The Concessionaire shall task the CP to frequently inspect lead related work areas, products, equipment, and to document all inspections.

1.6.2.1 The CP shall continuously inspect lead related work and shall ensure the work and the Concessionaire and/or contractor’s personnel comply this section and the LMP.

1.6.2.2 The CP shall coordinate and supervise air sampling in the affected work areas during lead related work.

1.6.2.3 The CP shall coordinate and supervise soil sampling in and around affected work areas during lead related work.

1.6.2.4 The CP shall inspect lead related work to ensure persons are not exposed to lead concentrations above the PEL and to prevent lead contamination of the environment.

1.6.2.5 The CP shall certify that lead related work facilities (including but not limited to sanitary installations, cloth change areas, showers, and decontamination areas) comply with this section and the LMP.

1.6.2.6 The CP shall document lead related work area inspections; documentation shall include photographs.
1.7 **DELIVERY, STORAGE AND HANDLING:** The Concessionaire shall deliver products to the work site in sealed containers with labels legible and intact. Only approved materials shall be stored at the work sites. Materials shall be stored in a single, ventilated place restricted to paint materials and related equipment. Precautions shall be taken to prevent fire or health hazards at the storage sites. Adequate ventilation shall be provided for the removal of toxic fumes. At least one 20-B fire extinguisher in accordance with NFPA 10 and with seal intact shall be provided for each 18 square meters (200 square feet) of area occupied for neutralizer storage and mixing. The Concessionaire shall take precautions shall be taken to prevent spilling of neutralizer.

**PART 2 – PRODUCTS**

2.1 **MATERIALS:**

2.1.1 **Storage Drums:** Storage drums shall comply with 49 CFR 178.504, U.S. Department of Transportation, Hazardous Material Regulations, identification code 1A2. Storage drums shall be steel with 55-gallon rated capacity. Storage drums shall be provided with removable lids. The Concessionaire shall provide drums with plastic bags to collect dust and wastes generated from substance with lead.

2.1.2 **Vacuums with HEPA Filters:** Vacuums shall be air-tight vacuums equipped with HEPA filters. Vacuums shall be designed with HEPA as the last filtration stage, where all the air drawn into the machine is expelled through the filter with none of the air leaking past it. Vacuums shall be designed for lead work.

2.1.3 **Neutralizer:** Neutralizer shall be a specialty product formulated to seal and treat the hazards of lead based paint. Neutralizer shall be acrylic latex coating designed for exterior and interior application, formulated to penetrate lead paint, dust particulates and chips, and chemically change them to harmless and non-leachable lead phosphate; thus rendering lead waste as non-hazardous for disposal. Neutralizer shall be low VOC, less than 50 g/L. The neutralizer shall be designed to penetrate multiple layers of existing paint, and not require its removal to render the lead paint harmless.

2.1.4 **Tarps:** Tarps shall be impermeable, high strength polyester scrim reinforced PVC vinyl tarps.

2.2 **PERSONNEL PROTECTION EQUIPMENT:**

2.2.1 **General:** The Concessionaire shall provide personnel protection equipment and respirators to contractor’s personnel assigned to lead related work. Personnel protection equipment and respirators shall comply with the requirements ACP norm 1410SAL-213, 29 CFR 1926.62(f) (Respiratory protection), and 29 CFR 1962(g) (Protective work clothing and equipment), and be according to the neutralizer manufacturer’s recommendations. Personnel protection equipment shall include coveralls or similar full-body work clothing; coveralls shall cover feet, head and hands.

2.2.2 **Respirators:** Respirators shall be NIOSH approved and be furnished with HEPA filters. The Concessionaire shall provide each employee required to wear a respirator a respirator fit test at the time of initial fitting and at least annually thereafter as required by 29 CFR 1926.62; the Concessionaire shall submit evidence respirator fit tests upon request by ACP or any authority having jurisdiction.

**PART 3 – EXECUTION**

3.1 **SIGNAGE:** The Concessionaire shall provide signage at the approaches and around the lead related work areas. Signs shall be located at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signage shall include Spanish and English signs indicating: ADVERTENCIA / ÁREA DE TRABAJO CON PLOMO / VENENO / NO COMA NI FUME
3.2 PROTECTION:

3.2.1 Ground Protection: The Concessionaire shall provide tarps to cover and prevent contamination of the soil, vegetation and pavements around the lead related work area. At the end of each work shift and before removing them, the Concessionaire shall use HEPA filtered vacuum cleaners to clean the tarps.

3.2.2 Weather and Filtration Protection: The Concessionaire shall provide impermeable traps or other means to protect lead related work areas from the weather. These means shall serve to protect treated components from the weather. The Concessionaire shall not apply the neutralizer during rain nor when rain is imminent. Additionally, the Concessionaire shall provide weather protection for lead related work drums, and temporarily stored lead related work residues.

3.3 RESIDUES: Residues shall include paint residues, lead dust, and lead related residues.

3.3.1 Collection and Storage: The Concessionaire shall collect with HEPA filtered vacuum cleaners. The Concessionaire shall store residues in plastic bags in appropriate storage drums. Storage drums shall securely lidded when not in use. Storage drums shall be placed in roofed locations, away from areas subject to flooding, away from drainage channels. The Concessionaire shall properly label each drum to identify the type of waste, potential risks associated to lead, weight, source, and the date the drum was filled.

3.3.2 Application: The Concessionaire shall seal and treat residues, including dosage determination, according to the neutralizer manufacturer’s recommendations.

3.3.3 Sampling and Analysis: After sealing and treating residues, and before final disposal, the Concessionaire shall take samples of the treated residues and analyze them through TCLP tests at the laboratory.

3.4 CLEANING AND ORDER AT THE WORK SITE: The Concessionaire shall maintain surfaces of the lead work related work areas free of accumulations of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use compressed air to clean up the area. At the end of each shift and when the paint removal operation has been completed, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner, wet mopping the area and wet wiping the area as indicated by the CP. Reclean areas showing dust or residual paint chips or debris. After visible dust, chips and debris is removed, wet wipe and HEPA vacuum all surfaces in the work area. If adjacent areas become contaminated at any time during the work, clean, visually inspect, and then wipe sample all contaminated areas. The CP shall then certify in writing that the area has been cleaned of lead contamination before restarting work.

3.5 AIR MONITORING AND SAMPLING: The Concessionaire shall conduct lead related work area air sampling daily, on each shift in which lead-based paint treatment operations are performed, in areas immediately adjacent to the lead related work area. Sufficient area monitoring shall be conducted to ensure unprotected personnel are not exposed at or above 30 micrograms per cubic meter of air. If 30 micrograms per cubic meter of air is reached or exceeded, stop work, correct the conditions causing the increased levels. Determine if conditions require any further change in work methods. Treatment work shall resume only after the CP and the Contracting Officer give approval. For outdoor operations, at least one sample on each shift shall be taken on the downwind side of the lead related work area.

3.6 MONITORING AND CONTROL OF EFFLUENTS: To avoid water contamination with lead or other pollutants, the Concessionaire shall provide treatment to all discharge waters resulting from
the operation of toilets, showers or washbasins. The Concessionaire shall ensure the limits established ACP norm 2610EAC-111 are met. The Concessionaire shall comply with requirements and methodology established in ACP norm 2610EAC-111 are met.

END OF SECTION
DIVISION 03 - CONCRETE

SECTION 03 30 00 – CONCRETE

PART 1 - GENERAL

1.1 SUMMARY: The parameters specified in this section represent the intended level of quality of products and construction. The Concessionaire’s design as presented in the drawings and specifications developed by the Concessionaire shall ensure that these parameters, whether expressed or reasonably implied, are achieved. The Concessionaire shall adopt a consistent set of codes and standards based on the American Concrete Institute (ACI) Codes and Standards. When standards other than those quoted are proposed to be utilized, the Concessionaire shall document that the alternate standards will achieve or surpass the Concession Agreement requirements and shall provide a copy of the standard to the Contracting Officer. ACI standards are referenced herein to establish general intent. This section covers structural marine concrete and structural concrete.

1.1.1 Structural Marine Concrete: Reinforced concrete that will be used for structural purposes and will be in contact with or subject to submersion, tidal variations, splash, or spray from water in navigable waterways. Reinforced mass concrete and liquid retaining concrete elements are included in structural marine concrete.

1.1.2 Structural Concrete: Concrete that will be used for structural purposes including plain and reinforced concrete for buildings and concrete features other than marine.

1.2 REFERENCES:

1.2.1 American Concrete Institute (ACI): The standards of the ACI Manual of Concrete Practice and the references used in these standards.

1.2.2 American Society for Testing and Materials (ASTM) International Standards.

1.3 DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE: The concrete shall have a design life of 50 years.

1.4 DOCUMENTATION FOR THE RECORD:

1.4.1 For the Marine Structures:

1.4.1.1 Drawings Showing:

(a) Proposed structure dimensions and joint locations, and details.

(b) Reinforcing layout.

1.4.1.2 Documentation: Report identifying the proposed concrete types and mixes, including complete test reports that substantiate the design strength, durability and permeability. Sources and material properties for all constituents in the concrete mix shall be identified.

1.4.1.3 Specifications.
1.4.2  For Buildings and Miscellaneous Structures:

1.4.2.1  Drawings Showing:

(a)  Complete structure dimensions and joint locations, and details.

(b)  Reinforcing layout.

1.4.2.2  Documentation:  Proposed concrete types and mixes, including test reports that substantiate
the design requirements and identify sources and material properties for all constituents in the concrete
mix.

1.4.2.3  Specifications.

END OF SECTION
DIVISION 31 – EARTHWORK

SECTION 31 23 00 – EXCAVATION AND FILL

PART 1 - GENERAL

1.1 **SUMMARY:** This section covers the design, specification, and construction of various items of earthwork to be carried out at the work site required for the execution of the work. The following items are included.

1.1.1 **Clearing and Grubbing:** Clearing and grubbing the site of trees, shrubs, stumps, roots, brush, and other vegetation; debris; existing foundations; pavements; utility lines; structures; fences; and other items that would interfere with construction operations.

1.1.2 **Excavation:** The changing of grade levels, removal of soil and rock, and selection and separation of existing soil in preparation for construction, including the provision of any temporary or permanent erosion- and sediment-control structures required for the execution of the excavation. The excavated material may be utilized for aggregate, fill, or backfill.

1.1.3 **Disposal:** Removal of the excavated material deemed to be unsuitable for use in the work; and placing this material at the designated disposal sites.

1.1.4 **Dewatering:** Removal of groundwater, seepage, and rainwater flowing toward or into excavations. The work also include the design, installation, and maintenance of groundwater-monitoring systems.

1.1.5 **Fill:** Appropriate material that is redistributed in accordance with the proposed design to reach the required elevations and slopes.

1.1.6 **Backfill:** Appropriate material that is redistributed to bring excavated areas to the design elevations or grades.

1.1.7 **Ancillary:** Temporary earthwork to facilitate construction by keeping excavations free of water.

1.2 **REFERENCES:**

1.2.1 **American Society for Testing and Materials (ASTM) International Standards:**

<table>
<thead>
<tr>
<th>Standard</th>
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<tr>
<td>C 136-06</td>
<td>Sieve Analysis of Fine and Coarse Aggregates</td>
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<td>D 422-63(02)</td>
<td>Particle-Size Analysis of Soils</td>
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<td>D 1140-00</td>
<td>Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve</td>
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<td>D 1556-00</td>
<td>Density and Unit Weight of Soil in Place by the Sand-Cone Method</td>
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D 1557-02 Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft³ (2,700 kN/m³)]

D 2216-05 Laboratory Determination of Water (Moisture) Content of Soil and Rock

D 2487-06 Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D 2937-04 Density of Soil in Place by the Drive-Cylinder Method

D 4318-05 Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.3 REQUIREMENTS:

1.3.1 Design:

1.3.1.1 Clearing and Grubbing: Prior to clearing and grubbing the Concessionaire shall design and implement a wildlife-rescue program based on the wildlife rescue plan and the environmental management plan/environmental impact statement.

1.3.1.2 Excavation:

(a) The Concessionaire shall duly investigate the work site for the design and construction of the work. The Concessionaire may use the information provided or conduct additional investigation to supplement currently available information as he deems necessary. The final site characterization shall be based solely on the Concessionaire’s interpretation of the geotechnical and geological information made available to him and that obtained directly by the Concessionaire.

(b) The Concessionaire shall determine the slopes of his excavations in accordance with standard geotechnical practice. Slope analysis shall consider the short-term (during and immediately after construction) and long-term stability, taking into consideration the effects of deterioration and loss of soil resistance due to local climatic and construction conditions. All permanent slopes shall be designed for an equivalent pore water pressure ratio \( r_u \) with a value not less than 0.30.

(c) The Concessionaire shall implement measures to avoid falling of debris, especially boulders, on to the working area of the work site that could result in loss of life, injury of personnel, and cause delays.

(d) Modification of the work site and grades is required for the construction of structures identified in section 01 81 16 (Transshipment Port Structures), and 01 89 16 (Site Construction), as well as for other unlisted items that require excavation for proper installation.

(e) Where Blasting is Required:

(1) The blasting pattern shall be designed so that little surface preparation will be required at the interaction surface between incompressible bedrock and concrete walls.

(2) The energy released shall not adversely impact the existing structures and shall not disturb communities in the vicinity of the blast.
1.3.1.3 Dewatering with Groundwater Monitoring:

(a) The Concessionaire shall design, install, and maintain a groundwater-monitoring system for each excavation. The system shall include, but not be limited to, geo-hydrological analyses and a network of piezometers and observation wells to be installed by the Concessionaire. Plans shall establish the method and frequency of observations and the method for recording and interpreting results. Records shall be available for the Contracting Officer at any moment.

(b) The Concessionaire shall design diversion ditches, dikes, and grading and shall provide an appropriate dewatering system as required to obtain and maintain dry working conditions. The water discharged as a result of the dewatering shall comply with the requirements of Environmental Impact Study (EIS) included in Appendix 10 of the Concession Agreement.

1.3.1.4 Disposal Site: The design of the disposal site shall meet the requirements of paragraph 1.3.2.3 (Disposal).

1.3.1.5 Fill:

(a) Fill shall be designed to adequately support the loads to which it will be subjected without producing excessive subsidence or bearing-capacity failures that could result in damage to structures supported on or within the fill.

(b) The Concessionaire shall apply only unpolluted natural soils and not use waste of any type. The organic-matter content shall be less than 5 percent.

1.3.1.6 Backfill:

(a) Backfill shall be designed to adequately support the loads to which it will be subjected without producing excessive settlement or bearing capacity failures that could result in damage to structures supported on or within the fill.

(b) The Concessionaire shall apply only unpolluted natural soils and not use wastes of any type. The organic matter content shall be less than 5 percent.

1.3.2 Construction:

1.3.2.1 Clearing and Grubbing:

(a) Clearing and grubbing shall be carried out prior to any excavation work.

(b) Should the Contracting Officer require that individual trees, shrubs, and hedges be preserved, the Concessionaire shall take all necessary precautions to prevent their damage. Any such damage that is not avoided through these measures shall be made good by replanting or landscaping, as required by the Contracting Officer and entirely at the expense of the Concessionaire.

(c) In areas to be cleared, all trees, limbs, logs, brushwood, vegetation, surface trash, loose stumps, and other perishable matter shall be removed to places where it will not interfere with the work or traffic.
1.3.2.2 **Excavation:**

(a) **General:**

(1) The Concessionaire shall perform slope-stability analysis based on the prevailing conditions at each excavation site.

(2) The Concessionaire shall excavate to the lines, grades, and dimensions shown on the final design drawings as required by the specifications.

(3) The Concessionaire shall remove from the designated excavation line all loosened rock, fractured rock, or otherwise loosened material that could slide or fall.

(4) All excavation for utilities shall be performed in dry conditions, if possible. The bottom of excavations for utilities or foundations of structures shall be even (within the tolerances specified) and free from loosened or fractured excavated material.

(5) Scaling, trimming, and remedial work to the rock slopes and berms of each area shall be carried out as soon as possible after excavation is completed. Scaling should include mechanical or hand methods to remove loose rock in order to create a safe environment for operators to work.

(6) Drilling and blasting shall conform to section 31 23 16.26 (*Drilling and Blasting*).

(b) **Stability of Excavations:**

(1) The Concessionaire shall remove or otherwise secure by barriers, nets, or other means any materials which might fall or slide and, thereby, cause damage to the work or injury to any person.

(2) It shall be the Concessionaire’s responsibility at all times to ensure the stability and safety of excavations. The Concessionaire shall take all measures necessary to ensure that no collapse or significant subsidence occurs. The Concessionaire shall also monitor the excavation progress and take all actions to prevent settlement of existing or new infrastructure as a consequence of the excavation.

(3) The removal of water shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplifting, and heaving in the excavation’s bottom and to eliminate interference with the orderly progress of construction. The Concessionaire shall monitor the lowering of groundwater in the vicinity of the excavations and take all actions to prevent settlement of existing and new infrastructure as a consequence of the water removal.

(c) **Ground-Level and Pre-Construction Cross Sections and Groundwater Monitoring:**

(1) The Concessionaire shall install a groundwater monitoring system with sufficient time to ensure proper monitoring before commencement of any earthwork.

(2) Prior to commencement of any earthwork, the sites shall be surveyed in the presence of the Contracting Officer to establish existing ground levels. The prevailing groundwater data shall be recorded at this time.

(d) The Concessionaire shall identify and clear all interfering utilities prior to excavation and shall coordinate the removal and relocation of utility lines with the Contracting Officer.

(e) The work includes construction of temporary earthwork, such as diversion ditches, banks, grading etc. Ancillary earthwork shall be maintained as necessary during construction to provide dry working conditions or otherwise ensure stability.
1.3.2.3 Disposal:

(a) Excavated materials, unacceptable for use in the work or not used for fill and backfill, shall be placed within the disposal areas.

(b) The Concessionaire shall ensure that disposal areas attain a neat appearance and proper surface drainage. To this end, the Concessionaire will neatly arrange the slopes of disposal fills to prevent scattering, erosion, or spoiling of the surroundings. Water runoff shall be controlled and channeled at the disposal sites, and the Concessionaire shall implement temporary and permanent sediment controls to avoid sediments runoff to reach natural water courses or final drainage areas. The arrangements may include earth coverage and the excavation of earthen drainage ditches.

(c) Points defining the polygonal limits of spoil areas shall be marked in the field by flags installed on permanent posts of sufficient height to be visible as the spoil embankment rises during the execution of the Concession Agreement.

(d) Care shall be exercised by the Concessionaire in order to avoid:

1. Damaging or obstructing existing drainage ditches or natural watercourses along the sides of the spoil area.

2. Disposal outside the limits of the spoil area.

3. Endangering a partly or completely finished structure.

4. Impairing the efficiency or appearance of any structure.

5. Landslides or subsidence.

6. Any actions that would be detrimental to the completed work.

(e) Disposal of vegetation by burying it under spoil material will be allowed.

(f) The burning of vegetation will not be allowed.

(g) Disposal sites in close proximity to watercourses or drainage channels shall be designed and constructed considering the natural conditions of the areas. Disposal sites shall be designed and constructed utilizing methods and equipment that will result in stable slopes and will not destabilize the area, and when necessary implement measures to prevent erosion of or otherwise damage of banks against stream overflows.

(h) Disposal sites designated or used as land reclamation areas shall be designed and constructed utilizing methods and equipment that will result in a level of compaction that will not cause excessive subsidence or cause unstable slopes.

1.3.2.4 Fill:

(a) Fill shall be placed and compacted utilizing methods and equipment suitable for the particular material and condition. Compaction in the vicinity of structures shall be done in a manner that will attain the required degree of compaction without causing damage to the structures. Compaction shall result in an earthwork body that is not susceptible to excessive subsidence or bearing-capacity failures that could affect structures supported on or within the fill.

(b) Before placing fill, any organic layer and muck shall be completely removed down to the level where suitable material is found. In such a situation, backfilling with suitable materials will be required to bring the site to the finish elevation.
Before placing fill, the underlying surface shall be scarified.

The Concessionaire shall apply only unpolluted natural soils and not use wastes of any type. The organic matter content shall be less than 5 percent.

**1.3.2.5 Backfill:**

(a) Backfill shall be placed and compacted utilizing methods and equipment suitable for the particular material and conditions. Compaction in the vicinity of structures shall be done in a manner that will attain the required degree of compaction without causing damage to the structures. Compaction shall result in a material that will not be susceptible to excessive settlement or bearing-capacity failures that could cause damage to structures supported on or within the fill.

(b) Prior to the commencement of placing backfill materials adjacent to structures, the backfill areas shall be cleared of all remaining concrete forms, other temporary works, and unsuitable materials.

(c) All backfill operations shall be performed in dry conditions, if possible.

(d) The Concessionaire shall apply only natural soils without contamination and not use wastes of any type. The organic matter content shall be less than 5 percent.

(e) Backfill material shall not be placed and compaction shall not be permitted adjacent to concrete that has been poured within the last 14 days.

**1.4 DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE:**

**1.4.1 Design (Including Specifications):**

1.4.1.1 All work shall comply with Environmental Impact Study (EIS) included in Appendix 10 of the Concession Agreement.

1.4.1.2 The Concessionaire shall compute settlements of new fills under structures/facilities and develop measures to mitigate settlements if they are deemed unacceptable (see section 01 82 13 (Foundations)).

1.4.1.3 Drawings show approximate capacities for the disposal sites at the elevations indicated. These capacities are provided for estimating purposes only and shall not be construed as the design capacity for the disposal sites. The Concessionaire shall determine the capacity of each disposal site in accordance with the requirements for the work and design them to ensure their stability and compliance with the requirements specified herein.

**1.4.2 Construction:**

1.4.2.1 The Concessionaire shall demonstrate that all settlement and movement of the excavations, including the support systems if any, will be within specified tolerances before proceeding with construction of the permanent work.

1.4.2.2 The Concessionaire shall establish baselines to monitor distress on slopes, buildings, structures, and facilities (e.g. settlement, lateral movements, ground velocity if blasting is used, etc).

1.4.2.3 The Concessionaire shall establish baselines to monitor groundwater-flow limits during construction.

1.4.2.4 The Concessionaire shall develop and implement mitigation actions if the above baselines are not met.
1.4.2.5 The Concessionaire shall install permanent settlement monuments and benchmarks.

1.5 DOCUMENTATION FOR THE RECORD:

1.5.1 Intermediate Design:

1.5.1.1 Drawings:

(a) A plan showing the location, alignment, and profile of the drainage system with the underlying geo-hydrological starting points.

(b) A plan showing the limits of excavation and filling, including the existing and finish grades (topography).

(c) Longitudinal and transversal sections showing the limits of excavation. The type of materials shall be identified in the sections.

