

Bijaya Adhikari

From: Parker, Jessica <jessica.parker@woodplc.com>
Sent: February 17, 2021 5:00 PM
To: Bijaya Adhikari; Mardy Semmler
Cc: Abbas, Riaz; Dean Smith (Arctic Allens); Kalashnikoff, Paul
Subject: Water Licence N5L1-1843 - Gunghi Creek Watercourse Crossing Replacement Notification of Modification
Attachments: Thermosyphon Drawing-IFC.pdf

Good Afternoon Bijaya and Mardy,

In accordance with condition 1 (a) of Part G of the Water Licence N5L1-1843 the licensee must notify the Board and the inspector in writing of proposed modifications to the planned project at least five (5) days prior to beginning the modifications. On behalf of the Government of the Northwest Territories (GNWT) please accept this email correspondence for notification of the inclusion/addition of Thermosyphon installation. The GNWT has confirmed a CO to include them effective February 12th,2021. The Contractor executed the CO and returned it to the GNWT the same day, however they have not yet received a signed copy in return. It is the Contractors intention to install thermosyphons, however the impact on the site is not expected to be different than is required for the drilling and installation of the pilings and arch structure itself. Please find attached design plans signed and stamped by an engineer.

It is understood as-built plans and drawings of the thermosyphons signed and stamped by an engineer referred to in the Water License are to be provided to the Board within ninety (90) days of the completion of the thermosyphons.

If you have any questions or require additional information, please contact the undersigned.

Regards,
Jessica

Jessica Parker, P.Biol., CPESC

Environmental Biologist / Erosion and Sediment Control Specialist

Wood Environment & Infrastructure Solutions

5681 – 70 Street, Edmonton, Alberta T6B 3P6

Direct: +1 (780) 377-3692

Mobile: +1 (780) 913-6594

jessica.parker@woodplc.com

www.woodplc.com

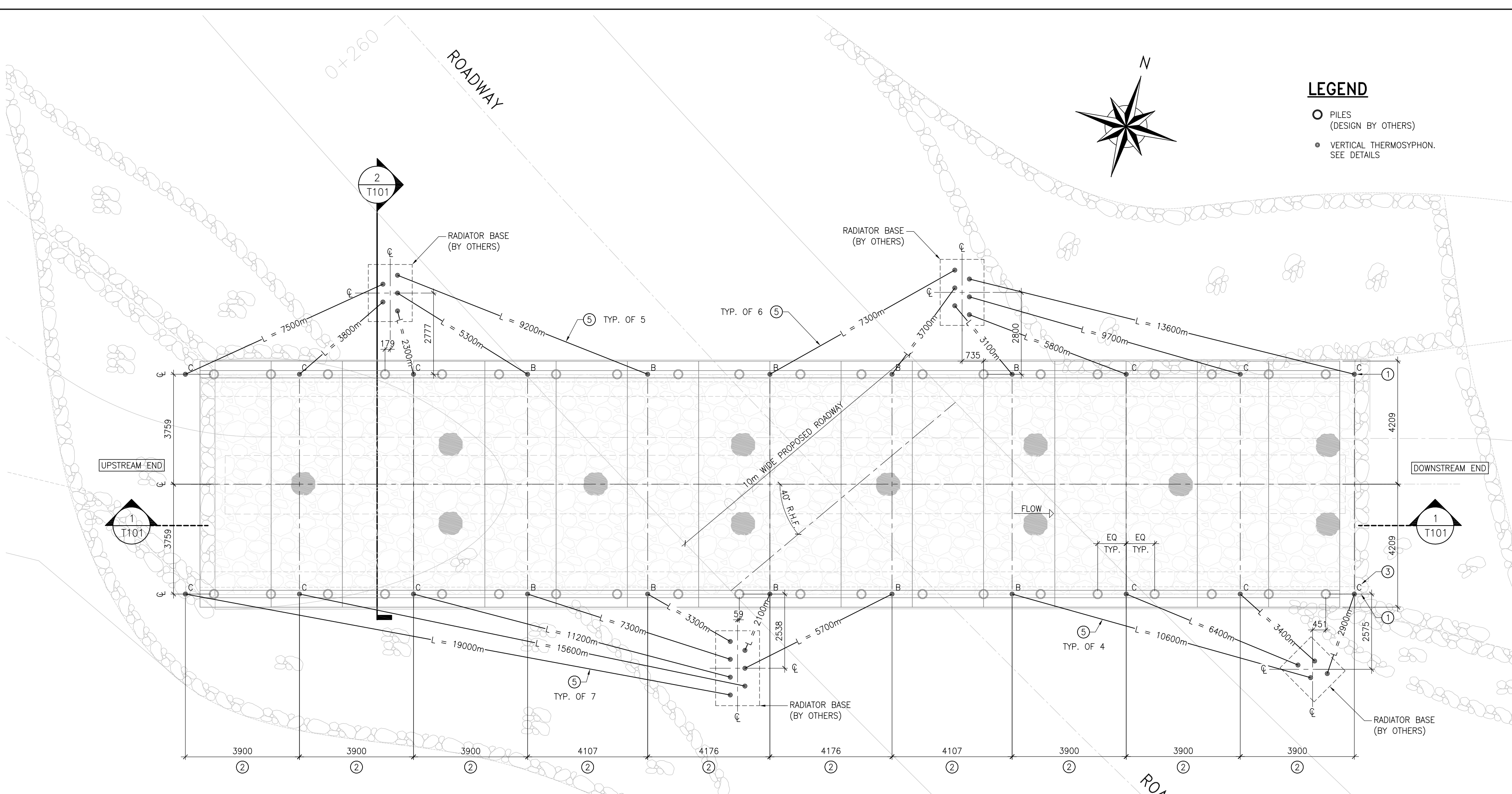
The logo for Wood, featuring the word "wood." in a bold, lowercase, sans-serif font. The "o" in "wood" is stylized with a horizontal line through it.

