

ALTO MAIPO**OWNER'S INSTRUCTION**
Section 2.29
PHAM-PLN12-INS-0003

Contract:	<input type="checkbox"/> AM-CO610/620B <input checked="" type="checkbox"/> AM-CO630/620A	SI 63401 N° 01066
Scope Segment Description:	PROBE HOLES 04021,7	Scope Segment ID: 3.4
Location:	VL4A-1 - Ch. 04021,7 Time for Compliance: Before next advance	

Contractor shall immediately proceed with the Work described below, in accordance with the terms and conditions of the Contract. This instruction is limited to maximum of 1000 UF or USD \$ 50,000., and without impact on the lump sums or schedule (except for Equivalent Times in the BOQ).

Instruction:

THE CONTRACTOR IS HERE INSTRUCTED TO CARRY OUT PROBE HOLES AT CH. 04021,7 OF VL4A-1 TUNNEL. DETAILS IN ATTACHMENT SHEET.

NOTES (AFTER DRILL THE PROBE HOLES):

1. IF TOTAL DISCHARGE \leq 4 L/s (FROM ALL PROBE HOLES); CONTINUE WITH NORMAL ADVANCE.

2. IF TOTAL DISCHARGE $>$ 4 L/s \leq 25 L/s; BUT APPLY GROUTING DUE TO PW; MEASURE AGAIN THE QW AND PW AFTER 1 HOUR WITH THE PACKER OPEN (DURING THAT TIME); AND CONFIRM THE RESULTS TO APPLY GROUTING.

Owner estimate of impact is: Per Units in BOQ ☒ ; or cost ; &/or Time

If Contractor believes that this instruction constitutes a Change, Contractor shall promptly provide Notice according to Section 11 of the Contract.

Contractor comments (if any):

Subjected to further comments

Issued by		Received by Contractor	
Name:	RICARDO RUBIES	Name:	Carlos Gordo
Sign:		Sign:	
Designation:	ING. GEOLOGIST	Designation:	Geologist
Date:	25-08-16	Date:	25-8-2016
Time:	00:30	Time:	04:00

(original): Contractor

Grouting Instruction VL4A-1 FIRST GROUT FAN

Tunnel	VL4A-1 (W=9,5 - H=7,3 m)
Instruction N°	General instruction 572

Instructed by:	Ricard Rúbies
Instruction date:	25-08-2016

Chainage	0+021,7
Total Inflow face (L/s)	4,5
Total Inflow Probe holes (L/s)	3,5
Water pressure measured (Bar)	7,8

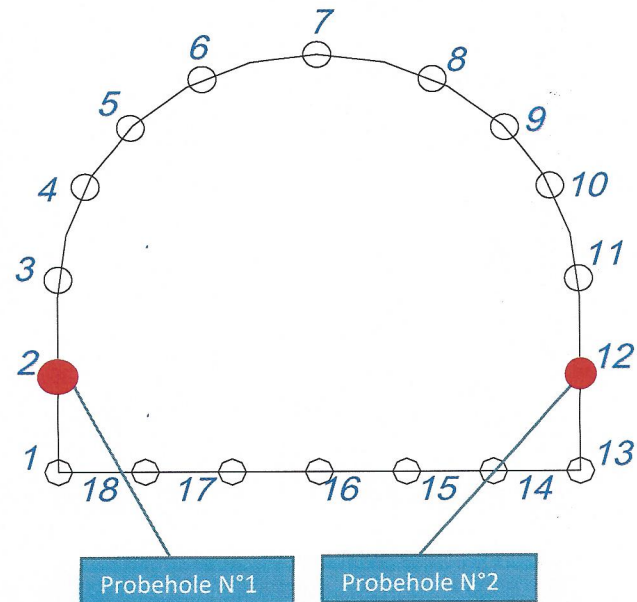
Mark additional holes with x and number

1-DRILL PROBEHOLES:
DRILL PROBEHOLES IN POSITIONS OF GROUTING CURTAIN FOLLOWING THE GUIDELINES OF GENERAL SI N°572. GROUT ALL PROBEHOLES AS STANDARD GROUTING.

2- DRILL HOLES UNDER COMPLETE THE COMPLETE CURTAIN (18 HOLES) AND THEN GROUT:

DRILL THE HOLES AND INSTALL THE PACKERS. DRILL TO FULL LENGTH (IF $Q_w < 10 \text{ L/s}$), OTHERWISE DRILL TO END OF RESPECTIVE ROD. MEASURE WATER INFLOW AND PRESSURE IN EVERY DRILLED HOLE.

3- GROUT ALL HOLES AS INDICATED BELOW AND IN "NOTES".

**NOTES:**

- 1- The maximum increase of grouting pressure shall be not more than 2,5 Bar per minute.
- 2- Use pump rate of 10 L/min for hole filling (=4 l grout per meter). Increase pump rate afterwards (to 25 L/min).
- 3- The volume closure criteria of 1000 Liters of grout shall apply if not significant pressure increase is observed (i.e. >3Bar).
- 4- Use anti wash-out additive (Sikament 100SC or equivalent).
- 5- After grouting of all holes redrilling can be conducted.

Design Mix (Type A,B,C, D or E)	A
WCR	0.45 if water inflow > 2.5 L/s 0.65 if water inflow < 2.5 L/s

Closure criteria

Pmax	25*
Vmax (l/m borehole)	85
GIN	1000

*IF GROUNDWATER PRESSURE IS HIGHER THAN 10 BAR THEN APPLY GROUT PRESSURE OF 2,5 TIMES GROUNDWATER PRESSURE

STRABAG

Carlos Gordo

Name

Signature

SAM

Ricard Rúbies

Name

Signature

⊗ Subjected to further comments