(d) Longitudinal and transversal sections showing the limits of the fill and final grade. The sections shall identify the type of materials utilized.

(e) Detailed plans and cross sections of any excavation-support systems, if required.

(f) Transversal sections showing the limits of the backfill and final grade. The sections shall identify the type of materials utilized.

(g) The layout for the temporary storage areas for the excavated material that is to be utilized as fill or backfill.

(h) A plan showing the location of disposal areas, including the existing and final elevation of the disposal areas, final grade slopes, location, alignment, and profile of the drainage system, temporary and final erosion and sediment controls, and other pertinent information. Drawings shall indicate the estimated capacity (cubic meters).

1.5.1.2 Documentation:

(a) A dewatering plan with the geo-hydrological background of the Site.

(b) Stability analyses (static and seismic) of the excavation and fill slopes, including the suitability of the fill material for complying with stability requirements; and liquefaction assessment during seismic shaking.

(c) Settlement calculation for the fills and backfills with the related compaction requirements.

(d) Proposed plans for slope stabilization, if required.

(e) Design calculations used in the determination and design of excavation-support and dewatering systems.

(f) Method of disposal, including description of haul roads, drainage within the disposal area and throughout any adjacent areas where the drainage has been affected by the deposition of the excavated material, and final grading of the spoil area.

(g) All relevant specifications.
1.5.2 Final Design Documentation:

1.5.2.1 A plan for clearing and grubbing including the proposed method of disposal of materials. The documentation shall include proof of the execution wildlife rescue and relocation plan.

1.5.2.2 Results of tests demonstrating that the proposed fill and backfill material meets the design requirements.

1.5.2.3 Reports from an independent testing laboratory that compaction tests were conducted in accordance with the standard practices within the trade and that they demonstrate compliance with design requirements.

1.5.2.4 The name and credentials of the independent testing laboratory, with sufficient additional information to enable the ACP to determine that the laboratory is acceptable. This information shall be furnished before any excavation or compacted filling is performed under the Concession Agreement.

1.5.2.5 Prior to beginning any excavation work, the Concessionaire shall submit a stockpile and disposal-area plan consistent with the drawings. The plan shall show, in addition to the proposed location and size of stock and waste piles, the Concessionaire’s plan for excavation, describing the sequence and manner in which the material will be handled.

1.5.2.6 Prior to beginning any excavation work, the Concessionaire shall submit an excavation plan consistent with the drawings. It shall describe the sequence and manner in which the excavation and plans for its support-system (if any) will be executed.

1.5.2.7 Drawings showing existing conditions including as a minimum cross sections, and plans of existing ground levels.

1.5.2.8 Final versions of the design drawings and documents specified as intermediate design submittals, paragraph 1.5.1 (Intermediate Design). Plans shall indicate the estimated volume of excavated material to be disposed at the disposal sites and the remaining capacity left in accordance to the design capacity.

1.6 QUALITY ASSURANCE: The Concessionaire shall, through his quality manager, verify conformance with the requirements of this section.

1.6.1 General Testing and Procedures: The Concessionaire shall keep a list and technical data of instruments and equipment for inspection and testing. The Concessionaire shall keep a designation showing the standards that will govern how quality control testing will be performed. The Concessionaire shall keep technical procedures and methods for performing quality-control inspections for all features of the work.

1.6.2 Laboratory Testing:

1.6.2.1 Control and Verification Testing: Within his specification and based on his method of construction, the Concessionaire shall prepare the testing criteria, procedures, methods, and other information upon which the control tests shall be made for each phase of the work. This information shall be available upon ACP’s request.

1.6.2.2 Capability Check: The ACP reserves the right to check laboratory equipment for compliance with recognized standards and to check the laboratory technician’s testing procedures, techniques, and qualifications.

END OF SECTION
SECTION 31 23 16.26 - DRILLING AND BLASTING

PART 1 - GENERAL

1.1 SUMMARY: The Concessionaire shall determine if blasting is necessary for the execution of the work. This section prescribes drilling and blasting requirements for the work.

1.2 REFERENCES:

1.2.1 Institute of Makers of Explosives (IME) Publications:

- SLP 1-06 Construction Guide for Storage Magazines
- SLP 2-91(11) The American Table of Distances
- SLP 3-15 Suggested Code of Regulations for the Manufacture, Transportation, Storage, Sale, Possession and Use of Explosive Materials
- SLP 4-09 Warnings and Instructions for Consumers in Transporting, Storing, Handling, and Using Explosive Materials
- SLP 14-13 Handbook for the Transportation and Distribution of Explosive Materials
- SLP 17-11 Safety in the Transportation, Storage, Handling, and Use of Explosive Materials

1.2.2 National Fire Protection Association (NFPA):

- 495-06 Explosive Materials Code

1.2.3 U.S. Army Corps of Engineers (USACE):

- EM 385-1-1 Safety and Health Requirements Manual, November 2003

1.2.4 Code of Federal Regulations (CFR):

- 29 CFR 1910 Occupational Safety and Health Standards
- 29 CFR 1926 Safety and Health Regulations for Construction - Occupational Safety and Health Administration (OSHA), Department of Labor
1.2.5 **Autoridad del Canal de Panama (ACP) Publications:**

1410SAL106(R4) Norma de Seguridad para Trabajos con Actividad Eléctrica Atmosférica (Tormentas Eléctricas)

1410SAL108(R1) Norma de Seguridad para el Manejo, Transporte, Almacenamiento y Uso de Explosivos y Municiones

1410SAL248 Norma de Protección Intrínseca

RMOCP Reglamentos Marítimos para la Operación del Canal de Panamá; the RMOCP comprises Reglamento de Arqueo de Buques para la Fijación de Peajes por el Uso del Canal de Panamá, Reglamento sobre Procedimiento para el Cambio de las Reglas de Arqueo y de los Peajes del Canal de Panamá, Reglamento para la Navegación en Aguas del Canal de Panamá, Reglamento de la Junta de Inspectores de la Autoridad del Canal, and Reglamento de Sanidad y Prevención de Enfermedades Contagiosas, including all amendments

1.2.6 **Cited Applicable Legislation:**

Ley N° 47 de 21 de noviembre de 1980 Consejo Nacional de Legislación por el cual se le asignan funciones a varias dependencias del estado y se dictan otras medidas. Gaceta Oficial: 19208

1.2.7 **United States Department of the Interior, Bureau of Mines Publication:**


1.3 **REQUIREMENTS:**

1.3.1 **Safety Regulations and Procedures:** When blasting is found to be necessary, the Concessionaire shall take precautions for the protection of individuals and property exposed to his operations. In addition to the documents explicitly referenced in the Concession Agreement; the Concessionaire shall comply with all the applicable blasting safety regulations of the ACP, available through URL: http://micanaldepanama.com/nosotros/sobre-la-acp/fundamentos-legales/seguridad-y-
salud-ocupacional/, including but not limited to ACP norm 1410SAL108; and the Concessionaire shall comply with applicable legislation of the Republic of Panama; and the Concessionaire shall comply with the requirements of IME publications SPL 2, SPL 3, SPL 4, SPL 14, SPL 17, SPL 20, SPL 22, SPL 23, SPL 27 and SPL 29; and the Concessionaire shall comply with 29 CFR 1926 - Subpart U - Blasting and the Use of Explosives; and the Concessionaire shall comply with Section 25 - Blasting of the U.S. Army Corps of Engineers EM 385-1-1. In case of discrepancies between these requirements, the order of priority is those issued by the ACP first; second, those issued by authorities having jurisdiction of the Republic of Panama; third, IME; fourth, OSHA; and USACE last.

1.3.1.1 **Importation of Explosives:** The importation of explosives into the Republic of Panama for use in the Concession Agreement requires previous authorization from the “Dirección Institucional en Asuntos de Seguridad Pública (DIASP), Ministerio de Seguridad Pública”. During importation procedures, the Concessionaire shall store explosives in the DIASP magazine(s) agreed upon between the Concessionaire and DIASP for this purpose.

1.3.1.2 **Handling to and from Vessels:** Handling of explosives during loading or unloading operations to or from vessels in Canal waters shall be governed by the requirements specified in RMOCP Chapter IX - “Mercancia Peligrosa” and the DIASP regulations for these operations in conformance with “Ley N° 47”. The Concessionaire shall allow ACP officials to oversee these operations to verify / confirm compliance with all safety regulations / requirements. If the Concessionaire intends to perform these operations in Canal waters, the procedure and plan shall be coordinated and approved by the Contracting Officer, the Canal operations Port Captain and ACP safety officials. If the Concessionaire intends to perform these operations outside Canal waters, the Concessionaire shall submit to the Contracting Officer the approval and method statement signed by the authorities having jurisdiction, including but not limited to the Republic of Panama’s “Autoridad Marítima de Panamá”. As stipulated by the RMOCP and for safety reasons, ACP tug and launch landings will not be available for loading and unloading explosive cargo.

1.3.1.3 **Drill Boat Safety:** Drill boat or barge shall have an “Obstruction Light” installed in compliance with the “Reglamento de Aviación Civil de Panamá (RACP)”, Book XXIII, Titles I and II. Concessionaire shall present compliance documentation provided by the “Dirección de Aeronautica Civil” to the Contracting Officer and the drill boat or barge shall be subject to inspection by ACP’s marine safety specialists. Concessionaire shall take all safety precautions to avoid dropping of explosives overboard when in Canal waters or mooring areas. Procedures for recovery of explosives shall be submitted for evaluation to the Contracting Officer, including diving services documentation and procedures. No highly-volatile explosives shall be left on the deck of the drill boat or barge except for the charge that is to be immediately loaded in the borehole. Any explosives remaining on deck shall be returned to the day magazine prior to firing any blasts. No explosives shall remain on deck during the drilling of adjacent holes or near the drill towers. The firing line reel or spool shall be mounted on the rig in such a way that it does not fall overboard. Concessionaire shall install a wooden working platform where explosive loading and connection of patterns shall be conducted to avoid accidental firing of charges caused by sparks or other effects due to contact with the steel deck of the barge or drill boat.

1.3.1.4 **Surface Transportation of Explosives:** Surface transportation of explosives shall be in accordance with NFPA 495; 29 CFR 1926, Subpart U; IME SPL 3, Paragraph 1926.902; “Ley N° 47”; and DIASP regulations. As required for the transportation of explosives on public roads, such transportation shall be escorted by the “Policia Nacional de Panamá” (PNP) and the “Benemerito Cuerpo de Bomberos de la República de Panama” (BCBP). These escorts shall be arranged by the Concessionaire and previously coordinated with the DIASP. Explosives shall be transported only in a vehicle specially equipped for the transportation of explosives. The Concessionaire shall install appropriate signs reading “Explosives / Explosivos” shall be installed on every vehicle before loading and transport. Unless the explosives are in proper containers, caps and explosives shall not be carried on the same vehicle. Blasting caps may be transported with certain other explosives in an IME SPL 22 approved container. Truck driver shall be licensed to transport explosive materials; refer to the “Reglamento de Tránsito Vehicular
1.3.1.5 **Notification of Transportation:** The Concessionaire shall notify the Contracting Officer of explosive transportation coordinated with government authorities, including the location and time of arrival, at least 24 hours prior to such transportation.

(a) In the event that the explosives are to be stored on board a drilling and blasting barge or any other floating equipment component that will be anchored or secured to docking facilities for repairs or maintenance or during non-operating hours, the Concessionaire shall submit to the Contracting Officer, certification of approval from the owner of the facility (ports, mooring or fleeting areas, anchorage, mooring buoys, etc.).

(b) If explosives will be stored on shore, special surveillance shall be required and provided by the PNP in accordance with local regulations. The Concessionaire shall coordinate this service directly with the PNP and submit pertinent documentation to the Contracting Officer.

1.3.1.6 **Other Handling Requirements:**

(a) Any damaged or leaking packages containing explosives shall not be touched, and the blaster-in-charge and Contracting Officer shall be informed immediately.

(b) Boxes of explosives shall be carried by hand. No cranes or hoisting equipment shall be used for loading/unloading boxes on board launches, barges, or floating equipment.

(c) All tools used within the blasting area and at the loading/storage sites shall be non-ferrous or non-sparking.

(d) Boxes of explosives shall be handled one at a time. They shall not be tossed or slid across floors or the beds of trucks.

(e) The blaster shall be present when explosives are delivered within ACP premises and when manipulation of the explosives begins for loading the aquatic transportation / storage and during receipt and final storage of explosives on the drill boat or barge explosives deposit. The blaster shall be responsible for watching over explosives and storage areas on board vessels. Only the blaster shall open and/or close the explosives deposit. The blaster shall be responsible for keeping and updating an on-board explosives inventory at the end of each shift. The blaster shall be responsible for locking the explosives storage after loading or unloading activities and making sure that helpers comply with safety regulations and procedures. The blaster shall be responsible for all phases of the blasting operation and shall ensure that all standard procedures for safe operations are followed; the blaster shall not delegate this responsibility to any other employee of the Concessionaire’s personnel. The blaster shall keep a record of all holes charged; explosives used per drilled hole, and detonators used per blast. The blaster shall also inspect his blasting system prior to each use to ensure proper operation. The blaster shall be responsible for organizing and monitoring the weekly safety meetings for the drill boat or barge personnel to familiarize them with aspects associated to safe explosives handling necessary to accomplish the job without accidents. The blaster shall be responsible for loading of explosives in the blast hole, placing detonators, and applying the firing design. The blaster shall be responsible for handling misfires, free stocked bars, loading explosives and retrieving the perforation bar after loading the hole; only the blaster and his designated helper shall be at the platform at that specific moment. The blaster shall be responsible for verifying the blasting pattern and warning signals before and after each blast.
1.3.1.7 **Field Training:** Field training (hands-on training) for critical functions onboard will not be allowed by the Contracting Officer during the execution of this Concession Agreement.

1.3.1.8 **Environmental Impact Study:** The Concessionaire shall comply with blasting requirements established in the Environmental Management Plan of the Environmental Impact Study.

1.3.1.9 **Publications:** The Concessionaire shall employ a suitably qualified blasters, to oversee any operation involving explosives.

1.3.1.10 **Blasting Warnings:**

(a) **Blasting Signs:** Signs advising drilling and blasting operations, as well as precautions to be taken, shall be posted in the area. Also, signs advising drilling and blasting operations, as well as precautions to be taken, shall be posted in land areas near public water accesses (ramps, docks, roads, etc.) where underwater blasting is being conducted. The Concessionaire shall build these signs adequately sized. These signs shall indicate that radio transmission in the area is prohibited. Signs shall comply with 29 CFR 1926.900(k)(3)(i) and (k)(3)(ii). These signs shall be posted in English and Spanish and shall be clearly visible day and night at all points of land access to the area. Definition of “the area” shall be determined in accordance with the tables of minimum distances recommended in IME SPL 2. Details are available online at http://www.ime.org/; by mail from 1120 Nineteenth Street NW, Suite 310, Washington, DC 20036, USA; by phone: (202) 429-9280; by fax: (202) 293-2420; or through e-mail: info@ime.org.

(b) **Blasting Signals:** Blasting signals shall be provided by the Concessionaire with horns, whistles, or sirens. A sound warning system shall be developed by the Concessionaire and shall be consistent throughout the performance of the work. The sound device used shall be able to cover at least a 1,000 meters radius from the blasting site according to the “area of influence”; refer to paragraph 1.3.19 (Pre-Blast Structure Inspections).

(1) **Contents of Signal:** The signal shall consist of a 5-minute warning signal to notify all in the area that a blast will be fired within a 5-minute period. A second warning signal shall be sounded 1 minute before the blast. After the blast is over, there shall be an all-clear signal sounded so all personnel in the area understand that blasting operations are finished.

(2) **Warning Signals:** Five minutes prior to the blast, 6 long signals lasting 10 seconds each shall be sounded using an air horn or siren. During one minute prior to the blast, one 10-second signal followed by no more than ten 3-second consecutive signals using a horn or siren shall be sounded.

(3) **All-Clear Signal:** The all-clear signal shall be one long signal lasting at least 10 seconds to indicate that all blasting operations have ceased. The all-clear signal shall only be given after the blaster in charge has ensured that all toxic fumes (if any) have dissipated and all charges have been detonated.

(4) **Safe Distances for Signals:** The drill boat or barge shall be 152 meters (500 feet) away from the blasting pattern. Blasting shall only be performed when the nearest transiting vessel is at least 450 meters (1,500 feet) away from the blasting site. If the vessel transiting closest to the blasting site is carrying “dangerous cargo” or is a “restricted transit,” the blast shall only be conducted when the vessel is at least 610 meters (2,000 feet) away.

(5) **Cardinal Buoys:** The blasting pattern shall be properly signalized at the north and south ends, using cardinal buoy / markers with the characteristics indicated by International Association of Lighthouse Authorities (international aids to navigation system for Sector B, concerning type, colors and lights) and the ACP’s RMOCP, to advice the transiting vessels and other vessels operating in the surroundings of the blasting pattern location, loaded or being drilled. The cardinal buoys
shall be placed at a minimum of 10 m on either direction measured from the outermost point of the blasting pattern. The location of the buoys shall be considered the operation zone for the drilling and blasting activity in regards to the minimum channel width of 122 m (400 ft).

1.3.1.11 Storage of Explosives: Explosives shall be stored in the DIASP magazine(s) agreed upon for this purpose between the Concessionaire and DIASP. If there is no DIASP magazine(s) available the Concessionaire shall construct magazines in accordance with paragraph 1.3.1.12 (Magazine Construction), and DIASP regulations. The storage of explosives shall be the Concessionaire’s responsibility.

(a) The Concessionaire may arrange directly with DIASP the establishment and operation of temporary storage facilities [transit area], outside the perimeter of the areas under the jurisdiction of the ACP, all in accordance with the requirements of this section, and the relevant Panamanian laws and provisions of the Concession Agreement. This includes obtaining the required permits and authorizations according to its land use and performing environmental evaluations.

(b) The Concessionaire shall be responsible for determining the location and size of the temporary storage facilities [transit area] which shall be used only as staging points for the transfer of explosives between DIASP’s main storage facilities and the place where the explosives will actually be used. In this area, the Concessionaire may secure the vehicles with explosive material, limited to blasts that are scheduled for the first hour of the next working day or for blasting scheduled for non-working days of DIASP’s magazines. However, the Concessionaire shall follow the recommendations of IME SPL 14 and SPL 27 for temporary storage sites and the recommendations of Title 27 CFR 555, specifically Parts 555.203 to 555.206, 555.209, and 555.212 to 555.224.

(c) The Concessionaire shall submit for approval by the Contracting Officer the proposed plan for deployment and operation of the transit area proposed to maintain for the temporary shelter of trucks carrying explosive loads. The plan shall consider the required physical distribution, safety measures, protection measures, lighting, security, surveillance and administrative controls. The Concessionaire shall provide the required maintenance for the installation. The Contracting Officer may, without previous notice, revoke the permit and/or temporarily or permanently shut down the installation as a result of a breach of compliance, evident or not, with the requirements of this section, and/or due to suspicion of inadequate use or use different to that approved for the installation.

(d) The Concessionaire shall submit whatever reports, information, proof or evidence that may be required by the Contracting Officer to verify that the transit area is being used within the established parameters. Should the Concessionaire deny providing such required evidence or should the Concessionaire fail to provide it in a diligent manner, the installation shall be closed without a right to claim by the Concessionaire.

(e) The Concessionaire shall store detonating agents completely separate from explosives, and in accordance with the requirements of NFPA 495, and subject to the same safety requirements according to specifications in the cases of explosives. The Concessionaire shall comply with requirements of Panama’s PNP, BCBP and DIASP.

1.3.1.12 Magazine Construction: Magazine type and location shall be submitted to the Contracting Officer for approval. The magazine construction shall be in accordance with the NFPA 495 and the IME SPL 1. Before submitting magazine construction to the Contracting Officer, the Concessionaire shall have submitted and received approval from other authorities having jurisdiction, e.g.: DIASP.

(a) A lightning protection system shall be provided in accordance with the recommendations of NFPA 780. The lightning protection system shall be submitted for approval to the Contracting Officer.
(b) Explosive initiating devices shall be stored entirely separated from explosives, in accordance with the requirements of the NFPA 495, and shall be subject to the same security requirements as specified for explosives.

1.3.1.13 **Identification of Storage:** The approach to and the immediate area within a magazine enclosure shall include signs posted in both English and Spanish, indicating the presence of explosives and prohibiting smoking and trespassing, as follows:

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<td>NO SMOKING</td>
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<td>EXPLOSIVE MAGAZINE</td>
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<td>WARNING - NO TRESPASSING</td>
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<tr>
<td>AUTHORIZED PERSONNEL ONLY</td>
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<td>AVISO - SE PROHÍBE LA ENTRADA</td>
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1.3.1.14 **Fence:** The Concessionaire shall provide a chain-link type fence to surround the entire magazine. Fence shall be not less than 2.45 meters (8 feet) high, with 3 strands of barbed wire. The area within the fenced enclosure shall be floodlighted by exterior lights mounted clear of the storage buildings. The light shall illuminate the interior of the magazine when the service doors are open. The fenced enclosure and the outer of the fence, up to a distance of 30 meters (100 feet) from the magazine, shall be kept clear of vegetation, including dried grass and leaves, and other visual obstructions.

1.3.1.15 **Responsibility for Security:** The PNP will ensure compliance with the regulations concerning the handling and storage of explosives. The security of the magazines for explosive is under the jurisdiction of the PNP, in accordance with the regulations of the Republic of Panama’s “Ministerio de Seguridad Pública”.

1.3.1.16 **Inspection of Magazines:**

(a) **Daily Inspection:** The Concessionaire shall designate a responsible employee of the Concessionaire’s personnel to make a daily physical inventory of explosive materials and accessories stored at each, inland or floating magazine storage, indicating all transactions. Such inventory shall be made at the end of each day and checked against requisitions and issues for that day. Stock shall be inventoried again in the morning to ensure that no material has been issued or taken from the magazine.
during the night. Records shall show the types and quantities received and issued, as well as the total remaining on hand at end of each shift. This inventory record shall be submitted to the drilling and blasting inspector onboard in every shift for control purposes. The explosives remaining in stock shall be checked to identify any existing discrepancies, which would indicate theft or loss of explosive materials and which shall be reported immediately.

(b) **Weekly inspection:** A responsible employee of the Concessionaire’s Personnel shall compile the daily inventory reports into a weekly inventory report and submit it to his supervisor. This report shall be checked against the stock record to see that they coincide; any discrepancies shall be investigated immediately. The Concessionaire shall expeditiously submit the weekly inventory report to the Contracting Officer on a weekly basis.