This message is the property of John Wood Group PLC and/or its subsidiaries and/or affiliates and is intended only for the named recipient(s). Its contents (including any attachments) may be confidential, legally privileged or otherwise protected from disclosure by law. Unauthorized use, copying, distribution or disclosure of any of it may be unlawful and is strictly prohibited. We assume no responsibility to persons other than the intended named recipient(s) and do not accept liability for any errors or omissions which are a result of email transmission. If you have received this message in error, please notify us immediately by reply email to the sender and confirm that the original message and any attachments and copies have been destroyed and deleted from your system.

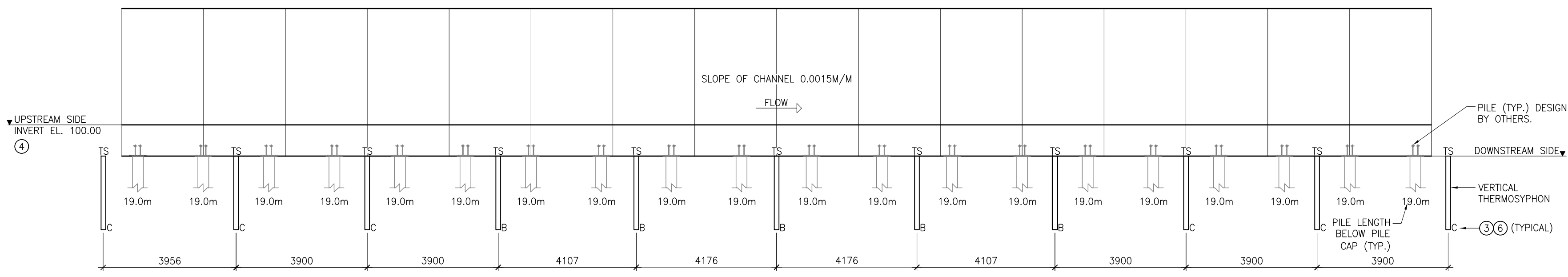
If you do not wish to receive future unsolicited commercial electronic messages from us, please forward this email to: unsubscribe@woodplc.com and include "Unsubscribe" in the subject line. If applicable, you will continue to receive invoices, project communications and similar factual, non-commercial electronic communications.

Please click <http://www.woodplc.com/email-disclaimer> for notices and company information in relation to emails originating in the UK, Italy or France.

