

PANAMA CANAL AUTHORITY		VARIATION	PAGE 1 OF 3
1. REQUEST FOR PROPOSAL No.:	2. CONTRACT No.:	3. DATE:	
RFP-76161	CMC-221427	August 30, 2011	
		4. VARIATION No.:	
		18	

5. ISSUED BY:

PANAMA CANAL AUTHORITY
Employer's Representative
Locks Project Management Division
Building 740, Corozal
Panama, Republic of Panama

6. NAME AND ADDRESS OF CONTRACTOR (INCLUDE PHYSICAL & POSTAL ADDRESS)	7. CONTRACTOR'S TELEPHONE NUMBER:
Grupo Unidos por el Canal, S.A. Brujas Road, Building 22B, Cocoli Panama, Republic of Panama	507-316-9900
	8. CONTRACTOR'S FACSIMILE NUMBER:

9. VARIATION:

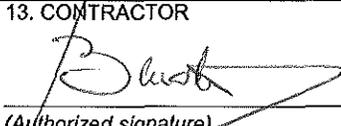
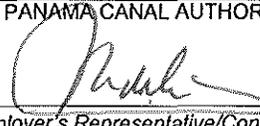
- The contract referred to in item No. 2 is hereby varied as set forth in item 10, entitled "DESCRIPTION OF VARIATION".
 YES. NO. The contractor shall send a copy, duly signed, of this Variation to the Employer's Representative/Contracting Officer.

	9 A. THIS VARIATION IS EXECUTED ON THE BASIS OF: (Specify the legal authority). THE VARIATION DESCRIBED IN ITEM 10 IS HEREBY INCORPORATED AND MADE A PART OF THE CONTRACT.
	9 B. THE CONTRACT REFERRED TO IN ITEM NO. 2, IS VARIED TO INCORPORATE ADMINISTRATIVE CHANGES (such as the paying office, account numbers, etc.).
X	9 C. THIS BILATERAL AGREEMENT IS SIGNED AND INCORPORATED INTO THE CONTRACT REFERRED TO IN ITEM NO. 2 OF THIS FORM, ON THE BASIS OF: (Specify the legal authority) Volume III, Conditions of Contract , Sub-Clause 1.16 [Entire Agreement], 4 th Paragraph
	9 D. OTHER. (Specify manner and the legal authority).
	9 E. ACCOUNT NUMBER (If required):

10. DESCRIPTION OF THE VARIATION (List in accordance with the order of the Contract. If additional space is required, use blank sheets).

See attached

Except for the variation(s) herein specified, all other terms and conditions of the Contract remain unchanged.

11. NAME AND TITLE OF THE PERSON AUTHORIZED TO SIGN (Type or print)	12. NAME AND TITLE OF THE EMPLOYER'S REPRESENTATIVE/CONTRACTING OFFICER (Type or print)		
Bernardo Gonzalez Contractor's Representative	Jorge de la Guardia, Employer's Representative		
13. CONTRACTOR	14. DATE:	15. PANAMA CANAL AUTHORITY	16. DATE:
 (Authorized signature)		 (Employer's Representative/Contracting Officer's signature)	30/VIII/2011

14/10/2011

This Variation No. 18 is issued to supplement Paragraph 1.04 [Design Criteria/System Description and Performance] of Section 03 30 00 [Concrete] of the Employer's Requirements.

The modification introduced in Variation 18 amounts to a voluntary modification by the Employer to enable the Contractor to begin producing and placing concrete while still developing Mix Designs for Structural Marine Concrete, and is made entirely without prejudice to the Employer's right to demand compliance with the Contract, and without prejudice to its rights to do so in all respects going forward.

Add the following Paragraph 1.04 D to Section 03 30 00 of the Employer's Requirements:

D. Special Concrete Types: *This Subparagraph covers the requirements for Structural Marine Concrete for Upper Chamber Floor Slabs in the locations shown in Attachments 2.1, 2.2, 2.3, 2.4 and 2.5, transmitted with the Contractor's Letter GUPC-IAE-0834. Concrete for Crossunders, in the same locations, which will be fully encased in lean concrete or structural marine concrete, is not required to meet the requirements of Structural Marine Concrete.*

1. *The concrete shall have a design life of 100 years, as demonstrated by acceptable modeling.*
2. *The concrete shall conform to recommendations of ACI 201.2R and ACI 222.R. Mass concrete shall conform to recommendations of ACI 207.1R. Use low heat and sulphate resisting concrete mixtures where required.*
3. *(Reserved)*
4. *The use of fly ash or ground granulated blast-furnace slag in the mixture is encouraged. Consideration shall be given to heat dissipation, permeability, setting time, strength gain, curing time, especially for mass concrete placements.*
5. *NOT USED*
6. *Minimum concrete cover at reinforcing bars shall be 75 mm at marine concrete structures unless approved by the Employer's Representative.*
7. **Required characteristics of concrete mixtures:**

<i>Minimum compressive strength based on cylinder tests</i>	<i>as required by design</i>
<i>Maximum water-cementitious materials ratio</i>	<i>0.40</i>
<i>Permeability, maximum total charge passed per ASTM C 1202</i>	<i>3,000 Coulombs</i>



- a. *The mixture proportions shall be developed by the Contractor to produce the design strength and durability required, and to provide durability, workability, and mixture consistency to facilitate placement and consolidation into the forms and around reinforcement, without segregation or bleeding.*
- b. *Permeability testing shall be in accordance with ASTM C1202. Perform tests on five samples and report the average passed charge. Discard any tests that vary from the average by more than 30 percent and recalculate the average of the remaining tests.*
- c. *Concrete shrinkage shall be tested in accordance with ASTM C 157 unless otherwise approved and substantiated by the Project Designer, the average shrinkage of three test specimens after 28 days of air storage shall not exceed 0.042 percent relative to the initial comparator reading.*
- d. *For mass concrete placements, the internal and external concrete temperatures shall be monitored and the maximum difference between them at any point in time shall not exceed 20-degrees Celsius (36-degrees Fahrenheit) and the maximum internal temperature of the concrete shall not exceed 70-degrees Celsius (160-degrees Fahrenheit). Also the temperature difference between the outside of the concrete and the adjacent air temperature shall not exceed 20-degrees Celsius (36-degrees Fahrenheit). Concrete constituents shall be cooled and ice shall be used in accordance with industry standards as needed to control heat at mass concrete placements. A request for consideration of alternate temperature limits may be made based upon submittal of detailed thermal analyses in accordance with ACI 207.1R.*
- e. *Maximize aggregate size for mass concrete placements. Coordinate reinforcement spacing with aggregate sizing.*

There is no time and/or cost impact to the Locks Contract as a result of Variation No. 18

A handwritten signature in black ink, appearing to be a stylized letter 'B' or similar, is written over the text of the variation.