1.3.1.17 **Theft:** In the event of suspected or confirmed loss or theft of explosives, accessories or support equipment or materials, the Concessionaire shall immediately inform / report all circumstances and details of the loss / theft to the nearest office of the local law enforcement authorities (“Policía Nacional de Panamá”), the ACP’s “Division de Protección y Respuesta a Emergencias” (OPP) (if within ACP operational areas) and the Contracting Officer.

1.3.1.18 **Blast Site Safety:**

(a) **Safety meetings:** Safety meetings, including explosive handling and blasting safety, shall be conducted by the Concessionaire with his employees each week to ensure proper working practices and compliance with the safety regulations.

(b) Equipment, explosives, and non-essential personnel shall be moved away to a safe distance prior to the blast. A minimum crew shall accomplish the shot. The blaster shall be in charge of the shot and be present for the initiation of all blasts.

(c) **Blast Guarding and Area Security:** A checklist for clear-out procedures and access control shall be prepared and used by the Concessionaire so that the system is effectively implemented every time. Everyone working in blast control and area security shall have clearly-defined responsibilities.

(d) Shots shall be checked and clear signals shall be sounded before the personnel and equipment are allowed to return to the blast area. The Concessionaire shall discontinue any method of blasting that leads to overshotting, is dangerous to navigation, is detrimental to slopes adjacent to the work site, or is otherwise determined objectionable by the Contracting Officer.

(e) **Wind direction:** The Concessionaire shall provide a wind sock to get an orientation of the wind direction prior to the shot in order to move the personnel to a safe location and prevent unnecessary exposure to toxic fumes.

1.3.2 **Personnel Requirements:**

1.3.2.1 **Blaster-in-Charge:** The Concessionaire shall procure the services of a blaster-in-charge qualified as required in this paragraph 1.3.2.1 (*Blaster-in-Charge*) to perform the duties specified in this paragraph 1.3.2.1 and elsewhere in this section.

(a) The blaster-in-charge shall be qualified, by reason of training, knowledge, or experience, in the field of transporting, storing, handling, and use of explosives, and shall have working knowledge of all laws and regulations that pertain to explosives in the Republic of Panama.

(b) The blaster-in-charge shall have 15 years of experience as a blaster and 10 years of experience blasting for other work of similar size and scope.
(c) The blaster-in charge shall be licensed in accordance with the applicable laws and regulations and permitted to purchase, transport, handle, store, and use explosives, including blasting agents.

(d) The blaster-in charge shall not be an employee of the explosive manufacturer, or explosive distributor.

(e) The blaster-in charge shall be on-site during all blasting operations, and have his license on-site at all times.

(f) The blaster-in charge shall have a current license issued from la DIASP as Qualified Blaster, Level #3 (Nivel #3), qualified over 240 hours.

1.3.2.2 **Blasting Crew**: The Concessionaire shall employ qualified and experienced powdermen to perform blast hole loading, delaying of charges, hole stemming and the firing of test and production blasts. Blasting crew members shall have the applicable licenses required by Panamanian law for their assigned duties under this Concession Agreement.

1.3.2.3 **Consultants and Specialists**: The Concessionaire shall procure the services of consultants and specialist to provide oversight to the blasting operations.

1.3.3 **Scheduling and Coordination**:

1.3.3.1 **Blasting Plan**: The Concessionaire shall prepare a blasting plan coordinated with associated drilling and dredging work. The Concessionaire shall consider nearby work, the presence of green concrete, vessels that transport dangerous cargo, and other activities which may be affected by blasting operations. No blasting shall be initiated before the blasting plan has been reviewed and approved by the Contracting Officer.

(a) **Blast Shot Plan Contents**: Before drilling, the Concessionaire shall submit a plan including the following information:

1. Station limits and offsets from the channels’ centerlines.

2. Plan and section views drawn to scale for the proposed drill pattern, including, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height, water depth (if applicable) and sub-drill depth.

3. Loading and drilling pattern, showing type and amount of explosives, primers (if used), initiators, and location and density of charge; per each blast.

4. Total amount of explosives in the blast and maximum kilograms (pounds) of explosives per delay interval.

5. Delay arrangement scheme showing delay interval proposed for each hole. Blast sequence, point of initiation, and direction of movement shall be shown on the plan view on a delay pattern grid. The type and brand of delays shall also be shown.

6. Character and source of firing, size and length of lead lines, electrical current requirement, sequence of firing. Blasting caps and detonating cord shall be indicated.

7. Technical reference for design method applied.

8. The blasting technique.
(9) Provisions to avoid unexpected ground vibrations, potentially damaging low frequency, or water shock effects on structures.

(b) Blasting Plan Form: The Concessionaire shall include in his blasting plan, for each blast, the information indicated in paragraph 1.3.3.1(a) (Blast Shot Plan) and any other information included in the sample blasting report plan not explicitly mentioned. Additional information on actual explosive loading and blast evaluation is to be added after the blast to provide a complete shot record.

1.3.3.2 Scheduling Restrictions:

(a) Blasting will be permitted only between 7:00 a.m. and 6:00 p.m.

(b) Blasting will be permitted only when the Contracting Officer has determined that the safety of transiting vessels near the blast area is ensured through coordination with OPT and when the blasting does not interfere with other ongoing dredging or excavation activities near the work site.

(c) To minimize the impact on nearby communities, blasting will not be allowed on Saturdays and Sundays. Blasting activities shall be coordinated with the Concessionaire’s community relations office and the Contracting Officer, so that nearby stakeholders who might be affected can be notified; the Concessionaire shall be responsible for this notification.

(d) The Concessionaire shall scrutinize the “daily transit log” available through URL http://www.pancanal.com for both northbound and southbound scheduled transits to keep track of any changes in the operational window. The Concessionaire shall also coordinate with the nearby ports to verify possible operational windows.

1.3.3.3 Other Restrictions. Underwater blasts shall not be detonated when a diving operation or water craft is within the danger area, nor until the diving supervisor has given permission for the blaster to fire the charge.

1.3.3.4 Advanced Notification: Shall conform to ACP 2600SEG-108. Each shot shall be scheduled to ensure approval by the Contracting Officer, in coordination with the ACP’s “Division de Operaciones de Tránsito” (OPT), at least 72 hours in advance. This notification is required to allow for the notification of agencies operating in the vicinity of the work site or requiring information concerning scheduled or unscheduled blast times. Drilling shall be at least 80 percent complete before the request for the initiation of blasting operations is submitted for approval.

1.3.3.5 Immediate Blasting Notification Protocol: At least 2 hours prior to the detonation of a pattern, the Concessionaire shall confirm to the Contracting Officer the complete description of the blast to be executed. This information shall include, but shall not be limited to: blast number, date and time of execution, reach, blast location (stations and offsets), total explosives loaded and maximum charge per delay. After the blast schedule for each shot has been approved, the Concessionaire shall notify the Contracting Officer, at the work site, at least 15 minutes in advance of the shot to be performed.

1.3.4 Test Blast Program: The Concessionaire shall conduct a test blast program which shall consist of up to 5 individual test blasts. The purpose of the test blast program is to allow the Concessionaire to establish safe limits of vibration and air overpressure. The test blast program shall be conducted and reported in strict accordance with procedures outlined herein with respect to vibration control and air blast control. Upon evidence of any damage to test structures, test blasting shall cease until the Contracting Officer has been notified, and adjustments made.

1.3.4.1 Test Scale: The test events shall begin with a small number of charges and extend upward to the maximum yield to be used. The final test event shall simulate as much as possible the explosive charge type, size, overlying water depth, charge configuration, charge separation, initiation methods, and placement conditions anticipated for the largest detonations.
1.3.4.2 Concurrent Reports:

(a) After the test blasts, the Concessionaire shall examine the representative structures of the pre-blast survey. Any new damage resulting from the test blasting shall be reported in detail to the Contracting Officer, along with photographs.

(b) One copy of the seismograph reports for the test blasts shall be submitted in electronic or tabular form to the Contracting Officer daily.

1.3.4.3 Air Overpressure Attenuation Curve Development: During initial test blasts, the Concessionaire shall develop an air overpressure attenuation curve; the following procedures shall be followed.

(a) The Concessionaire shall record air overpressures using linear arrays of multiple seismographs during test blasts by placing the seismographs at cube root scaled distances \( \frac{D}{W^{1/3}} \) ranging from 40 to 600 m/kg\(^{1/3}\) (9 to 140 ft/lb\(^{1/3}\)) or where peak overpressure levels are at or below 0.01 psi.

(b) The Concessionaire shall plot the data on a log-log graph as overpressure versus cube root scaled distance as shown in figure 1 to obtain the regression best-fit line equation.

(c) The results from the initial monitoring of the test blast program shall be used to predict air blast overpressures for succeeding events and to ensure peak positive overpressures do not exceed 0.02 psi at the closest structure or vessel moored or underway.

(d) One copy of the air overpressure records from each test blast identified, date and time and location of blast, amount of explosives used, peak positive overpressure shown, and all prediction curves necessary to adequately control blasting operations shall be submitted to the Contracting Officer after completion of the initial test blasts.

1.3.4.4 Engineered Procedure for Blasting: At the conclusion of the test blast program, the Concessionaire shall examine all reports, surveys, test data, and other pertinent information and
conclusions, which shall be the basis for developing a completely engineered procedure for blasting. The procedure shall include sketches showing blasting patterns, weights of explosives, wiring, and charge placement. Four copies of the developed procedure shall be submitted for review to the Contracting Officer and upon completion of the review and acceptance; it shall be appended to and become a part of the blasting plan.

1.3.5 **Pre-Blast Surveys**: Pre-blast inspections shall be conducted for all structures and features within the zone of blasting influence defined as a radius of at least 1,000 m from planned blasting activities and include the structures of concern, that may be farther than a 1,000 meter radius, as defined under paragraph 1.3.19.1 *(Structural Evaluation for Structures of Concern)*. Based on prudent industry practices, the Concessionaire may determine a radius for the zone of blasting influence greater than 1,000 m. Date of each pre-blast surveys shall be coordinated with the Contracting Officer who might attend such inspections. The pre-blast survey report shall contain at least the following information.

1.3.5.1 Name of the community and owner and occupant of the house or structure, identification number of the structure, and GPS location.

1.3.5.2 Date of inspection and name of the inspector.

1.3.5.3 Plan view map showing the location of inspected houses or structures.

1.3.5.4 Schematic plan view of the house or structure.

1.3.5.5 Detailed photographs showing the front elevations of the structure, and all external and interior walls for orientation purposes.

1.3.5.6 Detailed photographs and written description of pre-existing conditions. The pre-blast survey report shall include detail photographs of pre-existing damages throughout the structure; these photographs shall serve to determine the location and size of all defects, cracks and other damages.

1.3.5.7 The Concessionaire shall check all the available information: construction plans, soil tests, construction codes (of the time when the structure was constructed, if available) and previous inspections.

1.3.5.8 Structure inspections shall document the existing conditions of structures prior to blasting by noting the structure age and all construction materials, type and severity of all cracking with its dimensions, permanent deformations with the structure walls, foundation and roof, annexes characteristics and conditions, utilities in need of repair, water intrusions and leaking, provisions for water drainage controls, old vegetation and tree roots near structures, and other noticeable defects. Structure inspections shall also encompass other structures public or private in the vicinity of the area as sidewalks and walls.

1.3.5.9 In addition, an evaluation of the condition of the surrounding area that might affect the house or structure (erosion, drainage, topography, problematic foundation soils, large tree roots near foundations and others) shall be carried out. The Concessionaire shall prepare a pre-blast survey report for each structure inspected, signed by the structural engineer and shall be submitted for approval to the Contracting Officer.

1.3.5.10 Depending on the duration of the blasting phase, the Concessionaire and the Contracting Officer shall further coordinate joint follow-up and final visits; the Concessionaire shall prepare corresponding reports to assess any claims presented for damages attributed or resulting from the blasts.

1.3.6 **Seismograph Monitoring**:

1.3.6.1 **Equipment**: Ground vibrations and air overpressure shall be recorded at the closest structures or features by a qualified monitoring specialists. Equipment specifications shall meet all requirements of
Performance Specifications for Blasting Seismographs, ISEE Standards Committee, 2011 Edition. The seismographs shall be capable of measuring ground vibrations in three mutually perpendicular directions (vertical, radial, and transverse) producing permanent digital records. Seismograph geophones shall be oriented with the axis of the structure or feature to ensure a record of the maximum structure or feature response to every blast performed. A minimum of six portable blasting-type seismographs shall be available for use at all times for monitoring purposes at structures or features including, but not limited to, buildings, structures, or utilities, and shall be placed at the nearest location to the blasting site; at least two of the seismographs shall be located at the communities. All the seismographs locations shall be as approved by the Contracting Officer. Seismographs shall meet the following technical and operating standards.

1.3.6.2 Monitoring equipment shall be 4-channel (1 airblast and 3 seismic channels) units capable of digitally storing collected data along with the date, time of recording, instrument serial number, date of last calibration, and full waveform time histories.

1.3.6.3 Instruments shall have a flat frequency response between 2 and 250 Hz for velocity and air overpressure (to determine airblast).

1.3.6.4 The sampling rate for peak particle velocity and air overpressure measurements shall be at least 1024 samples per second or higher to provide accurate recordings.

1.3.6.5 The recording time shall be set for at least 2 seconds longer than the blast duration.

1.3.6.6 Seismographs used for off-site compliance monitoring shall be capable of recording overpressure up to 148 dB (L) and particle velocity from 0.76 to 254 mm/sec.

1.3.6.7 The horizontal distance from the seismograph to the blast shall be known to at least two significant digits. For example, a blast within 1,000 feet would be measured to the nearest tenth of a foot and a blast within 10,000 feet would be measured to the nearest hundredth of a foot. Where the vertical-to-horizontal ground slope ratio exceeds 2.5-to-1, slant distances or true distance shall be used and recorded in the monitoring records.

1.3.6.8 All seismograph software shall be capable of saving back-up copies of all event files in file formats supported by software that can open and interpret stored data.

1.3.6.9 When employing instruments to operate in auto-trigger-mode, trigger levels shall be set sufficiently low to record blast effects (0.76 mm/s recommended). If expected levels of blast noise or vibration do not exceed minimum trigger levels, the instrument shall be attended by an operator and turned on manually.

1.3.6.10 Monitoring Reports: A completed monitoring report signed by the Concessionaire’s monitoring specialist on a form approved by the Contracting Officer shall be filed with the Contracting Officer within 24 hours of completing each blast. Digital copies of all seismograph event files shall be submitted along with each report. The report shall include the following blast information.

(a) Blast identification by numerical and chronological sequence.

(b) Date, time, GPS location of the shot and the name of the qualified monitoring specialist.

(c) Location and placement of all instruments by plotting numbered locations on scaled maps complete with a north arrow showing where all monitoring sensors were placed.

(d) Distance of each instrument from the closest blast hole and method used to obtain these measurements (e.g., using a measuring tape, GPS calculations, etc.).
(e) Type of ground or material in or on which the geophone is attached or buried with a description of attachment method.

(f) Maximum kilograms (or pounds) of explosive charge weight per delay reported by the blaster.

(g) Square-root and cube-root scaled distances of each seismograph measurement location based on the maximum charge weight per delay.

(h) Summary of all recorded measurements to include peak particle velocity (PPV, in mm/s) for ground measurements, frequency at the PPV (in Hertz, Hz), spectral analysis predominant frequency (in Hz), peak overpressure (in pounds/square inch, psi), and airblast (in decibels, dB). In the case where geophones are attached to a structure, the measurement is in terms of peak component velocity.

(i) Plots of all ground velocity and airblast time histories with the time scale expanded to show the details of each wave form.

(j) An on-going log-log plot of ground vibration and airblast values for all blasts to date, highlighting the newest data. One additional plot must show regression analysis lines for the 50-percentile and 95-percentile for all blast data including the newest data. This information shall be provided to the blaster-in-charge prior to the final design of each subsequent blast.

1.3.7 Packaging, Transportation, and Handling Explosives:

1.3.7.1 Packaging: All boxes shall be clearly labeled with information, such as the type of explosive, manufacturer’s brand name, class, date of manufacture, weight, cartridge number, and size. Packaging for explosives should not exceed 22.63 kilograms (50 pounds) in net weight per packaging unit. This is to prevent back injuries and the striking of the explosives.

1.3.7.2 Transportation and Handling at the Work Site: The Concessionaire shall be responsible for the transportation and handling of the explosives from the storage magazine to the work site. Explosives shall be provided by the Concessionaire daily and only in the amounts that will be used for blasts scheduled for that day. If, for any reason, not all the explosives issued are used during the scheduled blasts, the excess amounts shall be returned to the storage magazine immediately, as indicated in 29 CFR 1910.109(e)(3)(vii). The Concessionaire shall develop a tracking system to ensure that all the issued explosive materials are really used for the execution of the work.

1.3.8 Explosive Manufacturer Requirements: All required material and equipment for the performance of blasting shall be the responsibility of the Concessionaire. The Concessionaire shall procure a manufacturer of the explosive that belongs to a reputable, internationally recognized, explosives manufacturer association, such as IME, FEEM or SAFEX INTERNATIONAL.

1.3.9 Explosives:

1.3.9.1 Acceptable and Unacceptable Explosives: Explosives made with nitroglycerine-based material will not be permitted for safety, health, and environmental reasons. Dry blasting agents and slurries or water gels and emulsions are acceptable. Explosives are known to age and deliver much less than the rated energy. For this reason, it is required that all explosives used on this Concession Agreement be 1 year or less in age. Products that do not meet manufacturers’ specifications shall not be used for the performance of the work. All explosives used for underwater blasting operations shall be oxygen balanced or specifically designed for this working condition to prevent excessive nitrogen dioxide emissions after the blast. The Concessionaire shall perform random monitoring of nitrogen oxide (NO-NO2-NO3) concentrations after every blast; all personnel shall stay clear of the after-blast cloud and high concentrations of nitrogen oxides until the blaster has determined that is safe to enter the blast site.
1.3.9.2 **Bulk Explosives:** The Concessionaire shall provide bulk explosives, such as ammonium nitrate suspension gels, with 0 percent ANFO (ammonium nitrate fuel oil). Bulk explosives mixed with fuel oil (ANFO), may not contain the proper amount of diesel oil due to evaporation or improper mixing. Low diesel oil drastically reduces the energy content of the explosive and commonly produces reddish brown or yellow fumes upon detonation.

1.3.9.3 **Aged or Deteriorated Explosives:** When, in the opinion of the Contracting Officer, any blasting product is either of excessive age or in what appears to be a deteriorated condition, all blasting shall cease until the product’s age or quality can be determined. The Concessionaire shall bring any blasting product to the work site if its date code is missing.

1.3.9.4 **Product Testing by the Contracting Officer:** At the option of the Contracting Officer, products may be tested by an independent organization to determine performance, as compared to the manufacturer’s data sheet. If the product performance or composition deviates by more than the percentage amount established by the manufacturer in the manufacturer’s data sheet, that lot number will be rejected. Acceptable deviation depends on the standard used for a particular test. When the blasting product is rejected, the cost of testing shall be paid by the Concessionaire.

1.3.10 **Initiating Devices:**

1.3.10.1 **Approved Type:** Non-electric caps, safety fuses, primers, electronic detonators, and detonating cords shall be of an approved type and suitable for underwater use.

1.3.10.2 **Age of Blasting Caps:** The delay elements in blasting caps are known to deteriorate with age. For this reason, it is required that all blasting caps used on this Concession Agreement be 1 year or less in age.

1.3.10.3 **Accuracy of Firing Times:** To ensure the accuracy of firing times of blasting caps, it is required that each cap period come from one lot number. Mixing of lot numbers for any one cap period is prohibited.

1.3.11 **Blasting Accessories:** Blasting accessories, including testing instruments, shall be of a non-electric firing system type approved by the Contracting Officer.

1.3.12 **Lightning Protection:**

1.3.12.1 Drill boat or barge shall have installed at all times a lighting protection device in compliance with ACP standards and regulations and be subject to ACP safety specialist inspection. If blast holes are loaded and could pose a hazard to traffic if detonated, the area shall be marked with the correct Cardinal Buoy and all access shall be blocked until the lightning hazard has passed.

1.3.12.2 **Battery Backup:** Unless equipped with an uninterruptible power supply (UPS), the system shall also have a battery charger and a battery pack for backup.

1.3.12.3 **Blasting Hazard Potential:** Refer to ACP norm 1410SAL106. When the lightning detector detects an electrical storm at the minimum setting (10 miles), the blaster shall monitor and evaluate the advance of the storm and indicate the appropriate time to stop the drilling operation and put the following safety procedures into effect.

(a) Personnel shall be relocated from all areas where explosives are present in an expeditious and orderly fashion.

(b) Explosives handling/loading shall stop immediately.

(c) Initiating devices shall be removed from the drilling platforms.
(d) All explosives shall be key-locked in the storage area for explosives.

(e) The Contracting Officer shall be notified.

(f) If blastholes are loaded and would pose a hazard to traffic if detonated, all access shall be closed until the lightning hazard has passed.

(g) When the blasting hazard potential dissipates, the Contracting Officer shall be notified before blasting operations are continued.

1.3.13 Check for Misfires:

1.3.13.1 Minimum Observation Period: The Concessionaire shall observe the entire blast area for a minimum of 5 minutes before entering. The site shall be examined by the blaster, or by a competent diver who has been instructed in the recognition of undetonated explosive materials and other blasting related hazards, and is under the direction of a blaster.

1.3.13.2 The blaster shall make sure that all boreholes have been blasted and give the “all clear” signal.

1.3.13.3 Contracting Officer’s Authority: The Contracting Officer shall have the authority at all times to prohibit or halt Concessionaire blasting operations if it is apparent that the results required or safety conditions are not being achieved through the methods being employed.

1.3.13.4 Misfire Handling Procedures: The blaster shall be responsible for investigating and correcting the problem that originated the misfire and shall perform a methodic, exhaustive and uninterrupted investigation.

(a) The Concessionaire shall notify the Contracting Officer about the misfire and document in the daily blasting report all details of the misfire for the official record, coordination and report.

(b) For non-electric systems, the shock tube shall be checked to make sure that the detonation media has entered the blast area.

(c) The blaster shall make sure all employees are out of the area except for those needed to correct the problem.

(d) The blaster shall correct the misfire in a safe manner.

(e) The blaster shall blast the misfire as soon as it is viable to minimize the possibility of traffic delays.

(f) Re-firing shall be accomplished by following the pre-blasting protocol and using the required blasting signals.

(g) Notification of the final result of the procedure shall be presented to the Contracting Officer.

1.3.14 Production Blasting Operations: All production blasting, including that carried out with the test-pattern requirements, shall be performed in accordance with the following general requirements.