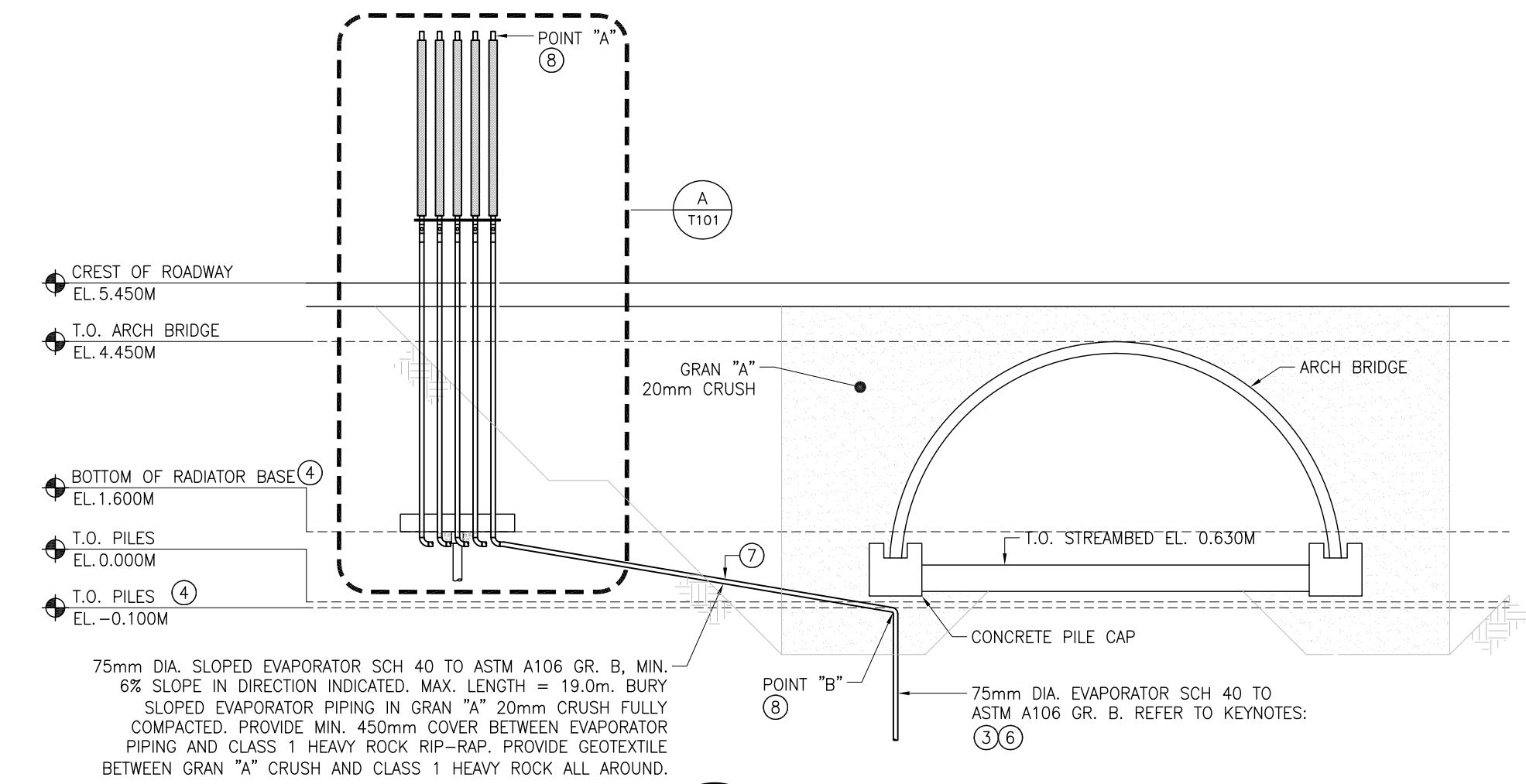
As a recipient of an email from a John Wood Group Plc company, your contact information will be on our systems and we may hold other personal data about you such as identification information, CVs, financial information and information contained in correspondence. For more information on our privacy practices and your data protection rights, please see our privacy notice at <https://www.woodplc.com/policies/privacy-notice>