1.3.14.1 Production Blasthole:

(a) Patterns: Production blastholes shall be drilled on the patterns reviewed by the Contracting Officer.
(b) **Restitution:** If more than 5 percent of the holes are drilled outside of specified tolerances, at the option of the Contracting Officer, the Concessionaire may be required to refill these holes with crushed stone and re-drill them at the proper location.

(c) **Burden Distance:** In order to control blasting effects, the Concessionaire is required to design, for every blast, an adequate burden distance (stiffness ratio).

(d) **Hole Protection:** Blastholes shall be covered to prevent overburden from falling into the holes after drilling.

1.3.14.2 **Production Blasthole before Final Slope:**

(a) **Plane of Blasthole Drill:** The row of production blastholes immediately adjacent to the final slope face of the excavation shall be drilled on a plane approximately parallel to the final slope face.

(b) **Minimum Distance from Final Slope Face:** Production blastholes shall not be drilled closer than 1.8 meters (6 feet) to the final slope face. The Contracting Officer shall be notified of any deviation from this limit.

(c) **Bottom of Production Blasthole:** The bottom of the production holes shall not be lower than the bottom of the controlled blastholes (final slope face line) when controlled blasting techniques are used. If necessary, the Concessionaire shall seek approval from the Contracting Officer to allow the bottom of the production hole to be lower than the controlled blastholes by the amount of sub-drilling used on the production holes.

(d) **Maximum Diameter:** Production holes shall not exceed 150 mm (6 inches) in diameter. The Contracting Officer shall be notified of any deviation from this limit.

1.3.14.3 **Detonation:** Detonation of production holes shall be on a delay sequence toward a free face. The maximum kilograms (pounds) of explosives per delay interval between detonations shall not be more than 210 kilograms (462 pounds).

1.3.14.4 **Stemming Material:** Stemming material used in production holes shall be angular granular confined materials that may vary from 10 to 20 millimeters (3/8 to 3/4 of an inch) in diameter, to ensure appropriate reduction in pressure.

1.3.14.5 **Minimum Damage to Back Slope:** It shall be the Concessionaire’s responsibility to take all necessary precautions in the production blasting so as to minimize blast damage to the rock back slope. The Concessionaire shall make every effort to design the blast direction away from the Canal.

1.3.15 **Pre-splitting:** Requirements mentioned here for pre-splitting shall also apply for cushion blasting.

1.3.15.1 **Forbidden Explosives for Pre-splitting:** Bulk ammonium nitrate fuel oil (ANFO) shall not be allowed in the pre-split holes. Only standard explosives manufactured especially for pre-splitting shall be used in pre-split holes. If the Concessionaire submits a non-standard type of explosive, the Concessionaire shall conduct a test to demonstrate its adequacy; non-standard types of explosive require the approval of the Contracting Officer. The Concessionaire shall submit data on these items as part of his blasting plan.

1.3.15.2 **Limits to Hole Diameter:** The pre-split drill-holes shall not be less than 65 mm (2.5 inches) and not more than 100 mm (4 inches) in diameter.

1.3.15.3 **Explosive Diameter:** The diameter of explosives used in pre-split holes shall not be greater than one half the diameter of the pre-split hole.
1.3.15.4 **Tolerances:**

(a) **Tolerance in Hole Location:** Pre-split holes shall be drilled within 75 mm (3 inches) of the staked collar location. If more than 5 percent of the pre-split holes are outside of the 75 mm (3 inches) tolerance, they shall be filled with crushed stone, stemmed, and drilled again.

(b) **Tolerance in Hole Alignment:** The Concessionaire shall control the drilling operations by the use of proper equipment and technique to ensure that no hole shall deviate from the plane of the planned slope by more than 225 mm (9 inches), either parallel or normal to the slope. All drilling equipment used to drill the pre-split holes shall have electromechanical or electronic devices affixed to it to accurately determine the angle at which the drill enters the rock. Pre-split hole drilling shall not be permitted if these devices are either missing or inoperative.

1.3.15.5 **Length of Pre-Split Holes:** The length of pre-split holes for any individual lift shall not exceed 9 meters (30 feet), unless the Concessionaire can demonstrate to the Contracting Officer that the Concessionaire can stay within the above tolerances and produce a uniform slope. If more than 5 percent of the pre-split holes are misaligned in any one lift, the height of the lifts shall be reduced until the 225 mm (9 inch) alignment tolerance is met.

1.3.15.6 **Determining that Holes are Free of Obstructions:** Before placing charges, the Concessionaire shall determine that the hole is free of obstructions for its entire depth. All necessary precautions shall be exercised so that the placing of the charges will not cause caving of material from the walls of the holes.

1.3.15.7 **Drill Hole Conditions:** The Concessionaire shall be required to use whatever type or types of explosives, blasting accessories, or both are necessary to accomplish the specified results.

1.3.15.8 **Fractional Portions of Standard Explosive Cartridges:**

(a) **Fixing to Detonating Cords:** If fractional portions of standard explosive cartridges are used, they shall be firmly affixed to the detonating cord in such a manner that the cartridges will not slip down the detonating cord nor bridge across the hole.

(b) **Spacing:** Spacing of fractional cartridges along the length of the detonating cord shall not exceed 750 mm (30 inches) center to center and shall be adjusted to give the desired results.

1.3.15.9 **Continuous Column Cartridges:** Continuous-column-cartridge explosives used with detonating cords shall be assembled and affixed to the detonating cords in accordance with the explosive manufacturer’s instructions, a copy of which shall be furnished to the Contracting Officer.

1.3.15.10 **Bottom and Top Charges of a Pre-Split Hole:** The bottom charge of a pre-split hole may be larger than the line charges, but shall not be large enough to cause overbreak. The top charge of the pre-splitting hole shall be placed far enough below the collar and reduced sufficiently to avoid overbreak and heaving.

1.3.15.11 **Stemming:** The upper portion of all pre-split holes, from the top charge to the hole collar, shall be stemmed.

1.3.15.12 **Alternatives to Pre-Split Hole Drilling:** As long as equally satisfactory pre-split slopes are obtained, the Concessionaire, at his option, may either pre-split the slope face before drilling for production blasting or may pre-split the slope face and carry out the production blast at the same time, provided that the pre-splitting drill holes are fired first.
1.3.15.13 Ground Vibration and Noise Reduction: If required to reduce ground vibrations or noise, the detonations for pre-split holes may be delayed, providing the hole-to-hole delay is no more than 25 milliseconds.

1.3.15.14 Tolerance in Pre-Split Slope Faces: A pre-split slope face shall not deviate more than 300 mm (1 foot) from a plane passing through adjacent drill holes, except where the character of the rock is such that irregularities are unavoidable, as determined by the Contracting Officer. The 300 mm (1 foot) tolerance shall be measured perpendicular to the plane of the slope. In no case shall any portion of the slope encroach on the lower bench.

1.3.16 Cushion (Trim) Blasting:

1.3.16.1 Alternative to Pre-Splitting Blasting: Where the horizontal distance from the cut face to the existing face is less than 4.5 meters (15 feet), cushion blasting may be performed instead of pre-splitting. With the following exception, requirements previously given for pre-splitting shall also apply to cushion blasting.

1.3.16.2 Difference between Cushion Blasting and Pre-Splitting: Cushion blasting is similar to pre-splitting, except that the detonation along the cut face shall be performed after the detonation of all production holes. Differences in delay times between the line and the nearest production row shall not be greater than 75 milliseconds or less than 25 milliseconds.

1.3.17 Drilling: The Concessionaire shall submit his proposed methods for handling these items as part of his blasting plan, especially if he plans to use any alternative practices.

1.3.17.1 Drill Hole Size: Drill holes shall be of a size to give sufficient clearance to insert the explosives and shall be in accordance with the blasting plan.

1.3.17.2 Drill Hole Depth: The depth of the holes shall be decided by the Concessionaire in conformance with his method for excavating the rock.

1.3.17.3 Casing: Casing shall be used where drill holes are in loose gravel or other material that may cause the loss of the hole.

1.3.17.4 Stemming: Holes shall be stemmed with suitable angular-type stemming material immediately upon completion of loading.

1.3.17.5 Decking: Decking shall be applied in all cases where the blasting site is close to structures or Canal side-slopes. Due to construction design, age of structures or geotechnical conditions that could be found in the project area, the Contracting Officer shall request the Concessionaire to apply this procedure to guarantee that vibration levels remain within a range that would enable to achieve the goal of causing no damages.

1.3.18 Line Drilling:

1.3.18.1 Definition: Line drilling is a technique where blastholes are drilled within 2 to 4 diameters of one another.

1.3.18.2 Purpose: Under proper geological conditions, these unloaded closely spaced drill holes can act as stress concentrators or guides to cause cracks to form between them.

1.3.18.3 Exception: In geologically complicated material, line drilling may not function as desired since fractures tend to concentrate at naturally occurring weakness planes rather than at the manmade weakness plane created by the line drilled holes.
1.3.18.4 **Use of Line Drilling**: Unloaded line drill holes shall be used in tight corners to guide cracks into a specific angle. Line drilling shall also be used between pre-split or trim blastholes to help guide the cracks.

1.3.19 **Pre-Blast Structure Inspections**: Engineered structures, occupied building, and other vibration-sensitive features shall be surveyed to determine existing conditions prior to the start of blasting operations.

1.3.19.1 **Structural Evaluation for Structures of Concern**:

   (a) The Concessionaire shall employ a professional structural engineer to perform structure evaluations for structures of concern and determine the structure’s vulnerability to blasting vibrations.

   (b) Requirements of the evaluation analysis and report are described in paragraph 1.3.5 (*Pre-Blast Surveys Reports*).

   (c) Construction of new structures, temporary or permanent installations or developing industry buildings not included at the time this Concession Agreement was written, shall be inspected, analyzed and included in the list once agreed between the Concessionaire and the Contracting Officer.

   (d) In addition to inspections, the Concessionaire shall use controlled blasting techniques such as pre-splitting when drilling and blasting is to be performed in sensitive areas, to minimize the effects of the vibration waves on the surrounding structures and to minimize effects on the quality of life of people in those areas.

   (e) The Concessionaire shall not perform any blasting at a distance of less than 30 meters from the blasting site to the closest point of any structure.

1.3.19.2 **Pre-Blast Inspections**:

   (a) At least 28 days prior to planned blasting, letters of structure inspections offers shall be provided to all property owners within a radius of 1,000 m from planned blasting and the structures of concern indicated in the above table. The inspections will be free to property owners who have given the required consent to perform the inspection, and paid for by the Concessionaire.

   (b) Record shall be kept of non-responding property owners who refuse to have an inspection conducted.

   (c) Electronic copies of inspection reports and photographs will be retained by the Concessionaire for 3 years.

   (d) Details of the inspection reports are described in paragraph 1.3.5 (*Pre-Blast Surveys*).

1.3.20 **Protection of Property**:

1.3.20.1 The Concessionaire shall exercise utmost care so as to avoid endangering life or property while using explosives. When blasting near buildings, engineered structures, utilities, dams, cofferdams, vessels, bridges over nearby rivers, Canal slopes and side banks, and green concrete which may be subject to damage from blasting, the Concessionaire shall control the blasting operations by the use of properly designed delay sequences and allowable charge weights per delay so that the maximum peak particle velocity or peak component velocity at the closest critical structures remain below thresholds specified in paragraph 1.3.21.1 (*Ground Vibrations*).

1.3.20.2 The Concessionaire shall take all necessary precautions to minimize the risk to transiting vessels and to those vessels tied up at nearby docks, mooring areas, marinas, and anchorages. To this respect,
the Concessionaire shall be required to utilize all means possible (including signs, signals, announcements, evacuation), deploy launches or cars to make sure that transiting vessels or individuals stay away from the immediate area of influence of the blast site.

1.3.21 **Performance Limits:**

1.3.21.1 **Ground Vibrations:** The maximum ground vibration amplitude limits for the protection of structures, slopes, and other features, using the Frequency Based Criteria according to publication USBM RI8507.

1.3.21.2 **Air Overpressure:** The maximum peak positive air overpressure for any structures, vehicle, or vessels moored or underway, with glass windows shall not exceed 0.02 psi (or airblast of 136.8 dB).

1.3.21.3 **Modifications to Limits:** Vibration and air overpressure limits may be modified by the Contracting Officer for certain locations where areas of geological instability appear to be too close for safety, as determined from studies and from devices installed by the ACP in the area.

1.3.22 **Disposal of Empty Explosive Boxes:**

1.3.22.1 Shall be as indicated in 29 CFR 1910.109(e)(2)(i), “Empty boxes and paper and fiber packing materials which have previously contained high explosives shall not be reused under any circumstances, shall be burned at an outdoor, approved isolated location, and no person shall be nearer than 304.8 meters after burning starts.” The Concessionaire shall follow approved written procedures to destroy old, misfired, or recovered products.

1.3.22.2 If the disposal / destruction site for explosives is outside the ACP’s area of jurisdiction, the Concessionaire shall comply with the regulations and procedures of the Republic of Panama’s “Ministerio de Seguridad Pública”.

1.3.23 **Communication Plans:** The Concessionaire shall be responsible for maintaining a community relations program for construction blasting projects to include a plan for on-going communications with neighbors, the distribution of informational brochures and flyers to update persons on the progress of rock blasting activities, conducting community meetings, and developing a plan to respond to blast-related complaints and claims.

1.3.23.1 **Public notifications:**

(a) The Concessionaire shall be responsible for the formal communication of blasting plans and notification of related activities to all affected private parties and to authorities having jurisdiction; such notification shall be:

1. Made directly to the owners of structures and facilities which may be affected,
2. provided in flyers indicating the beginning and ending of the drilling and blasting activities,
3. community meetings with potentially sensitive receptors, such as schools, children daycare facilities, office buildings, health care facilities, public offices, among others, and
4. distributed by any other means that will ensure proper notification

(b) The Contracting Officer may participate as a witness and shall not be responsible for claims resulting from improper notification / communication by the Concessionaire.
(c) In addition, the ACP shall provide the above-mentioned information about its internal assigned representatives and shall participate as witness during the notification and communication process by the Concessionaire. The ACP shall not be liable for any problems or claims that may arise due to failures in the communication process.

1.3.23.2 Blast-Related Complaints:

(a) The Concessionaire shall provide his Community Relations Office telephone numbers, fax, e-mail, physical address and the names of his responsible representatives to all interested parties (stakeholders) in case they need to submit any complaint or claims or requests for information or to request improvement of the above-mentioned communication channels.

(b) The Concessionaire shall prepare and maintain individual complaint forms and a complaint log to document all blasting-related complaints and follow-up actions taken by the Concessionaire to resolve complaints. Procedures used to handle complaints shall be approved by the ACP and the ACP shall be informed of the list of complaints received by the Concessionaire and the status of all complaints. At a minimum, this procedure shall include requirements established in “Procedimiento de Seguimiento, Control y Evaluación de Quejas y Reclamaciones Relacionadas a la Gestión Socioambiental del Proyecto Puerto de Corozal” in annex A.

1.3.23.3 Blast-related Damage Claim to a Structure or Property: The Concessionaire or his agent will acknowledge the damage claim and arrange an inspection of the property within 24 hours following the initial claim notification. A report accepting or denying the claim shall be issued to the claimant within 28 days after receipt. All remaining unresolved claims shall be finalized no more than 91 days after conclusion of all blasting work under the Concession Agreement. The claims assessment steps the Concessionaire shall undertake will include the following:

(a) Process, document and present to the acknowledgement of the Contracting Officer any and all claims filed by private citizens resulting from the use of explosives, no later than 24 hours after receipt.

(b) Review the blasting and monitoring reports to assess the measured or predicted amplitudes of ground vibration and air overpressures at the property for the event(s) leading to the claim and compare these with the safe blasting limits indicated on paragraph 1.3.21 (Performance Limits).

(c) Conduct a post-blast inspection of the property and document any cracking or defects using photographs and appropriate measurements. The survey method implemented shall be acceptable to the Concessionaire’s insurance company and the Contracting Officer. All inspection records shall be made available to the Contracting Officer for review.

(d) If a pre-blast survey was previously conducted at the property, compare pre-existing defects, with damages cited for the claim to determine if new cracking or defects have occurred.

(e) A report of the findings shall be submitted by the Concessionaire to the Contracting Officer.

1.3.23.4 The Concessionaire shall be responsible for repairs caused by damages resulting from blasting or blasting effects should any report findings verify the property damage claim is blast-related and due to a nonconformance of the specification. The Concessionaire shall assume all liabilities and hold and save the ACP, its officers, agents, and employees non-liable for any and all claims filed as a result of personal injuries, property damages, or other claims arising from or in connection with detonation of explosives under this Concession Agreement and proven that are blast related and due to a non-conformance of the Concessionaire to the specifications.
1.4 DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE: The following descriptions apply to the work in this Section.

1.4.1 Production Blasting: Production blasting, as covered herein, refers to the rock-fragmentation blasts resulting from widely spaced production holes throughout the main excavation area adjacent to the final slope shown on the drawings. Production holes shall be detonated in a controlled delay sequence.

1.4.2 Controlled Blasting:

1.4.2.1 Techniques: Controlled blasting techniques are used to minimize damage to the rock back slope and to help ensure long-term stability. The Contracting Officer will require the Concessionaire to use controlled blasting techniques to form the faces of final slopes, even if the main excavation can be ripped.

1.4.2.2 Description: Controlled blasting refers to the controlled use of explosives and blasting accessories in carefully spaced and aligned drill holes to produce a free surface or shear plane in the rock along the specified excavation back slope. Controlled blasting techniques may include pre-splitting or another suitable method. Line drilling may be used in conjunction with pre-splitting or trim blasting.

   (a) Pre-Splitting: Pre-splitting shall be thought of as a protective measure to keep the final wall, both those resulting from production blasting and from final slopes, from being damaged by the production blasting. When pre-splitting, the detonation of the pre-split line shall be before the detonation of any production holes.

   (b) Cushion Blasting: Cushion (trim) blasting offers no protection to the wall from the production blast and its sole purpose is to create a cosmetically appealing, stable perimeter. Cushion blasting is similar to pre-splitting, except that the detonation along the cut face shall be performed after the detonation of the production holes. Final faces shall be done with pre-splitting or line-drilling blasting techniques.

1.5 SUBMITTALS:

1.5.1 Personnel: The Concessionaire shall make available documentation with personnel qualifications for review upon ACP’s request; refer to paragraph 1.3.2 (Personnel Requirements). Documentation for the blaster-in-charge the blasting crew shall include resumes, required licenses and certifications. The Concessionaire shall keep resumes for the following consultants and specialists: blasting consultant, seismic specialist, pre-blast survey specialist, structural engineer and monitoring specialist. Qualifications shall be in accordance with existing Laws, safety standards, and regulations that apply.

1.5.2 Explosive Materials: The Concessionaire shall submit for approval descriptive data, material safety data sheet, manufacturer’s quality certificate, and literature for each type of explosive material. Explosive materials submittals shall be presented at least 42 days in advance of any blasting. As a minimum, explosive materials submittals shall include the following.

   1.5.2.1 Relevant Characteristics: Relevant characteristics of the material such as manufacturer’s brand name, product name, packaging, weight and cartridge dimensions (diameter, length, etc.), weight per box, and storage life or expiration date, and instructions.

   1.5.2.2 Material Properties: Material properties such as base material components, explosive classification, sensitiveness, detonation speed, energy, density versus depth curve for up to 30.5 meters, detonation pressure, absolute bulk strength, fumes, flammability, water resistance, immiscible/adherence, temperature sensitivity, sleep time certification that explosive is suitable for this blasting environment, sympathetic detonation, static and dynamic desensitization, critical density and critical diameter for confined and unconfined conditions and required initiation devices.
1.5.2.3 **Membership Certificate:** Certificate to evidence that the explosives furnished are manufactured as required in paragraph 1.3.8 (*Explosive Manufacturer Requirements*). Certificate shall be prepared by the manufacturer of the furnished explosive.

1.5.2.4 **Toxic Fumes Certification:** The Concessionaire shall submit certification from the manufacturer guaranteeing that after 10 minutes of detonation of the product, the Nitrogen Oxide (NO-NO2-NO3) levels will be below 5 ppm. The Concessionaire shall submit certification from the manufacturer guaranteeing that after 15 minutes counted from the end of every 8-hour shift, the Nitrogen Oxide (NO-NO2-NO3) levels will be below 1 ppm.

1.5.3 **Initiating Devices:** The Concessionaire shall submit for approval the manufacturer’s brand name, material safety data sheet, manufacturing date, and the manufacturer’s quality certificate for initiating devices such as non-electric caps, primers, shock tubes, and delays. The Concessionaire shall include information such as detonating cord’s tensile strength, thickness, PETN grains per foot, water proof capability, non-electric cap delays, primer dimensions (if any), and initiation method in the submittal. Initiating devices submittals shall be presented at least 42 days in advance of any blasting. Refer to paragraph 1.3.10 (*Initiating Devices*) for requirements.

1.5.4 **Blasting Equipment and Barge:** The Concessionaire shall submit for approval descriptive data and information for the blasting machine, alarm system, lightning detection with warning system for approaching electrical storms, and communication devices. If the Concessionaire determines to assemble a barge to perform underwater drilling and blasting, the Concessionaire shall comply with floating equipment requirements included in section 01 14 00 (*Work Restrictions*), and present a complete submittal coordinated with requirements in section 35 20 23 (*Dredging*) and that includes a trim and stability report of the assembled vessel, a detailed method statement, and a schedule showing how blasting work is to be integrated with the dredging operation.

1.5.5 **Method of Transportation and Handling of Explosives:** The Concessionaire shall submit for approval both, land and aquatic transportation and explosive handling procedures. The Concessionaire shall present transportation and handling methods and procedures at least 42 days in advance of any blasting. The Concessionaire shall evidence compliance with Concession Agreement requirements, ACP regulations and regulations Republic of Panama authorities having jurisdiction.

1.5.6 **Drilling and Blasting Plan:** The Concessionaire shall submit for approval a drilling and blasting plan integrated in the dredging execution plan. The plan shall be signed by the blaster-in-charge and the Concessionaire’s project manager. The plan shall be peer-reviewed by the team of consultants and specialists specified in paragraph 1.3.2.3 (*Consultants and Specialists*); the Concessionaire shall submit a written and signed statement from the blasting consultants and blasting specialists to evidence their review of the documents and plans being submitted. If the plan is not acceptable, the Concessionaire shall revise and resubmit the plan. The Contracting Officer will have 7 days to review the revised plan. No blasting shall be initiated before the blasting plan has been reviewed and approved by the Contracting Officer. Acceptance by the Contracting Officer shall not relieve the Concessionaire from his responsibility for producing safe and satisfactory results. Refer to paragraph 1.3.3 (*Scheduling and Coordination*). Also, the Concessionaire shall submit weekly drilling and blasting plans; refer to paragraph 1.5.9.2 (*Weekly Drilling and Blasting Plan and Report*).

1.5.7 **Test Blast Program:** The Concessionaire shall submit a test blast program for review. Test blast program shall be submitted at least 42 days in advance of any blasting. The test blast program includes submittals during its execution; refer to paragraph 1.3.4 (*Test Blast Program*).

1.5.8 **Pre-Blast Survey Report:** The Concessionaire shall submit a pre-blast survey report at least 42 days in advance of any blasting. The pre-blast survey report shall be include inspection and analysis performed by the Concessionaire’s specialist team including but not limited to; the blaster, the monitoring specialist and a professional structural engineer.
1.5.9 Progress Documentation:

1.5.9.1 Daily Drilling and Blasting Report - As Built Blast: On the following day after every blast, the Concessionaire shall submit to the Contracting Officer, for approval, the daily drilling and blasting report showing all details of the blast as it was executed, including: the blast plan number, location, stations and offsets, type of material, date, seismic vibration monitoring, detailed hole information, actual charges per delay, actual charges per cubic meter, operational times and delays, distance to structures for each blast, airblast information, drilling area covered (holes drilled only and holes loaded), production (volume) and blasting details (devices used, blast ratio). The Concessionaire may use a simplified form based on the one adopted for the blasting shot plan.

(a) The drilling and blasting reports are used for quality control and record-keeping purposes and shall be signed by the blaster. This daily report shall be accompanied by:

(1) The loading diagram showing type and amount of explosives, primers (if any), and initiators in each drill hole, the design timing showing initiation sequence of blast holes, including delay times and delay system in each blast hole. Trade names and sizes of all explosives, primers, and initiators to be employed.

(2) Event report(s) from all seismographs deployed to read vibration levels at the influence area of the blasts.

(3) Plan and section views of drill pattern, burden, blast hole spacing, blast hole diameters, blast hole angles, lift height, depth, water column, and sub-drill depth.

(b) Review of the blast log / report / plan by the Contracting Officer shall not relieve the Concessionaire from his responsibility for the accuracy and adequacy of the blasting log. The blasting report shall be a report of the actual blast and not a copy of the blasting plan or the underwater blast notification.

(c) A sample blasting report form is provided at the end of this section to assist the Concessionaire in properly submitting the blasting information to the Contracting Officer. It shall be understood that the Concessionaire shall include in his blasting report or log, the information required in this paragraph 1.5.9.1 (Daily Drilling and Blasting Report - As Built Blast) and any other information included in the sample blasting report plan not explicitly mentioned above.

1.5.9.2 Weekly Drilling and Blasting Plan and Report: Before the weekend (preferable every Friday), the Concessionaire shall submit to the Contracting Officer the complete drilling and blasting plan for the upcoming week for appropriate notification, internal coordination and record. On the first working day of the week (usually on Monday), the Concessionaire shall submit a drilling and blasting summary report for the previous week. Both documents shall include relevant information of all activities: production, progress, inventory, drill logs, blast logs, personnel, etc.

1.5.9.3 Monthly Progress Report: The Concessionaire shall submit to the Contracting Officer a complete monthly summary report including all relevant information such as personnel listings, explosives inventory, production, progress, drill logs, blasting logs, etc., summarized in a weekly fashion.

1.5.10 Seismograph Monitoring Plan: The Concessionaire shall submit a seismograph monitoring plan that addresses ground vibrations and airblast measurements at least 42 days in advance of any blasting. The plan shall include proposed measurement locations at closest critical structures and how these locations will satisfy measurements to protect structures and other vibration-sensitive features. The plan shall include the name and qualifications of monitoring specialist who will operate the blasting seismographs. The plan shall include equipment documentation and methodology. Methodology shall include methods for deployment of geophones and microphones and details of geophone attachment. Equipment description shall include the manufacturer and model of the instrumentation. The plan shall
include copies of calibration certificates issued by the equipment manufacturer or calibration facility certified by the manufacturer confirming all recording devices, transducers, hydrophones, and microphones have been calibrated within the last 12 months. Seismograph monitoring requires submittals during its execution; refer to paragraph 1.3.6 (Seismograph Monitoring). The plan include proposed monitoring reports, one for ground vibrations and airblast and one for hydrophone measurements.

1.5.11 Communication Plan: The Concessionaire shall implement a communication plan in order to keep community members informed of blast occurrence. This communication plan shall be submitted for approval at least 42 days in advance of any blasting. This plan shall include: blasting schedule, communication flyers, community’s visits, and telephone number of the Concessionaire’s reception office for general blasting-related inquiries and complaints. Communication flyers shall be delivered to all the owners or resident of the structures within a radius of 1,000 m from planned blasting on a bi-weekly frequency; such flyers shall be delivered at least 48 hours before initiating any blasting period. Communication flyers shall include, at minimum, the following information: Concessionaire name and logo, project name, community to whom flyer is addressed, bi-weekly blasting schedule, applicable alarms and signals, and community relations office contact information to request information or for presenting complaints or claims.

1.5.12 Complaint Handling Procedure: The Concessionaire shall submit for approval at least 42 days in advance of any blasting a complaint handling procedure in order to track complaints from community residents and implement solutions. Such procedure shall be in accordance with the requirements established in “Procedimiento de Seguimiento, Control y Evaluación de Quejas y Reclamaciones Relacionadas a la Gestión Socioambiental del Proyecto Puerto de Corozal” in annex A.

1.5.13 Video Recording of Blasts: The Concessionaire shall take video recordings of each blast. Recordings shall start one minute before the blast and finish one minute after it. Video shall be indexed in a manner to properly identify each blast, including date/time and location; type of shot (e.g., close-up or pan left or right), and a brief description of what is being filmed. Video shall be in a digital format, which shall be readily played using most available media players.

1.6 QUALITY ASSURANCE (TEST PATTERN):

1.6.1 Demonstration: After the Concessionaire submits his drilling and blasting plan and approval by the Contracting Officer is received, the Concessionaire shall demonstrate the effectiveness of his proposed plan on a short test section in a length compatible with the Concessionaire’s blasting pattern.

1.6.2 Test Section: In general, a short test section shall not have more than 30 meters (100 feet) in length. The test section shall be drilled and blasted and sufficient material shall be excavated so that the Contracting Officer can determine if the Concessionaire’s methods have produced an acceptable slope.

1.6.3 Unsatisfactory Results:

1.6.3.1 Results Considered Unsatisfactory: Unsatisfactory tests shot results would arise from an excessive amount of fragmentation beyond the limit of the work site, excessive fly rock, or violation of other requirements of these specifications. Also, test shot that do not conform to vibration damage criteria in accordance with paragraph 1.3.21 (Performance Limits) will be considered unsatisfactory.

1.6.3.2 Review of Drilling and Blasting Plan: If, in the opinion of the Contracting Officer, the results of the test shot or shots are unsatisfactory, then notwithstanding the Contracting Officer’s prior review of such methods, the Concessionaire shall adopt such revised methods as are necessary to achieve the required results.
1.6.4 **Authorization to Proceed with the Work:** The Concessionaire will not be allowed to drill ahead of the test shot area until the test section has been excavated and the results reviewed by the Contracting Officer.

1.6.5 **Failure during the Progress of the Work:** If, at any time during the progress of the work, the methods of drilling and blasting do not produce the desired result of a uniform slope and shear face within the tolerances specified for the excavation of the work, the Concessionaire shall be required to drill, blast, and excavate in short sections, not exceeding 30 meters (100 feet) in length, until a technique is arrived at that will produce the desired results.

END OF SECTION
SECTION 32 35 16 - NOISE POLLUTION CONTROL

PART 1 - GENERAL

1.1 SUMMARY: The Concessionaire shall provide noise pollution control measures. Noise pollution control measures shall mitigate all noise originating from the concession area, including but not limited to noise from moored vessels, transshipment port operations, its complementary facilities operations, and intermodal rail services. The Concessionaire shall determine noise pollution control measures based on good industry practices. Noise pollution control measures shall include but not be limited to noise mitigation at the source, and sound barriers to shield neighboring localities.

1.2 REFERENCES:

1.2.1 Applicable Legislation:

| Decreto ejecutivo No. 1 | Ministerio de Salud |
| (de 15 de enero de 2004) | Que determina los niveles de ruido para las áreas residenciales e industriales |
| Gaceta Oficial: 24970 |

1.3 REQUIREMENTS:

1.3.1 Noise Pollution Management and Control: The Concessionaire shall incorporate in the design, construction and operation phases of the facilities all the necessary measures to prevent, asses, mitigate and control noise pollution and their negative effects over labor force, the surrounding natural ecosystem, and neighboring population. This shall be done through a noise pollution management plan.

1.3.2 Noise Pollution Control: The Concessionaire shall monitor and control each stage of his noise pollution management plan using the latest control technology available in order to guarantee that actual noise pollution is mitigated as planned. Monitoring and frequency of reporting shall be as best practice on noise pollution control requires. Attenuation measures shall be required in order not to exceed noise limits. The noise pollution management plan shall include but not be limited to the following tasks.

1.3.2.1 Design Requirements: The Concessionaire shall evaluate alternatives to noise generating port operation processes. The Concessionaire shall locate equipment as far as possible from surrounding communities. The Concessionaire shall design access roads with low slopes to minimize noise generated by trailer trucks. The Concessionaire shall procure equipment with power-save features that can turn it off when not in use.

1.3.2.2 Monitoring: The Concessionaire shall establish a noise monitoring system. This system shall be in place before any construction work at the site and continue throughout port operations. The Concessionaire shall set at least four noise monitoring points during the construction phase. Noise monitoring shall continue during the rest of the concession for the operations in accordance with the Environmental Impact Study.

1.3.2.3 Scheduling: The Concessionaire shall consider noise generation for the preparation of the construction work schedule and port operations.

1.3.2.4 Enclosures: The Concessionaire shall enclose noisy equipment within sound mitigating barriers. In particular the Concessionaire shall enclose low frequency noise sources like compressors and generators.

1.3.2.5 Maintenance: The Concessionaire shall provide timely maintenance to access roads and vehicular circulation system to minimize tire treading noises.
1.3.3 **Noise Limits:** The Concessionaire shall adhere to the most stringent international, regional, or local ordinances, regulation, code and standards for noise limits; nevertheless, the Concessionaire shall include measures in the noise control plan to prevent excessive noise due to the Concessionaire’s activities; where excessive noise is defined as greater than 50 dBA Leq (hourly) from 10:00 p.m. to 5:59 a.m., and greater than 60 dBA Leq (hourly) from 6:00 a.m. to 9:59 p.m., as measured at the concession area limit. Special emphasis shall be taken on noise limits regarding negative effects on the adjacent localities, including but not limited to Diablo Heights, Los Rios and Cardenas. The Concessionaire shall consider that local authorities having jurisdiction may issue more restrictive ordinances, which may restrict construction work and/or establish more stringent excessive noise definitions.

1.3.4 **Environmental Noise:** Within surrounding localities where the existing environmental noise levels are greater that those specified in paragraph 1.3.3 (*Noise Limits*), the Concessionaire shall not worsen the existing condition.

1.3.5 **Sound Barrier:**

1.3.5.1 Notwithstanding other noise pollution control requirements prescribed in the Concession Agreement, the Concessionaire shall design and build a sound barrier along the land border between the concession area and Diablo Heights. This sound barrier shall mitigate the noise levels from Corozal transshipment port construction and regular operations that might reach Diablo Heights.

1.3.5.2 The Concessionaire shall schedule the construction of the sound barrier before any other work in the concession area.

1.3.5.3 The sound barrier shall include an acoustical wall which shall rise at least 2.5 m above the finished level of the container yard. The acoustical wall shall be furnished with a deflector which shall rise at least 1 m above the top of the acoustical wall and be angled to redirect sound waves upwards in a manner that contributes to cancel out sound waves that do not hit the sound barrier.

1.4 **DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE:**

1.4.1 **Design Criteria:**

1.4.1.1 **Layout Considerations:** The Concessionaire shall consider locating noise generation sources in manner that minimizes noise pollution in surrounding localities. For example the Concessionaire shall consider container orientation perpendicular to the Canal may reduce noise pollution at the Diablo Heights locality; also, the Concessionaire shall consider that the alignment of the vehicular circulation system away from surrounding localities may reduce noise pollution therein.

1.4.1.2 **Sound Barrier:**

(a) Sound barrier shall be capable to reduce the amount of noise produced in the concession area during construction and during regular operation of the port facilities.

(b) Sound barrier shall be located as close to the source of sound as possible, taking into account physical constraints.

1.4.2 **System Description and Performance:**

1.4.2.1 **Sound Barrier:**

(a) Sound barrier shall be at least as high as required in paragraph 1.3.5.3. Barrier shall be solid and continuous, with no gaps in the vertical or horizontal plane. Reflected noise shall be taken into consideration. Vegetation alone shall not be taken as an effective noise barrier, but it shall be included.
as part of the landscape as visual mitigation of the sound barrier. Sound barrier color, texture, pattern, and volume shall be in context with the surrounding landscape and consistent along its length. The design shall be prepared to prevent stepping onto the wall. The design shall incorporate the use of a deflector to improve the sound barrier performance. The Concessionaire shall determine the mass index of the acoustical wall to meet the parameters of this section, but the acoustical wall shall have a mass index above 70 kg/m².

(b) The Concessionaire shall take into account that the view from the adjacent residential area must not be adversely affected.

1.5 SUBMITTALS:

1.5.1 Intermediate Design:

1.5.1.1 Noise Impact Assessment: The Concessionaire shall provide upon ACP’s request noise impact assessment results, including noise pollution management plan, recommendations and proposed products.

1.5.1.2 Noise Control Plan: The Concessionaire shall not start construction work at the site before the preparation of a noise control plan. The noise control plan shall include measures to prevent excessive noise; refer to paragraph 1.3.3 (Noise Limits). Also, the noise control plan shall address all considerations under paragraph 1.3.2 (Noise Pollution Control). With respect to construction work, the noise control plan shall include the following elements.

(a) Training for construction personnel and subcontractors on noise mitigation measures, such as: maintenance of heavy equipment, equipment location, equipment replacement to select less noisy equipment, etc.

(b) Encapsulating the very noisy equipment with temporary barriers type screen. Especially if equipment produces tonal low frequency noise frequency (compressors and generators).

(c) The noise control plan shall include a list of major equipment planned for use in the work, with estimated sound level contributions at 50 feet.

(d) The noise control plan shall include descriptions of noise reduction equipment and methods that will be used to minimize or avoid excessive noise contributions. The Concessionaire shall consider use of electric equipment when practicable; noise barriers or baffles; and sitting equipment so as to minimize sound contributions.

(e) The noise control plan shall include additional mitigation concepts such as:

(1) Equipment shutdown when not in use;

(2) Sizing equipment to be appropriate to the task;

(3) Routing and traffic patterns or equipment;

(4) Maximizing the distance between the equipment and sensitive receptors;

(5) Keeping the access roads to the work areas in good condition to prevent noise produced by rolling;

(6) Avoiding steep slopes in the access roads to the work areas to reduce noise and minimize material falling from trucks;

(7) Using rubber coating on containers and vehicles used to transport materials or waste;
(8) Establishing optimal working hours for noisy construction activities.

(f) The noise control plan shall include descriptions of mitigations measures specifically pertaining to pile-driving activities. The Concessionaire shall consider using drilled piles instead of kneeling, which produce noise impacts that are highly annoying.

(g) The noise control plan shall include a construction noise reduction and mitigation plan that addresses proposed equipment and processes, and include the following information.

(1) Proposed construction equipment (attach additional information as necessary):

<table>
<thead>
<tr>
<th>Construction Equipment Type and Model</th>
<th>Sound Level (dBA) at 50-Feet (or Measured at Another Distance, as Indicated)</th>
<th>Noise Reduction Accessories or Methods to be Employed with Equipment</th>
<th>Total Anticipated Hours of Equipment Usage</th>
<th>Daily Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

(2) Other proposed noise mitigation processes and/or equipment:

<table>
<thead>
<tr>
<th>Process</th>
<th>Description</th>
<th>Estimated Noise Reduction or Attenuation</th>
<th>Daily Schedule</th>
</tr>
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</table>

1.5.2 Final Design:

1.5.2.1 Calculations: The Concessionaire shall submit complete design calculations.

1.5.2.2 Drawings: The Concessionaire shall submit sound barrier drawings, including but not limited topographic layout, profile, cross sections, sound barrier system components, substrate materials, corner and edge details, base plate anchorage details, foundation details and accessories.

1.5.2.3 Specifications: The Concessionaire shall submit complete specifications for sound barriers, including but not limited to manufacturer’s installation instructions and as otherwise required for complete and proper installation.

1.6 QUALITY ASSURANCE:

1.6.1 Manufacturer: The Concessionaire shall provide sound barrier products from one manufacturer with resources to provide products from the same production run for all the work; products shall be of consistent quality in appearance and physical properties.

1.6.2 Installers: The Concessionaire shall provide sound barrier installation services using qualified personnel skilled in installation of sound barrier products; the installers shall have proven experience of installations similar in material, design, and extent to that indicated for this work.

PART 2 - PRODUCTS

Not used in this section
PART 3 - EXECUTION

3.1 **IMPLEMENTATION:** The Concessionaire shall implement the noise pollution management plan that complies with the applicable legislation and standards required. The Concessionaire shall assess environmental controls (including noise) in daily work planning and document operational compliance with the noise control plan for all construction work, provide quality assurance for construction activities, ensure proactive planning is conducted, and enforce construction operations and use of controls. The Concessionaire shall constantly evaluate noise during construction to ensure that the sound pressure levels do not worsen the existing condition.

END OF SECTION
DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

SECTION 35 20 23 – DREDGING

PART 1 - GENERAL

1.1 SUMMARY: The project includes dredging by the others according to ACP’s design in Canal operation areas; as shown in reference drawings 6121-362. This section covers the requirements for dredging work to be performed by the Concessionaire in accordance with the Concessionaire’s design.

1.2 REFERENCES:

1.2.1 Autoridad Aeronáutica Civil (AAC) Regulations:

Reglamento de Aviación Civil de Panamá (RACP), book XXIII, titles I and II

1.2.2 Autoridad del Canal de Panamá (ACP) Regulations:

RMOCP

Reglamentos Marítimos para la Operación del Canal de Panamá; the RMOCP comprises

Reglamento de Arqueo de Buques para la Fijación de Peajes por el Uso del Canal de Panamá, Reglamento sobre Procedimiento para el Cambio de las Reglas de Arqueo y de los Peajes del Canal de Panamá, Reglamento para la Navegación en Aguas del Canal de Panamá, Reglamento de la Junta de Inspectores de la Autoridad del Canal, and Reglamento de Sanidad y Prevención de Enfermedades Contagiosas, including all amendments

1.2.3 International Association of Lighthouse Authorities (IALA)

1.2.4 U.S. Army Corps of Engineer’s Manual:

EM 1110-2-1003 Hydrographic Survey Manual

1.2.5 ACP Safety Standards and Regulations

1.3 REQUIREMENTS:

1.3.1 General: The Concessionaire shall perform dredging according to good industry practices in the best practice of the trade and to fully satisfy the purpose of this Appendix and the Concession Agreement. The Concessionaire shall be capable of conducting underwater drilling and blasting operations where required to achieve the project depth. The minimum water depth at berthing sites shall be greater than or equal to -18 m MLWS.

1.3.2 Physical Data: The Concessionaire shall perform his own site investigation of the work site for the design end execution of the dredging required for the transshipment port facilities, and to determine geographic and physical constraints, the nature and quantity of the material to be dredged,
debris, wrecks and abandoned structures in the work site, and potential interactions with Canal operations, and work by other contractors in the vicinity of the work site. The final work site characterization shall be based solely on the Concessionaire’s interpretation of the hydrographic surveys, and the geotechnical and geological information made available to the Concessionaire and additional data obtained directly by the Concessionaire.

1.3.3 **ACP Maritime Regulations:** The Concessionaire shall comply with the ACP’s RMOCP; the official documents are the Spanish language documents, available through URL: http://micanaldepanama.com/servicios/canal-servicios-maritimos/reglamentos-maritimos/.

1.3.4 **Docking Facilities:** The Concessionaire shall be responsible for the docking arrangement necessary for his floating equipment. Additionally, the Concessionaire shall be responsible for deployment, support activities, coordination with local ports and harbor management authorities having jurisdiction.

1.3.5 **Plant Fleeting Areas:** The Concessionaire shall coordinate with the ACP the installation of plant fleeting areas within which all non-used Concessionaire’s equipment shall be stored. This area shall be marked by hazardous area buoys, properly placed and marked with reflective tape to give adequate night-time warning for public and ACP vessels and launches. The Concessionaire shall request, through the Contracting Officer, those areas within ACP jurisdiction required to secure his equipment.

1.3.6 **Concessionaire’s Equipment:** The Concessionaire shall be responsible for dredging plant and equipment selection. The Concessionaire shall use dredging plant and equipment capable of performing the work. Dredging plant and equipment shall effectively remove the material to reach the design depth and build the slopes. Dredging plant and equipment shall be in optimum conditions and proven in comparable work. The Concessionaire shall provide maintenance and other services to keep dredging plant and equipment in good operating conditions at all times. The Concessionaire shall operate dredging plant and equipment to avoid slides, shoals or fill deeper areas. The Concessionaire shall insure that the configuration of dredging plant and equipment and their operation do not interfere or endanger the Concessionaire’s personnel, ACP personnel, vessels or structures in the vicinity. The Concessionaire’s dredging execution plan shall include evidence to demonstrate compliance with the following requirements.

1.3.6.1 **Obstructions:** The Concessionaire shall signalize and illuminate potential obstructions on its floating equipment. Potential obstructions are structures or components that could temporarily be extended towards the navigational channel or obstruct the safe passage of transiting vessels or other vessels (such as tugs, launches, etc.) in the work site. Potential obstructions include, but are not limited to, booms, cables, anchors, and assisting launches. Appropriate signals include, but are not limited to, reflective paint/marks, and nun buoys. Signals and illumination shall make potential obstructions discernible in all visibility conditions, and serve to alert all vessels in the vicinity of the Concessionaire’s floating equipment.

1.3.6.2 **Radiation:** Radioactively-operated density measurement devices require certification and approval by the “Ministerio de Salud” of the Republic of Panama. The Concessionaire shall comply with the ACP’s safety norm 1410SAL270.

1.3.6.3 **Dredge Plant Instrumentation:** All dredge plant equipment shall be instrumented to monitor where dredging takes place and to describe the dredging sequence completely. Every Concessionaire’s vessel shall have an AIS (Automatic Identification System) Class A equipment complying with IMO Resolution MSC.74(69), Annex 3 - Recommendation on Performance Standards for an Universal Shipborne Automatic Identification Systems, available through: http://www.navcen.uscg.gov/enav/ais/AIS_standards.htm, or http://www.navcen.uscg.gov/marcomms/imo/msc_resolutions/MSC69-22a1-12.pdf.
(a) The Concessionaire shall provide his own pilot plug needed for the connection of the C-TAN unit on board each vessel prior to the beginning of the work.

(b) The Concessionaire’s proposed format for the dredging plant output data shall be submitted at the pre-construction conference and requires approval by the Contracting Officer prior to the start of work.

(c) Within 24 hours after commencement of dredging, the Concessionaire shall submit a hard copy and disk with data in the format previously approved, for verification. All data shall be related to the dates and real times of day.

1.3.6.4 Working Launch: The Concessionaire shall provide a working launch for each dredge at all times. The Concessionaire shall not leave dredges unattended; a working launch shall remain close to the dredge for assistance, especially during traffic.

1.3.6.5 Trailing Suction Hopper Dredge (TSHD):

(a) Boarding Structures: Boarding facilities shall comply with the ACP’s RMOCP. Boarding arrangements shall be located on the opposite side of the suction pipe in use. If there were 2 suction pipes in use, suction shall be stopped on the side being used during personnel boarding. For safety reasons, deck personnel with radio communication device shall be present whenever ACP personnel or visitors are boarding the dredge. Boarding facilities, especially the pilot’s ladder shall be set in such a way that it may be easily lowered and hoisted to be used at different draft elevations to help reduce impact to the work and ensure safe boarding. Ladder and platforms shall be arranged in such a way as to allow personnel to safely step over a flat, non-slippery surface on deck. Also, a safe passage towards the superstructure shall be properly signalized and providing a non-slippery surface to access the bridge or the area designated for ACP and visitors. Boarding facilities and deck shall be clean and clear of obstructions as to prevent personnel boarding from tripping hazards. Deck and boarding facilities shall be washed from sediments and other materials that may create a slippery surface.

(b) Bow Thrusters: TSHD shall be equipped with directional or bow thrusters.

(c) Speed Requirements: TSHD’s minimum speed at loaded condition shall be 5 knots.

(d) Hopper Capacity: Hopper fill-up shall not exceed the certified and approved load lines.

(e) Residues: The Concessionaire shall not dispose of garbage, trash or residues in the hopper.

(f) Hermetic Requirements: Hopper doors and TSHD valves shall be closed and completely sealed during the dredging and during transportation of material to the disposal sites. Dredging shall be stopped at the overflow level, and overflow shall be kept closed during the dredging cycle, unless otherwise approved by the Contracting Officer. TSHD shall be equipped with securing devices (wedges, safety pins, etc.) to avoid accidental opening of hopper doors and valves, and to ensure proper containment of dredged material in the event of a power failure.

(g) Overflow: Overflow shall not be allowed, flush or discharge of sediments in suspension shall not be allowed into Canal waters and sailing routes, slurry or dredged material discharge shall not be allowed at the dredging work site or during transportation.

(h) Disposal Site Requirements: The Concessionaire shall perform material discharge on the selected grid cell (subdivision of the disposal site area) and with the vessel not making way, to reduce the possibility of dispersing sediments in suspension in a larger area. Flushing or washing the hopper shall be done at the disposal site, not during sailing or near the sailing route.
1.3.6.6 **Mechanical Dredges:**

(a) **Submittal Requirements:** The Concessionaire’s dredging execution plan shall include the Concessionaire’s proposed methods and procedures to effectively remove jammed boulders from buckets and whether use of explosives will be required. The Concessionaire shall also include: the procedures and mechanisms to hoist bucket/stick and spuds from the bottom in case of electrical, hydraulic or mechanical failures; number of dump barges used during the work and the maximum number that will be secured to the dredge during the execution of the work.

(b) **Capability:** Mechanical dredges, including but not limited to backhoes, clamshell and dipper dredges shall be capable to hold and effectively remove boulders from the bottom and unload them on dump barges.

(c) **Dredging Operations Requirements:** Dredging shall be conducted with the dump barge being loaded, secured on the side of the traffic flow to avoid the possibility of accidents when extending the bucket and stick/boom towards traffic.

1.3.6.7 **Cutter Suction Dredges (CSD):**

(a) **Submittal Requirements:** The Concessionaire’s dredging execution plan shall include CSD productivity rates and measuring systems, maximum length of pipelines to be used when operating, land-based machinery used for disposal work.

(b) **Dredging Operations Requirements:**

(1) **Canal Operations:** CSD shall not obstruct traffic or Canal operations by swinging towards traffic, even if the cutter is lowered to the bottom.

(2) **Anchors:** Use of anchors within the navigational channel (between prism lines) will not be allowed. The Concessionaire shall not use more than two anchors to hold the CSD in position and/or to swing the drag head/cutter during operation. The Concessionaire shall mark anchor location with removable buoys and illuminated to alert approaching vessels including but not limited to tugs, launches and barges. The Concessionaire shall use colors, shapes and lights in accordance with ACP’s RMOCP and the IALA.

(3) **Pipelines:** Floating pipelines, including their anchoring systems, will not be allowed within the navigational channel (between prism lines). Towing maneuvers (dead tows) required for adding or removing sections of pipelines or relocating them between working areas require prior inspection and approval of the ACP Port Captain through the Contracting Officer. Installation of submerged pipelines whether crossing the channel or not, require prior approval of the ACP Port Captain through the Contracting Officer. The Concessionaire shall ensure that submerged pipelines lie on the bottom of the channel, below navigational depth. If the available depth does not permit this installation, the Concessionaire shall excavate a trench to reach to the required depth. Location, transport, lowering or sinking of the submerged pipelines shall be coordinated and approved by the ACP Port Captain through the Contracting Officer. Once installed, the Concessionaire shall perform the final soundings.

1.3.6.8 **Plow/Bed Leveler Vessel:** The Concessionaire’s dredging execution plan shall include detailed information regarding vessel (tug and barge) characteristics, towing procedures and configuration, size, weight and set up of the cutting blade and its hoisting system. Also, the Concessionaire’s dredging execution plan shall include proposed actions to prevent the cutting blade from getting stuck at the bottom of the channel and to address failure of the hoisting system, and the contingency plan to recover the cutting blade in case the hoisting system fails or the wire ropes break.

1.3.6.9 **Tug Boats:** The Concessionaire’s dredging execution plan shall include information regarding tug boat dimensions, propulsion, bollard pull and applicable towing procedures. Tug boats shall be
capable of pushing or towing alongside stationary dredges, barges, dump barges and drill boats under site conditions of the Canal; assisting the floating equipment at the work site; and transporting dump barges to and from the disposal sites. Tug boat configuration and general arrangements shall be done in such a way that visibility shall not be reduced or obstructed by the towed vessel.

1.3.6.10 Barges: The Concessionaire’s dredging execution plan shall include information regarding barge dimensions, capacity of hoppers (dump barges), load or deck barges, discharge system, propulsion system and/or towing procedures for transportation. Barges shall be properly secured to the stationary equipment or to the approved fleeting area facilities. Doors, valves and gates shall be closed and sealed during loading and when being hauled to the disposal site.

1.3.7 Navigational Aids:

1.3.7.1 ACP Navigational Aids: The Concessionaire shall design and prosecute the work in a manner that does not require the removal of ACP navigational aids; the Concessionaire shall prepare the dredging execution plan accordingly.

1.3.7.2 Ranges, Gages, and Lines: The Concessionaire shall furnish, set, and maintain ranges, buoys, and markers needed to define the work and to facilitate inspection. The Contracting Officer or the ACP Port Captain may suspend dredging whenever buoys or ranges cannot be seen or followed.

1.3.7.3 Buoys for Concessionaire Operations: The Concessionaire shall furnish and install different types of buoys (cardinal, isolated danger, open water disposal site markers, pipeline anchors, etc.) as required for the execution of the work.

(a) The Concessionaire shall furnish and install buoys at locations that define the operation zone for the dredging activity.

(b) In addition to buoys specifically required for the dredging work, the Concessionaire shall furnish and install cardinal buoys and other buoys/markers needed for the execution of the work in compliance with ACP’s RMOCP. In addition to compliance with ACP’s RMOCP, the Concessionaire shall furnish and install the cardinal buoys and other buoys/markers needed for the execution of the work in accordance with the IALA Maritime Buoyage System.

1.3.7.4 Traffic Controls - Warning Signs: The Concessionaire shall place suitable warning signs well ahead of the work site to alert approaching traffic about land-based activities and his floating equipment shall display all required navigation lights and signals required by ACP regulations.

(a) Navigation Warnings: The Concessionaire shall furnish and maintain navigation warning signs along the pipeline, fleeting areas, landings, and other operational installations as required and as many as necessary.

(b) Dredge Pipeline Markings: Pipelines, as pertains to critical markings, shall be defined in terms of submerged and floating. Submerged pipelines shall be defined as pipelines constructed and positioned to rest on, or be positioned on, or be anchored to, the bottom at all times. Any pipeline not constructed and positioned to remain at rest on the bottom shall be defined as floating for purposes of these marking requirements. These definitions and requirements shall apply whether there is dredge slurry flowing through the pipeline or not.

(c) Submerged Pipeline Markings: Any marking sign, buoy or flag utilized to indicate the initial and final location of the submerged line section shall be constructed of reflective material, e.g., paints, etc. that conventional marine radar can detect and that can be easily seen when hit with a spot light beam. Signs shall be illuminated on both sides, so that they can be seen from a distance of 800 meters. A sign indicating “DO NOT DROP ANCHOR/NO TIRAR ANCLA” shall be posted on both sides where the submerged part of the pipeline ends. The sign shall be properly illuminated as to be seen from
transiting vessels. Dimensions, size and colors shall comply with ACP standards and regulations or those specifications resulting from the ACP Port Captain’s evaluation.

(d) **Floating Pipeline Markings:** The entire length of floating pipeline shall be marked with a row of yellow lights (0.25 A 12 V in ML120), equally spaced, where lights flash 50 to 70 times per minute, lights shall be visible all around the horizon for at least 3,200 meters on a clear dark night. The lights shall be sufficient in number to clearly show the pipeline’s alignment (length and course). The lights shall not be spaced more than 10 meters when pipeline is inside the navigable channel and 60 meters when outside the navigable channel.

(e) **Underwater Disposal Sites Markings:** In-use underwater disposal sites shall be marked using buoys in yellow color with amber light for appropriate nighttime warning to public and ACP boats and launches. The Concessionaire shall submit to the Contracting Officer the general dimensions and configuration of the proposed buoys for inspection and acceptance.

1.3.8 **Safety of Structures:** The Concessionaire shall insure the stability of structures lying in or adjacent to the work site; and repair damages resulting from work. Dredging plant and equipment (including plow vessels, and barges) shall not operate beyond the concession area shown on the Concession Agreement drawings. In general, dredging plant and equipment shall be kept 30 m away from all structures. Shorter distances require the approval of the Contracting Officer. Structures include, but are not limited to: piers and docks. The Concessionaire shall consider that the area of influence is delimited by the perimeter resulting from measuring a 500 m outwards from concession area perimeter.

1.3.9 **Dredged Material:** All dredged material shall be disposed of in the authorized and approved inland or underwater disposal sites, as indicated in the Environmental Impact Study. The Concessionaire shall not hold the ACP liable for any misuse of the material or its quality and conditions.

1.3.9.1 If the Concessionaire desires to use the dredged material for other purposes from those prescribed in paragraph 1.3.9 (Dredged Material), the Concessionaire shall submit this in writing to the Contracting Officer for approval. This submittal shall include detailed information of the proposed use of the material, location where it would be delivered, and appropriate official notes from the authorities having jurisdiction. These official notes shall show proof of compliance with Republic of Panama laws and regulations. Additionally, this submittal shall include proof of compliance with ACP regulations. Each request for a different use will be evaluated by the Contracting Officer on an individual basis.

1.3.9.2 If the ACP determines a different use for the dredged material, and consequently requires the delivery or disposal of this material in a location other than the disposal sites specified in this Concession Agreement, then the Concessionaire will be formally requested by the Contracting Officer to deliver or dispose this material in the new location. This work will be agreed and coordinated with the Concessionaire to minimize delays and/or interruption to Concessionaire activities.

1.3.10 **Disposal Sites:** ACP authorized disposal sites are shown in the drawings shown in the VDR. The Concessionaire shall deposit dredged material in such a way that sedimentary material will not spread out of the disposal site limits. The deposit of dredged materials in unauthorized sites is forbidden.

1.3.10.1 **Surveys:** The Concessionaire shall verify conditions and actual capacity of the underwater disposal sites, the Concessionaire shall conduct hydrographic surveys and submit resulting charts to the Contracting Officer, to document the initial condition before starting disposal work, every month, at the end of disposal work, and when maximum capacity is reached. For each selected inland disposal site, the Concessionaire shall prepare and submit surveys indicating the initial condition before starting dike improvements, at the end of disposal work at this site, when this site’s maximum capacity has been reached, when the source of dredged material changes, and when the work has been completed. The Concessionaire’s dredging execution plan shall include the provisions to leave the disposal sites ready for future use and indication of the remaining capacity.
1.3.10.2 **Surveys at Discharges:** Concessionaire shall perform monthly hydrographic/topographic surveys in the areas where spillways will be discharging to channels, basins or rivers, covering a radius of approximately 200 m. The Contracting Officer will assign ACP personnel to take part in joint initial hydrographic survey, and resulting charts shall be revised and agreed prior to start disposal work. Subsequent surveys shall be required for monitoring purposes.

1.3.10.3 **Inland Requirements:** While depositing dredged or excavated material at inland disposal sites, the Concessionaire shall uniformly grade and build drainage trenches in the area. Once the use of disposal sites has been finished and before final acceptance of the work, Concessionaire shall level inland disposal sites leaving a minimum grade of 2 percent and provided with drains for proper runoff and to prevent accumulation of water.

1.3.11 **Salvaged Material:** Any articles of value (historical, archaeological, economical), or those that the Concessionaire suspects to be of value, which are brought to the surface during dredging shall be deposited on shore at a convenient location near the work site. Such articles shall become the property of the ACP and, as directed by the ACP representative on board, or on the field and the Contracting Officer, shall be handled depending on their condition and suspected value.

1.3.12 **Artificial Obstructions:**

1.3.12.1 The ACP shall not be responsible for debris such as, but not limited to: sunk structures and objects, metal bands, pallets, pieces of broken cable, rope, anchors, fire hoses, tires, broken piles, pipelines, pipes, rows, tubing, cords and materials used for blasting operations, chains, locomotive cables, wooden and synthetic fenders from the locks and floating equipment, concrete blocks and other remains, abandoned sunk buoys and piles, rails, abandoned bank lights, rocks or concrete structures from the breakwaters located at Corozal, erosion control materials, and wrecks; although such debris may be found in the channels and in the proximity of piers, locks structures and docks.

1.3.12.2 No operational beacon is used in the navigational channel. In the event abandoned beacons or abandoned aids to navigation are encountered within the working area obstructing the operation, they shall be considered as debris and shall be removed and disposed by the Concessionaire accordingly. ACP may provide access and a location on shore for the Concessionaire to temporarily pile or store these recovered debris, but Concessionaire shall implement sanitary, safety and environmental actions to prevent affecting personnel, the environment, and others. Except those valuable items, refer to paragraph 1.3.11 (*Salvaged Material*), all removed debris shall be disposed of by the Concessionaire outside ACP areas.

1.4 **DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE:**

1.4.1 **Connections:** The Concessionaire shall design berthing area and its approaches to facilitate berthing operations without adversely affecting Canal operations. Dredging design shall be prepared to provide berthing for the design vessels specified in section 01 10 00 (*General Requirements*).

1.4.2 **Slopes:** The Concessionaire shall determine and design the optimum slope of all areas dredged under this Concession Agreement in order to ensure the overall stability of berthing area and its approaches’ side slopes, Canal prism channel side slopes, as well as the structural integrity of any nearby facilities. Notwithstanding the above, a minimum design slope no steeper than 1V:1H is required.

1.4.3 **Transitions:** The elevations at the berthing area shall be below the elevation of the Canal prism channel to which it connects. The Concessionaire shall design the required transitions.

1.5 **SUBMITTALS:** The Concessionaire shall submit the dredging execution plan to the Contracting Officer for approval. The dredging plan shall consist of the detailed and organized description of the procedures, methodology, schedule and equipment the Concessionaire proposes to perform the work. This plan shall be submitted twice; firstly, as part of the intermediate design submittal;
this submittal shall consist of a general description of the work. The second submittal shall be a complete detailed fine-tuned dredging execution plan and it shall be submitted as part of the final design submittal. Dredging shall not start until the Concessionaire receives the Contracting Officer’s approval for the dredging plan. The Concessionaire shall submit for approval to the Contracting Officer the following items that, as a whole, will be referred to as the dredging plan. The dredging plan may include other items deemed necessary by the Concessionaire or as determined by the Contracting Officer.

1.5.1 **Survey Plan**: Shall include hydrographic surveys as well as any other specialized surveys to be performed.

1.5.2 **Communication Plan**: The Concessionaire shall submit a communication system between the Concessionaire’s personnel and ACP personnel assigned to supervise and coordinate Concession Agreement work. Concessionaire’s personnel shall include, but not be limited to, its technical support team, the dredge and auxiliary equipment crew, and the crew at the disposal area. ACP personnel shall include but not be limited to, inspectors and transit advisors. The Concessionaire shall be responsible for obtaining the permits for operational frequencies from the authorities having jurisdiction. The Concessionaire may be required to change radio frequencies if these interfere with Canal operations.

1.5.3 **Equipment**:

1.5.3.1 The Concessionaire shall submit a list of all his equipment -- privately-owned and subcontracted -- necessary to perform the work, including: dredging in Canal waters, work at the disposal sites, other work at the dredging sites, temporary facilities and shops.

1.5.3.2 The equipment list shall be submitted together with all corresponding information regarding type; number; characteristics; instrumentation; operation, towing and positioning procedures; personnel and crew; productivity; last dry dock and maintenance program; past experience, cutting and lifting forces, drawings, pictures and videos (if possible) taken during equipment operations, etc.

1.5.3.3 The equipment list shall be submitted together with all corresponding shop drawings, design, calculations, construction plans, and all technical information, certified by engineers, regarding building and assembling new equipment. Such equipment may include: dredge components, hoisting devices, floating piers, plough units or vessels, mooring facilities, drilling and blasting barges, excavators, work floats, etc.

1.5.4 **Dredging Execution Plan**: The Concessionaire shall submit a dredging execution plan. The dredging execution plan shall include dredging methodology and detail other work such as: towing procedures, buoy removal plan, navigation maneuvering, and plough/bed leveling. The dredging execution plan shall include a detailed description of locations, procedures, methods, and equipment; and sequence of operations (including details such as working simultaneously in different sectors), proposed to perform the required work. The dredging execution plan shall provide details about the coordination, information and processing of permits and approvals by ACP and authorities having jurisdiction. The Concessionaire shall be responsible for processing permits and approvals from authorities having jurisdiction. The dredging execution plan shall be up-to-date and proven, and shall consist of dredging methods and procedures that according to the Concessionaire’s expertise would enable the Concessionaire to meet requirements in terms of safety, productivity, efficiency and effectiveness, and to fully comply with the Concession Agreement, its timely completion, protection of ACP and third-party property, and safeguarding of ACP operations in progress. The dredging execution plan shall include all operational details regarding the estimated volume of material to be dredged, the areas and location of the different types of materials to be worked during the sequence indicated in the Concessionaire’s approved work schedule, and volume of material to be disposed, careful treatment, and removal and disposal of materials. In case the Concessionaire needs to modify the approved dredging execution plan, the Concessionaire shall submit the modified dredging execution plan for review at least 21 days in advance of the date in which the Concessionaire plans to begin with the change; this is required so the
ACP can make necessary adjustments for those changes and implement if required measures such as the installation of baselines and other survey controls.

1.5.5 **Dredged Material Disposal Plan**: The Concessionaire shall submit a dredged material disposal plan. The Concessionaire’s selected method of disposal shall not represent risks or obstructions for Canal traffic, and shall comply environmental requirements stated in Appendix 10 of the Concession Agreement. The plan shall be prepared applying the best practices of the trade. The plan shall include the results of Concessionaire’s inspection and evaluation, plus tests and results of geotechnical studies performed by the Concessionaire. The plan shall include all assumptions, statements of facts, computations and a narrative to fully explain the procedures that the Concessionaire will follow. The plan shall address all different disposal situations and include all required monitoring, preparation, operation, and maintenance. The plan shall include the location, number, type of dredged material conveyor pipelines and provide details regarding the inspection of all pipelines and specify actions to be taken in the event a leak or break. The plan shall address leaving the disposal areas ready for future use. The capacity indicated for the underwater disposal site is estimated according to the ACP basic disposal site design, the dredged material disposal plan shall include: the capacity of the disposal site and the minimum after-use depth, as calculated by the Concessionaire; and the Concessionaire’s calculations to assess whether the disposal site will be partially or entirely used during Concession Agreement execution.

1.5.6 **Protection Plan**: The Concessionaire shall submit a plan for the protection of surrounding structures, utilities, facilities, equipment, local activities, business and vessels close to the work site.

1.5.7 **Sketches, Drawings, and Charts**: Drawings shall be presented in hard copy and digital format. Digital format shall be compatible with the ACP’s system.

1.5.7.1 **Soundings**: The Concessionaire shall submit hydrographic charts of surveys performed to support for the different stages of the work including, but not be limited to, before dredging, after dredging, and final condition survey charts; hydrographic survey charts shall be generated through soundings. The Contracting Officer may request other soundings when, after dredging, conditions arise which could affect Canal traffic.

1.5.7.2 **Disposal Site Condition Surveys**: In addition to the two submittals required as part of the dredging plan, the Concessionaire shall submit underwater disposal site drawings at least 21 days before disposal execution starts as well as at the end of the Concession Agreement. The Contracting Officer may request updated condition surveys during disposal execution and at other times during the execution of the work. Drawings shall indicate the proposed grid patterns that the Concessionaire will use to uniformly distribute the material, and buoy characteristics and location.

1.5.7.3 **Sailing Routes**: In addition to the two submittals required as part of the dredging plan, the Concessionaire shall submit drawings for all proposed sailing routes to access the underwater disposal sites, dredging, fleeting and other project areas, at least 21 day before disposal execution starts. These drawings shall indicate width of channel and centerline.

1.5.8 **Ranges, Gages, and Lines**: The Concessionaire shall submit a description of methods to be used for ranges, gages, and lines.

1.5.9 **Dredge Plant Instrumentation**: The Concessionaire shall submit a written description thoroughly explaining the data format used with the proposed dredge plant instrumentation.

1.5.10 **Recovery and Removal Plan**: The Concessionaire shall submit a recovery and removal plan. The plan shall address the handling of artificial and natural obstructions. In addition to the two submittals required as part of the dredging plan, the Concessionaire shall submit an updated recovery and removal plan once the removal is started or when a change is needed. The plan shall include, but not be limited
to, drawings indicating the location, list of expected or detected items, equipment, personnel and materials, methodology, transportation and disposal activities.

1.5.11 **Plant Fleeting Area:** The Concessionaire shall include the following.

1.5.11.1 Characteristics, dimensions and securing procedures of the equipment,

1.5.11.2 Period of time needed,

1.5.11.3 Drawings of requested location, design of structures/facilities on shore or on water, placement of temporary floating berths (jetty), anchor buoys and their connections between land and water. Depending on type of installation, the ACP may require the Concessionaire to present technical and engineering calculations and evaluations.

1.5.11.4 A construction plan including the methodology, type of equipment to be used, safety precautions and socio-environmental protection.

1.6 **QUALITY ASSURANCE:**

1.6.1 **Measurements:**

1.6.2 **Initial Measurements:** The Concessionaire shall conduct soundings of the entire area to be dredged. This is to account for possible changes in the seabed and side slope profile due to environmental changes and vessel traffic, siltation effects during the time elapsed between pre-contract soundings and actual dredging.

1.6.2.1 The initial measurement, soundings, shall be executed by the Concessionaire. The Concessionaire shall notify the Contracting Officer at least 14 days in advance of the date in which the Concessionaire plans to execute the initial soundings. The Contracting Officer may assign specialized ACP personnel to coordinate the initial soundings.

1.6.2.2 Initial measurements made by the Concessionaire shall be submitted to the Contracting Officer for review at least 28 days before the proposed starting date of the dredging.

1.6.2.3 **Final Acceptance Soundings:** Once determined by the Concessionaire that the berth pool along the quay walls is at the design depth, the Concessionaire shall document and maintain such evidence to be used by the Suitable Independent Surveyor as part of his obligations stated in clause 5.8(d) of the Concession Agreement.

1.6.2.4 **Disposal Site and Sailing Route Soundings:** The Concessionaire shall comply with the minimum acceptable depth for the disposal sites as shown on each disposal site reference drawing, and for sailing routes defined by the ACP, and shall furnish hydrographic charts as described in paragraph 1.5.7 (*Sketches, Drawings, and Charts*).

(a) The Concessionaire shall perform all pertinent survey work before and after disposal operation phases to ensure proper use of the disposal sites and sailing routes. Soundings shall be taken at 20 meter intervals.

(b) The Concessionaire shall present the data resulting from the initial and final survey work for every stage of the operation.

(c) Whenever necessary, the Contracting Officer will request preparation of control soundings during the progress of the work.
1.6.2.5 **Soundings to detect obstructions:**

(a) Obstructions to traffic may include, but are not limited to: shoals, slides, heaving of bottom, accumulation of material, rocky material being removed, boulders that may not be removed or dredged, misplaced material being dredged, spills from hoppers, accidentally sunk or recovered objects.

(b) In case objects recovered are disposed of during the execution of the work, the Concessionaire shall be responsible for sounding the area to confirm that the object does not represent an obstruction to traffic.

(c) The Concessionaire shall remove shoals created by the action of dredging, seabed leveling, or drilling and blasting equipment. After dredging the shoal, the Concessionaire shall verify through soundings that the work site is “clear for traffic” before the equipment is relocated from the area.

(d) Soundings shall be taken in a radius of 50 m around the working perimeter defined by the shoal created. After removal, the Concessionaire shall perform a final verification sounding to confirm that the shoal created has been removed.

(e) The bathymetric charts shall indicate: channel centerline, prism lines (present channel and widening), contour of present navigational depth and depths readings above it, date, channel reaches and information on shoals specifying station, offset to the centerline and minimum depth identified.

1.6.2.6 **Soundings for High Spots:** If hydrographic charts or survey data show pending areas to reach the design depth specified under this Concession Agreement, the Concessionaire shall submit and coordinate with the Contracting Officer a high spots removal plan.

(a) This plan shall include: removal sequence, location of pending areas, the estimated time for removal and sounding activities.

(b) Field investigations may be required (drag bar test, low frequency soundings, etc.) to determine the type of material and removal method.

(c) Verification soundings shall cover 50 meters surrounding the high spot perimeter.

(d) The Concessionaire shall present a removal plan 24 hours in advance to the Contracting Officer for coordination purposes. The ACP shall not be liable for any delays experimented by the Concessionaire due to this.

1.6.2.7 **Plant Fleeting Area Soundings:** The Concessionaire shall submit hydrographical and topographical charts attached to his request for the use of ACP operation or compatibility areas for the installation of temporary facilities and structures on the water or anchored or placed on the seabed, to present initial bottom conditions.

(a) The Concessionaire shall present to the Contracting Officer the charts with the final condition as part of the demobilization process for approval.

(b) Control soundings will be required from the Concessionaire at the occurrence of any incident that may represent a risk to ACP or third party vessels or personnel.

1.6.2.8 **Siltation Control Soundings:** Due to the extent of the work, the natural action of environmental forces and artificial forces induced by Canal traffic, and dredging itself, some siltation may be expected during dredging execution.
1.6.2.9 **Echosounder:** The Concessionaire shall use electronic sounding equipment. The depth sounder shall be located in such a position on the vessel hull that measurements shall not be affected by sailing or sea condition effects as rolling, pitching and squad (heave compensator).

1.6.2.10 **Transducers:**

(a) **Frequency:** The Concessionaire shall use a sounding frequency for single beam of 200 kHz and for multibeam survey of 300 kHz with and acceptable allowance of plus or minus 5 percent.

(b) **Angle:** The depth sounder beam angle, measured with the vertical line, shall not be less than 8 degrees. Smaller angles shall require the Concessionaire to ensure complete coverage of the bottom by reducing the spacing of sounding lines.

1.6.2.11 **Electronic Positioning:** The survey launch shall be equipped with a differential global positioning system (DGPS).

1.6.3 **Data Format Requirements:**

1.6.3.1 The Concessionaire’s hydrographic charts shall be submitted at scale 1:1000 and shall delineate not less than the following information:

(a) Contour showing the “design depth and the overdredge allowance.

(b) Slope upper design projection line indicated for the different sections of the work.

(c) The east and west prism lines (existing channel and after the completion of the work).

(d) Design slopes ratio.

(e) Center line, sailing line, points of intersection between channel reaches, east and west prism lines for the existing navigational channel.

(f) Navigational aids: buoys, beacons, lighthouse and towers.

(g) Scale of drawing.

(h) Structures of concern.

(i) Date of survey, north arrow, grid ticks, vessel name, cable crossings, and any other pertinent information.

(j) The soundings shall be referred to the mean low water springs (MLWS) datum.

(k) All soundings shall be in meters and decimeters, rounded to the nearest decimeter. Soundings density on plots shall be approximately 9 soundings data per inch (at 1:000 scale). Plan view plots shall delineate the actual vessel track along the specific route.

1.6.4 **Field Data:**

1.6.4.1 Field data shall be processed and tabulated in ASCII format containing:

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<thead>
<tr>
<th>Northing</th>
<th>Easting</th>
<th>Depth (Raw Data)</th>
<th>Date</th>
<th>Tidal Information</th>
<th>Time</th>
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1.6.4.2 Northing and easting are UTM coordinates and are referred to NAD 27 (North American Datum 1927). The depths shall be soundings referred to MLWS.
1.6.4.3 The Concessionaire shall prepare the survey data in “RAW” hard copy form (fathometer charts books, etc.) and the “RAW” digital survey data in a compact disc, within 5 working days of completion of the survey.

1.6.5 Cross Sections: Cross-sectional plots shall be maintain on hard copies in a template format at a horizontal scale of 1:500 and vertical scale exaggerated 10 times.

1.6.6 Final Examination and Acceptance:

1.6.6.1 Removal of any siltation produced by natural effects or induced by any operation and the accumulation of material in the channel caused by dredging or ploughing, shall be part of the work to be done by the Concessionaire.

1.6.6.2 The Concessionaire will be notified when soundings and/or sweepings are to be made, and will be required to accompany the survey party.

1.6.6.3 When the original or unacceptable area(s) is found to be in a satisfactory condition, it will be accepted finally. In case more than one sounding or sweeping operation by the ACP over an area be necessary by reason of work for the removal of unacceptable shoals disclosed at a prior sounding or sweeping, the cost of such second and any subsequent sounding or sweeping operations will be charged against the Concessionaire at the rate of B/.900.00 per day for each day in which the ACP is engaged in sounding or sweeping and/or is en route to or from the site or held at or near the said site for such operations.

1.6.6.4 The ACP may require the Concessionaire to perform bathymetries to verify final grades at specific areas that may have been skipped during the dredging process.

END OF SECTION
APPENDIX 3
PREPARATORY WORKS

1. The ACP shall remove the utility lines within the Concession Area.

2. The ACP shall vacate the premises used by the ACP and identified by the Concessionaire on the Terminal Rail Spur Access Area as describe on Appendix 2.
APPENDIX 4
ACP BLASTING AND DREDGING PROGRAMMES

The blasting and capital dredging work of the ACP will be executed as shown in reference drawings 6121-362 which are available in the VDR.

The ACP will complete the blasting and capital dredging work required to comply with clause 5.1 within a period of fifty two (52) weeks from the Concession Area Rights Date.

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<th>PRELIMINARY DREDGING SCHEDULE BY ACP</th>
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<td>Dredging of Balboa Reach</td>
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<td>Dredging of turning basin</td>
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APPENDIX 5
CANAL RESTRICTIONS

1. Scheduling Requirements

1.1 Special attention needs to be paid to the scheduling and execution of the Terminal Construction Works (including Concessionaire Dredging Work and Concessionaire’s Maintenance Dredging) and Terminal Services vis-a-vis existing Panama Canal projects and port operations.

1.2 The Concessionaire shall be aware of all maritime activities and operations conducted in the vicinity of the Panama Canal entrance on the Pacific Ocean, and in connection with the project site, especially those at the Pacific Locks, the navigation channel, and the ACP projects. Since private, government and ACP operations and activities run simultaneously with canal traffic, the Concessionaire's Terminal Construction Work Programme shall consider constant coordination and communication to minimize delays in the operations for all parties. The Concessionaire shall develop its Terminal Construction Work Programme in accordance with the general scheduling requirements indicated in paragraph 3.1 of this Appendix, the works required by this Concession Agreement and their specified sequences.

1.3 Requests for permission to interrupt utility services or operations at any ACP access channels, roads, properties or facilities shall be submitted in writing at least ten (10) days prior to the desired date of interruption to the Contracting Officer, for approval and coordination with other ACP divisions. The Concessionaire shall explain its proposal in detail, including possible alternatives and mitigation measures to reduce the impact and plan for contingencies. In the case of state-owned, public or private access channels, roads, properties, facilities and/or utilities, authorization for interruption shall be negotiated and coordinated by the Concessionaire with the external parties and the negotiated and approved plan shall be submitted in writing to the Contracting Officer at least ten (10) days prior to the desired date of interruption.

2. Work by Others

2.1 It is anticipated that there will be work performed by others, engaged in relation to the Panama Canal in the vicinity of the work site. The Concessionaire shall scrutinize, consider and cooperate with said stakeholders and contractors in the vicinity of the work site. The Concessionaire shall not interfere unnecessarily or improperly with other ACP contractors. The Concessionaire should expect the ACP's and other contractors' equipment at the project site and surrounding areas. This equipment may include dredgers, barges, pipelines, support vessels, land-based equipment, and other equipment, requiring the Concessionaire to coordinate with the Contracting Officer for access or possible interference. Coordination shall be addressed through the Liaison Committee and depending on the conditions, with other contractors.

3. General Scheduling of Work

3.1 In planning and scheduling its activities and operations, the Concessionaire shall be aware of the working hours for the ACP and government agencies. Depending on their availability and as coordinated with the Contracting Officer and the Liaison Committee, operational units may assist the Concessionaire in coordinating during non-working hours, however the ACP shall not accept
responsibilities or claims for delayed receipt of information or responses by the ACP in such cases. The Concessionaire shall submit written notification to the Contracting Officer at least five (5) working days in advance whenever the Concessionaire shall require coordination for an activity. The notification shall detail the equipment to be used, the start and end time for each shift and the area in which the Concessionaire shall be working. Depending on the activity scope or the type of operation, as well as due to its relevancy for the project execution or the ACP activities, the Contracting Officer could require additional information, specific plans and clarifications in order to approve them.

3.2 The Concessionaire shall coordinate in advance dredging, on-site activities and related works with the Contracting Officer and the Panama Canal port captain, taking into account that other affected parties shall be notified at least twenty four (24) hours in advance, taking in consideration the ACP working hours and conditions indicated in Error! Reference source not found., to minimize interruptions and equipment downtime. The Concessionaire shall review daily traffic schedules that show estimated vessel transiting times in the Pacific as reference when planning its work. This information is subject to change and shall be used as a guide.

4. Working on different sectors of the canal waters

For an appropriate scheduling of work, the ACP needs to know in which sector of the canal waters the Concessionaire is going to perform any marine works. The ACP and the Concessionaire shall mutually agree on work sectors to allow for better deployment of equipment and for different operational scenarios to achieve the proper completion and delivery of the work. The Concessionaire shall execute the work as set out in Error! Reference source not found. and the Terminal Construction Works Programme. The Contracting Officer shall allow a maximum of four (4) sectors.

5. Scheduling and Sequence

Scheduling for the different sectors shall be done in accordance with the completion deadlines proposed by the Concessionaire. The Concessionaire could work simultaneously in different sections, but any plan shall be submitted in a timely manner and coordinated with the Contracting Officer and shall be reflected accordingly in the work schedule. To achieve progress, appropriately execute the works, optimize operating conditions and reduce unnecessary delays, as well as to allow other ACP’s projects, the ACP requires the Concessionaire to plan its operational strategy considering that the Concessionaire shall remove and dispose any artificial obstruction, wreck, debris, obstructions, sunken objects and any other materials in the project site before dredging operations start;

6. Replacement, Removal and Relocation of Buoys

6.1 The number of buoys to be removed and the frequency of removal shall depend on the Concessionaire's operational demands, the progress of dredging works and the agreed-upon buoy-removal plans. Removal and relocation of temporary buoys shall always be supervised by on board ACP officers and specialized personnel. This plan shall be presented to the port captain for his evaluation, instructions and approval. Usually, not more than three buoys on either side
are allowed to be replaced by temporary buoys and due to safety reasons, those replaced cannot be located on both sides of the navigation channel within the same section of the channel.

6.2 The ACP shall replace and remove aids to navigation (temporary buoys) and relocate them as coordinated with the Concessionaire and under the supervision of ACP personnel. The Concessionaire shall follow the instructions of the ACP port captain.

6.3 The ACP shall furnish and install temporary buoys (spherical, Type 5x9 or similar) to replace existing permanent buoys (Type 8x26). Temporary buoys shall be furnished and installed with sinkers (concrete blocks or anchor), chain, solar panels and lights. Scheduling for replacement and availability of temporary buoys shall be considered in the buoy-removal plan.

7. Structures of Concern

The Concessionaire shall avoid interference with the daymarks (landmarks), aids to navigation towers and lighthouses, buoys and structures surrounding the work area and they shall be visible at all times for the traffic (including transiting vessels, tug, floating equipment, launches and other vessels) on Panama Canal Pacific locks, navigation channel and the south approach channel to the third set of locks. Also, the Concessionaire shall prevent damage to locks walls, structures and installations, erosion controls and equipment within and in the proximity of the project site. The Concessionaire shall monitor the slopes adjacent to these structures to ensure the stability of the slopes is not compromised with the excavation or dredging works. The Concessionaire shall avoid obstructing, interfering or affecting the normal operation or the conditions of these structures. The Concessionaire shall conduct its operations so as not to affect ACP and third parties structures, vessels and floating equipment and shall consider the proximity of marinas, mooring facilities, anchorages and port installations and bridges near the project site when conducting its operations.

8. Partial Interruptions and/or Delays to Dredging Works

8.1 Partial interruptions and/or delays to dredging works could be experienced due to canal and port operations, activities and instructions during the execution of the work by the Concessionaire.

8.2 Partial interruptions or delays to the dredging work, that would cause down-time of the equipment, could be expected due to canal and/or port operations. The use of the navigation channel and canal water by the Concessionaire's or Concessionaire Contractor’s floating equipment, as well as the Concessionaire's or Concessionaire Contractors’ activities or operations could be affected by ACP activities in the project site. Therefore, the Concessionaire shall take into consideration as part of the normal operating conditions, the traffic and operations related to the Panama Canal Locks and other ACP activities. The intention is to implement a process and reach an agreement that shall coordinate all activities, reducing possible delays.

8.3 The Concessionaire shall comply with ACP restrictions to access the channel as indicated in the Table of Operating Restrictions under paragraph 10.

8.4 Under no circumstances the ACP shall compensate the Concessionaire for any Partial Interruptions and/or Delays to Dredging Works, including downtime of equipment's.
9. **Restrictions to Navigation**

9.1 Considering the Table of Operating Restrictions included in this Appendix and the prevailing traffic conditions for a particular area, and space to be used by the Concessionaire to deploy its equipment, the Concessionaire shall operate and guarantee a minimum clearway channel (width) for navigation according to the following:

(a) a minimum of 122m (400 feet) to allow one-way traffic. The term "one-way traffic" refers to the transit in a single direction (northbound or southbound) of only one vessel at a time in the location being considered. The navigation channel centre shall not be available for work during the one-way traffic scenario, but the Concessionaire may continue work inside the prism lines provided the minimum channel width is maintained;

(b) the Concessionaire's equipment shall be moved outside the existing prism lines as required to allow restricted transiting vessels ("clear channel vessel") and post-Panamax vessels to pass. Post-Panamax vessels may be entering or leaving ports and anchorages located at the Pacific side. Depending on post-Panamax vessel movements, coordination shall be made with the ACP authorities and vessels in order to confirm whether the Concessionaire is allowed to temporarily relocate his floating equipment at a safe distance to allow safe passage and to continue operating within the area. Usually, post-Panamax vessels allow advance notification, since they are scheduled with enough anticipation. The frequency of these departures and arrivals is in the range of three (3) to five (5) vessels per week, more often from Thursdays to Sundays, and usually between 7:00 a.m. (0700 hrs) and 1:00 p.m. (1300 hrs) local time; and

(c) the Concessionaire's dredge may remain on the navigation channel during two-way traffic conditions, if the port captain has allowed it, taking into consideration approaching vessel size. Pilots shall consider dredge working area as a one-way traffic area, see paragraph 9.1(a).

9.2 The Concessionaire may be requested to move its equipment outside of the existing prism lines or relocate the equipment to other positions, in special circumstances, to allow:

(a) vessels to enter or leave the ports and anchorages,

(b) a vessel to use the emergency anchorage (beaching area) and

(c) other vessels with special traffic restrictions transit through the work area. This requirement shall depend on ACP needs and shall be coordinated through the ACP pilot on board the equipment, a minimum clearway channel shall be kept at all times as mentioned in paragraph 9.1(a) above.

9.3 When working in or intending to enter the navigation channel, the area of the ports and by the "Puente de las Americas", all navigational safety actions shall continue to be applied and communication with the ACP port captains, port-entry coordinators, marine-traffic control centre and transiting vessels shall be required.
9.4 Whenever the width of the navigation channel is such that it becomes necessary to implement one-way traffic in the area, it is often necessary to have a tug available to assist transiting vessels while the dredging equipment is in the area. The ACP shall cover the fee for the custodial tugs.

9.5 A restriction against execution of the work within 305m (1,000 feet) north or south of the point of intersection of consecutive reaches have been established by the ACP (canal operations captain). The Concessionaire shall submit a flexible working plan for the consideration of the Contracting Officer, keeping this restriction in mind to minimize any negative impact on job performance and canal operations. Special approval and coordination is necessary to operate in such locations; the Concessionaire shall use the Table of Operating Restrictions when scheduling and conducting the works. The ACP shall not be liable for delays incurred by the Concessionaire in these locations.

9.6 Traffic "scenarios" or "windows" on the Pacific side are shown in the Table of Operating Restrictions included below. During these periods, some traffic can be expected from vessels coming in and out the port terminals or vessels on their way to and from the ACP landing facilities, public ramps and private marinas along the navigational channel. Traffic within anchorages near the Pacific Entrance channel, and moorings, can also be expected.

9.7 The Concessionaire's works are expected to be free from restrictions twenty four (24) hours of the day in the areas outside the existing prism lines.

9.8 The Concessionaire is advised to review port schedules to program its activities, since post-Panamax vessels may be using port facilities and their dimensions may require special channel conditions in terms of available navigational width during the execution phase of this Agreement. Operations at Panama Ports Company at Balboa and Roadman (Port of Singapore Authority) are usually conducted between 0600 and 1800 hours, but may be expected over the full twenty four (24) hours.

9.9 ACP locks operations, repair works or maintenance, ACP dredging, drilling and blasting operations, vessels bunkering and under repairs, industrial diving and/or other port operations (not directly related to movement of vessels to and from the ports) in the vicinity of the working area could restrict manoeuvres, positioning and performance of Concessionaire's dredging activities. The Concessionaire shall maintain continued communication with ports to minimize delays to its operation and possible impact on port activities. If delays occur due to these restrictions, the ACP shall not accept claims for the hours lost. The Concessionaire shall notify the Contracting Officer of this coordination, its results and the effects on the works.

9.10 The Table of Operating Restrictions takes into account possible traffic behaviour and work site conditions, but the characteristics, conditions, capabilities and operative requirements of the Concessionaire's equipment are not included. The Concessionaire shall assess canal operations and site conditions to determine the equipment needed to accomplish the work under the restrictions indicated in this Agreement and shall take measures to reduce the possible need for additional requirements or operational restrictions.
9.11 The ACP port captain and the Contracting Officer may review the limitations indicated in the Table of Operating Restrictions depending on the progress of the project and the prevailing traffic conditions.

9.12 If the Concessionaire's floating equipment needs to drop its anchor, it shall make the effort not to drop it out on finished sector, otherwise, a survey work shall be performed by the Concessionaire to verify that this does not create a critical shoal in navigation channel or affect the available depth within the basin. This information shall be submitted for Contracting Officer evaluation.

9.13 The Concessionaire's floating equipment shall be capable of safely operating under the traffic conditions, rivers outflow, the wash and wake from tugs and launches manoeuvring and the suction effect from transiting vessels.

9.14 If the Concessionaire needs to navigate or use the recently widened areas of the navigational channel, or the south approach channel to the third set of locks, permission shall be requested for evaluation and approval of the port captain and the involved project managers through the Contracting Officer. Areas provided for this purpose shall not be altered and no delays incurred by the Concessionaire shall be considered grounds for compensation.

9.15 If the Concessionaire's floating equipment needs to drop its anchor in the abovementioned location of widened areas and the south approach channel to the third set of locks, the Concessionaire shall perform survey work to verify that this does not create a critical shoal in the navigation channel or affect the available depth within the basin. This information shall be submitted for Contracting Officer evaluation and to determine actions to be taken.

10. Table of Operating Restrictions

10.1 The following table shows the traffic scenarios or windows for the project and other areas.

<table>
<thead>
<tr>
<th>Table of Operating Restrictions</th>
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<tbody>
<tr>
<td>Pacific Entrance Channels and access to New Locks</td>
</tr>
<tr>
<td>From Station</td>
</tr>
<tr>
<td>8P+500</td>
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<tr>
<td>68K+410</td>
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</table>
### Table of Operating Restrictions

**Pacific Entrance Channels and access to New Locks**

<table>
<thead>
<tr>
<th>From Station</th>
<th>To Station</th>
<th>Hours</th>
<th>Condition</th>
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<tbody>
<tr>
<td>0300 TO 1030</td>
<td>1500 TO 1700</td>
<td>2200 TO 2400</td>
<td>ONE WAY TRAFFIC</td>
</tr>
<tr>
<td>1030 TO 1500</td>
<td>(11.5 HOURS)</td>
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<td></td>
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<tr>
<td>0000 TO 0230</td>
<td>1730 TO 2230</td>
<td>(7.5 HOURS)</td>
<td>TWO WAY TRAFFIC</td>
</tr>
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<td>0230 TO 1000</td>
<td>1530 TO 1730</td>
<td>2230 TO 2400</td>
<td>ONE WAY TRAFFIC</td>
</tr>
<tr>
<td>1000 TO 1530</td>
<td>(5.5 HOURS)</td>
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<td></td>
</tr>
<tr>
<td>82K+000</td>
<td>84K+250</td>
<td>0000 TO 2400</td>
<td>TWO WAY TRAFFIC</td>
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<tr>
<td>(24 HOURS)</td>
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**Notes concerning the Table of Operating Restrictions:**

(i) The information on this table should only be used as a reference, since the traffic conditions vary from day to day. When Neopanamax ships increase in transits and the rules and operational restrictions are adjusted or changed, the windows will also vary. This table does not include port movements as these cannot be predicted.
(ii) Stations and hours are estimated and are subject to changes due to variations in market, port improvements, canal activities and weather conditions. Therefore, windows could change at their starting and ending times and in the total available hours during the day.

(iii) Traffic conditions indicated in the table refer to scheduled canal traffic.

(iv) Trailing suction hopper dredges (TSHDs) are authorized to operate twenty four (24) hours a day, provided that there is close coordination with pilots on board and marine-traffic control personnel, and manoeuvring from ACP pilots shall be required to accommodate the dredge under special traffic conditions. The ACP guarantees availability for eighty per cent (80%) of the times indicated on the table. The Concessionaire shall, therefore, take into account that twenty per cent (20%) of the indicated times shall not be available for performing work.

(v) Exceptions to windows and restrictions shall be evaluated, approved and coordinated with the port captain through the Contracting Officer. Execution shall be coordinated with pilots and marine-traffic control personnel after receiving notification from the Contracting Officer.

(vi) During the "NO TRAFFIC" windows in the existing navigational channel, the Concessionaire may expect some traffic from and to the near docks and ports. Close coordination with ACP pilots on board and marine-traffic control personnel shall be maintained at all times.]
APPENDIX 6
SOCIAL FUND

The Concessionaire shall establish the Social Fund for the purpose of funding social projects for the benefit of the communities surrounding the Concession Area, in accordance with clause 8.9(d) at Diablo, Los Ríos, Corozal and Cardenas.

1. Social Fund Amount

1.1 This Social Fund shall be a fixed amount of one per cent (1%) of the total estimated investment required for the construction of the Corozal Container Terminal, which is estimated at seven hundred million US Dollars (US$700,000,000.00).

1.2 The Concessionaire shall contribute the following amounts to establish the Social Fund: seven million US Dollars (US$7,000,000.00).

2. Contribution Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount</th>
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<tr>
<td>Four (4) months after the Award Date</td>
<td>US$3,000,000.00</td>
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<tr>
<td>Three (3) years after the Award Date</td>
<td>US$2,000,000.00</td>
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<tr>
<td>Five (5) years after the Award Date</td>
<td>US$2,000,000.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>US$7,000,000.00</strong></td>
</tr>
</tbody>
</table>

3. Administration of the Social Fund

3.1 A third party social fund manager will be hired by the Concessionaire within thirty (30) days of the date of execution of the Execution Version as stated in paragraph 11.3 of the RFP.

3.2 The responsibilities of this third party social fund manager will be:

(a) act as the Social Fund Manager;

(b) the preparation of the terms of reference for the selected projects, project evaluation, project bidding and supervision of its execution;

(c) establishing appropriate mechanisms for transparency, control and accountability of the Social Fund funds.

4. Social Fund Manager selection

4.1 The Concessionaire will select the entity to be the Social Fund Manager according to the following criteria:
(a) it must be a non-governmental organization, international organization or foundation;
(b) it must be established in the Republic of Panama for ten (10) years or more;
(c) it must have ten (10) years or more experience in the selection, administration, tendering, implementation and monitoring of projects that contribute to improve the standards of life of the surrounding communities;
(d) it must have established mechanisms and procedures of control, transparency, and accountability; and
(e) it must be able to demonstrate that it staff is composed of professionals in different areas of project management and fund administration.

4.2 The amount charged by the Social Fund Manager may not be greater than ten per cent (10%) of the funds managed.

4.3 The ACP must approve the administrative entity selected by the Concessionaire, based on the above-mentioned criteria.

5. Evaluation Committee

5.1 An Evaluation Committee will be established to evaluate and select the project proposals to be developed.

5.2 The Evaluation Committee will be composed of:

(a) a representative of the ACP;
(b) a representative of the Concessionaire; and
(c) a representative of the communities (chosen by a majority of the residents).

Note: The membership of each representative in the Evaluation Committee is for 3 years.

6. Project proposals

6.1 The types of social and environmental projects to be developed by the Social Fund are:

(a) community infrastructure, community beautification, maintenance of sports and recreational green areas, and establishment of public areas;
(b) projects, events and health competitions, environmental education and sustainable development;
(c) local activities and sports and cultural events;
(d) other projects aligned with environmental management and social development of the communities in the area.
6.2 The project proposal presentation procedure is as follows:

(a) the following organizations can present project proposals to the Evaluation Committee:

(i) organizations formed by community residents of the nearby communities with legal status;

(ii) community-based organizations (CBO's) or non-governmental organizations based in the communities of Diablo, Los Ríos, Corozal and Cárdenas (NGOs) with legal status; and

(iii) schools of the communities indicated;

(b) the deadline for submitting proposals shall be within the first three (3) months for each calendar year; and

(c) submitted project proposals must have twenty five per cent (25%) of signatures of residents of the concerned community, according to the Population and Housing Census of 2010 or the last census.

6.3 The Social Fund Manager will establish a procedure and forms for submitting proposals, disbursement of funds and implementation of social and environmental projects. The project proposals shall include or contemplate, at least, the following:

(a) a project summary;

(b) the project objectives;

(c) the project beneficiaries;

(d) the expected results;

(e) a description of activities;

(f) a schedule and implementation plan;

(g) the level of contribution and participation of the community;

(h) a budget;

(i) details for the delivery of reports;

(j) administrator tracking and monitoring to ensure implementation; and

(k) delivery and maintenance of the project disclosure of the submission process, selection and implementation of projects.

6.4 The Social Fund Manager, along with the Concessionaire's Office of Community Relations, will be responsible for communicating the process of submission, selection and implementation of the projects submitted to the Evaluation Committee for the acknowledgement of the communities...
surrounding the Concession Area. The ACP will assist in the communication through the available media.

7. **Concessionaire's Office of Community Relations**

7.1 In order to continue the process of community participation that was launched and included as part of the Environmental Impact Study, the Concessionaire shall establish Office of Community Relations. This office shall be located within the surrounding communities.

7.2 The Office of Community Relations shall have a person in charge of receiving and handling any communication with community representatives and of ensuring that their concerns are passed on to the appropriate responsible parties for resolution. The person in charge of the Office of Community Relations shall be a social worker or a sociologist. Any complaint, concern, request, or comment from the community shall be recorded, reported and handled promptly.

7.3 Any calls or visits shall be recorded in a communications log. A weekly report on the follow-up requests or grievances shall be prepared and submitted by the person in charge of the Office of Community Relations to the Social Fund Manager. This follow-up report shall clearly state whether the concern was already handled and resolved, what corrective actions were taken or are ongoing, or why the problem could not be resolved and the conditions that would facilitate a solution.

7.4 The Concessionaire's Office of Community Relations in coordination with the Social Fund Manager will be responsible for the implementation of the Social Fund. A monthly report on the follow-up of the Social Fund implementation shall be prepared and submitted by the person in charge of the Office of Community Relations to the ACP. A monthly report on the follow-up of the Social Fund implementation shall be prepared and submitted by the person in charge of the Office of Community Relations to the ACP.
APPENDIX 7
GUARANTEED ANNUAL CONTAINER MOVEMENTS

<table>
<thead>
<tr>
<th>Operating Year</th>
<th>Guaranteed Annual Container Movements(^7) (subject to adjustment as set out below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Operating Year</td>
<td>[●] ([●]) Container Movements</td>
</tr>
<tr>
<td>Second Operating Year</td>
<td>[●] ([●]) Container Movements</td>
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<tr>
<td>Third Operating Year</td>
<td>[●] ([●]) Container Movements</td>
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<tr>
<td>Fourth Operating Year</td>
<td>[●] ([●]) Container Movements</td>
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<tr>
<td>Fifth Operating Year</td>
<td>[●] ([●]) Container Movements</td>
</tr>
<tr>
<td>Sixth Operating Year and each Operating Year thereafter until Ninth Operating Year</td>
<td>[●] ([●]) Container Movements</td>
</tr>
<tr>
<td>Tenth Operating Year and each Operating Year thereafter until Thirteenth Operating Year</td>
<td>[●] ([●]) Container Movements</td>
</tr>
<tr>
<td>Fourteenth Operating Year and each Operating Year thereafter until the Termination Date</td>
<td>[●] ([●]) Container Movements</td>
</tr>
</tbody>
</table>

Adjustments to the Guaranteed Annual Container Movements (and Fees):

1. If the First Operations Date is a day other than 1 January, the Guaranteed Annual Container Movements (and accordingly the Guaranteed Annual Container Movements Fees) for the First Operating Year shall be adjusted on a pro rata basis to take account of the number of days from the First Operations Date to end of the First Operating Year.

2. If a Force Majeure Event occurs and the Concessionaire is the Affected Party, the Guaranteed Annual Container Movements (and accordingly the Guaranteed Annual Container Movements Fees) for each Operating Year during which the Force Majeure Event subsists shall, to the extent that it prevents or hinders the Concessionaire from completing Container Movements, and provided that the Concessionaire has complied with its obligations under clause 9.1, be reduced on a pro rata basis to take account of the period during which the Force Majeure Event subsisted in that Operating Year.

3. If the Termination Date is a day other than 31 December, the Guaranteed Annual Container Movements (and accordingly the Guaranteed Annual Container Movements Fees) for the Final

\(^7\) [To be completed on the basis of the Awardee's Binding Offer.]
Operating Year shall be adjusted on a pro rata basis to take account of the number of days in the Final Operating Year.
APPENDIX 8
FORM OF PAYMENT BOND

IMPORTANT NOTE: Each Payment Bond must be accompanied by an authenticated copy of the power of attorney (or equivalent) stating that the person executing such Payment Bond has been duly authorized by the institution issuing such Payment Bond to execute the same. For this purpose "authenticated" has the meaning given to it in the RFQ.

AUTORIDAD DEL CANAL DE PANAMÁ
FIANZA DE PAGO

<table>
<thead>
<tr>
<th>Número de Fianza:</th>
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<td>[Concesionario] (EL CONCESIONARIO):</td>
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<td>Cantidad de la Fianza:</td>
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<td>Contrato No. (EL CONTRATO):</td>
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Conste por el presente documento que LA FIADORA y COFIADORAS (de darse el caso) suscritas a continuación, por este medio le garantiza(n) a las personas que hayan prestado servicios de mano de obra a EL CONCESIONARIO, lo que incluye también a contratistas, subcontratistas, agentes y/o cualquier entidad contratada para proveer mano de obra al CONCESIONARIO, que recibirán las sumas que éste les adeude, no pagadas, en concepto de mano de obra prestada al CONCESIONARIO durante el diseño, construcción y operación de un puerto de trasbordo de contenedores en el área de Corozal Oeste conforme se señala en EL CONTRATO.

Por lo tanto, en caso de que EL CONCESIONARIO incumpla con el pago por servicios de mano de obra prestada en la ejecución de EL CONTRATO, LA FIADORA y COFIADORA(S) estará(n) obligada(s) a cumplirlo, de conformidad con los siguientes términos y condiciones:

1. LA FIADORA y COFIADORA(S) garantizan a LA AUTORIDAD que las personas que hayan prestado servicios de mano de obra a EL CONCESIONARIO, o según lo aquí descrito, recibirán las sumas que éste les adeude, no pagadas, prestadas en cumplimiento del objeto de EL CONTRATO.

2. LA FIADORA y COFIADORA(S) renuncian a la notificación por parte de LA AUTORIDAD de las modificaciones a EL CONTRATO, siempre y cuando estas no varíen de manera sustancial el objeto del mismo.

3. A los trabajadores se les pagará las sumas que EL CONCESIONARIO les adeude por prestaciones obrero-patronales (empleado-empleador) provenientes de servicios prestados bajo EL CONTRATO. En todo caso el pago de las prestaciones está también limitado a:

   (a) Vacaciones y decimotercer mes proporcionales.
(b) No más de los salarios dejados de pagar por EL CONCESIONARIO, por el tiempo trabajando para EL CONCESIONARIO en la ejecución del CONTRATO.

(c) Cuotas empleado-empleador, recargos e intereses adeudados por EL CONCESIONARIO a la Caja del Seguro Social por razón de los trabajadores contratados para la ejecución de EL CONTRATO.

(d) La suma retenida por concepto de Impuesto Sobre la Renta y Seguro Educativo correspondiente a los salarios devengados por la mano de obra de EL CONCESIONARIO en la ejecución del CONTRATO.

(e) Cualquier otra prestación o aporte laboral establecido en la Ley, que se le adeude a la mano de obra por razón de la ejecución del CONTRATO.

(f) Para calcular el monto a pagar en los renglones anteriores, se considerará únicamente los servicios prestados durante el tiempo que la persona trabajó directamente en la ejecución por parte de EL CONCESIONARIO del CONTRATO.

4. En caso de suscribirse una o más COFIADORA(S) para garantizar los pagos detallados en esta fianza, estas serán responsables con LA FIADORA por dichos pagos hasta el monto y en la proporción asumida por cada una.

5. Esta fianza permanecerá vigente hasta 180 días después de la fecha de la terminación del CONTRATO, y después de que se haya anunciado por EL CONCESIONARIO por tres (3) veces consecutivas en un diario de circulación nacional, sobre la terminación del CONTRATO.

6. Quien tenga reclamos pendientes contra EL CONCESIONARIO por servicios de mano de obra prestados, según lo descrito en esta Fianza de Pago, deberá presentarlos en cualquier momento durante la ejecución del CONTRATO, luego de culminada la relación laboral con el CONCESIONARIO, o hasta los ciento ochenta (180) días siguientes a la fecha de la última publicación de comunicación de la terminación del CONTRATO.

7. Toda reclamación o demanda proveniente de, o relacionada con, esta fianza, deberá entablarse por las personas que hayan prestado servicios de mano de obra a EL CONCESIONARIO en contra de EL CONCESIONARIO conjuntamente con LA FIADORA y COFIADORA(S). Para estos efectos, LA AUTORIDAD suministrará, a requerimiento, copias de la presente fianza a las personas que hayan prestado servicios de mano de obra a EL CONCESIONARIO.

8. Queda expresamente estipulado que en ningún caso, LA FIADORA y COFIADORA(S) estará(n) obligada(s) a pagar sumas que EL CONCESIONARIO adeude a terceros por razón de préstamos, suministros de materiales, insumos o equipos y/o servicios de consultoría u honorarios profesionales.

9. LA FIADORA y COFIADORA(S) pagará(n) las sumas correspondientes a la mano de obra hasta el monto máximo afianzado aquí constituido. En el caso de que las deudas por mano de obra reclamadas superasen el importe de la fianza, entonces los créditos por mano de obra serán pagados a prorrata.
10. En caso de que hubieren contratistas, subcontratistas, agentes y/o cualquier entidad con créditos pendientes contra EL CONCESIONARIO por razón de subcontratos inherentes a la ejecución del CONTRATO, a éstos se les pagará el importe de la mano de obra suministrada y no pagados, utilizados en la ejecución del CONTRATO. En todo caso, el monto reclamado no podrá exceder el saldo del subcontrato adeudado por EL CONTRATISTA.

11. LA FIADORA Y COFIADORA(S) harán los pagos bajo esta fianza después de presentados los comprobantes, planillas y demás elementos de prueba que establezcan que la mano de obra fue prestada y no pagados por el CONCESIONARIO.

En fe de lo cual, se suscribe esta Fianza en la ciudad de Panamá, en la fecha indicada en la cabecera de este documento.

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APPENDIX 9
FORM OF PERFORMANCE GUARANTEE

IMPORTANT NOTE: Each Terminal Construction Performance Guarantee or Terminal Operations Performance Guarantee must be accompanied by an authenticated copy of the power of attorney (or equivalent) stating that the person executing such Terminal Construction Performance Guarantee or Terminal Operations Performance Guarantee (as the case may be) has been duly authorized by the institution issuing the Terminal Construction Performance Guarantee or Terminal Operations Performance Guarantee (as the case may be) to execute the same. For this purpose "authenticated" has the meaning given to it in the RFQ.

AUTORIDAD DEL CANAL DE PANAMÁ
División de Administración de Proyectos de Construcción
Building 732, Ancón, Corozal Oeste
Panama, Republic of Panama

Dear Sirs,

On demand guarantee No: [NUMBER] dated [DATE]

1. We understand that you have entered into a Concession Agreement in relation to the Corozal Container Terminal (the "Concession Agreement") with [NAME AND ADDRESS OF THE CONCESSIONNAIRE] (the "Concessionaire") and that under the Concession Agreement the Concessionaire is required to procure an on demand guarantee for [STATE AMOUNT] in respect of the Concessionaire's performance of the Concession Agreement.

2. In consideration of your entering into the Concession Agreement and for other good and valuable consideration, receipt and sufficiency acknowledged, we [NAME AND ADDRESS OF BANK] irrevocably and unconditionally promise to pay, as primary obligor, to you on your first written demand an amount or amounts not exceeding in aggregate [MAXIMUM AMOUNT OF GUARANTEE] (the "Maximum") provided that your demand complies with the provisions of clause 4.

3. This on demand guarantee shall expire at [●] pm ([●] time) on [DATE] ("Expiry").

4. Your demand under this on demand guarantee must be received by us before Expiry and must state:

4.1 that the Concessionaire has failed to perform the Concession Agreement in accordance with its terms and conditions;

4.2 that as a result of such failure, the amount claimed is due to you; and
4.3 the amount claimed.

5. We agree that any demand or other notice or communication under this on demand guarantee may be, and will be effectively given to us if sent to:

5.1 [ADDRESS] or such other address as we may advise to you on not less than 30 days notice; or

5.2 if the address referred to in clause 5.1 is not (or reasonably appears to you not to be) currently occupied by us, to our registered or principal office from time to time, or any other place occupied by us,

and may be sent by mail by a delivery service providing proof of delivery (in which case it shall be deemed as having been received at the time recorded by the post office or other delivery service) or by hand (in which case it shall be deemed as having been received at the time of actual delivery).

6. We will make all payments hereunder:

6.1 to such account as you nominate in writing;

6.2 by telegraphic transfer in freely transferable United States Dollars;

6.3 without deduction, withholding, set-off or counterclaim on any account whatsoever, including (without limitation) for any present or future taxes, or for bank or other charges.

7. Subject to the Maximum, you may make more than one demand under this on demand guarantee.

8. On Expiry, whether returned to us for cancellation or not, this on demand guarantee shall become null and void, except in relation to any demand properly made on us before Expiry. Any demand received after Expiry shall be ineffective.

9. Our obligations under this on demand guarantee are primary, and independent of the relationship between you and the Concessionaire, and of any obligations owed between you and it, and are not subject to any claim, objection or defence, whether arising from the relationship between you and the Concessionaire, or otherwise, and are not conditional on the occurrence of any default by the Concessionaire.

10. This on demand guarantee is assignable by you.

11. Any waiver by you of the terms of this on demand guarantee or any consent or approval given by you shall only be effective if given in writing and then only for the purpose and upon the terms and conditions, if any, on which it is given.

12. This on demand guarantee and any dispute or claim arising out of or in connection with it or its subject matter or formation (including non-contractual disputes or claims) shall be governed by and construed in accordance with the laws of the Republic of Panama.

13. We irrevocably agree that the courts of the Republic of Panama shall have exclusive jurisdiction to settle any dispute or claim arising out of or in connection with this on demand guarantee or its
subject matter or formation (including non-contractual disputes or claims). However, you are also entitled to bring proceedings (whether concurrently or not) in relation to this on demand guarantee in the courts of any other place where jurisdiction may exist or be established.

14. In respect of any proceedings under this on demand guarantee, we hereby irrevocably waive any right of immunity (whether sovereign or state or otherwise) which we or our assets now have or may hereafter acquire and we hereby consent generally in respect of any proceedings under this on demand guarantee to the giving of any relief, or the issue of any process in connection with such proceedings, including, without limitation, enforcement or execution or attachment against any of our assets whatsoever.

In witness of which we have executed and delivered this on demand guarantee on the date first written above.

Signed on behalf of [NAME OF BANK], a bank company incorporated in [TERRITORY], duly established and operating in the Republic of Panama with valid general license [NUMBER] issued by the Superintendence of Banks of the Republic of Panama (by [NAME[S] OF PERSON SIGNING], being [a] person[s] who is acting under the authority of the bank company

Authorised signatory