A THERMOSYPHONS PLAN
T101
1:100

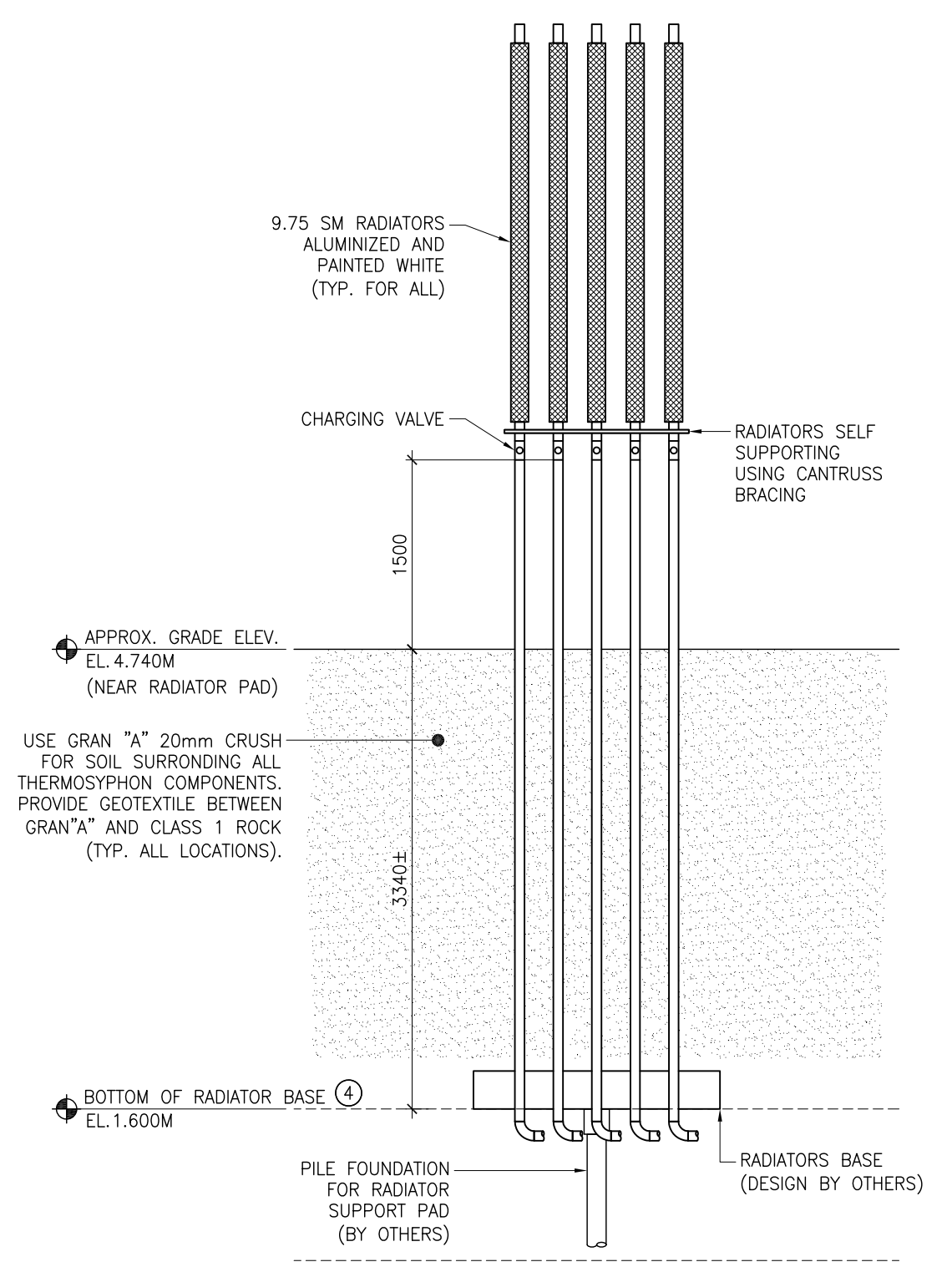


1 SECTION
T101
1:100

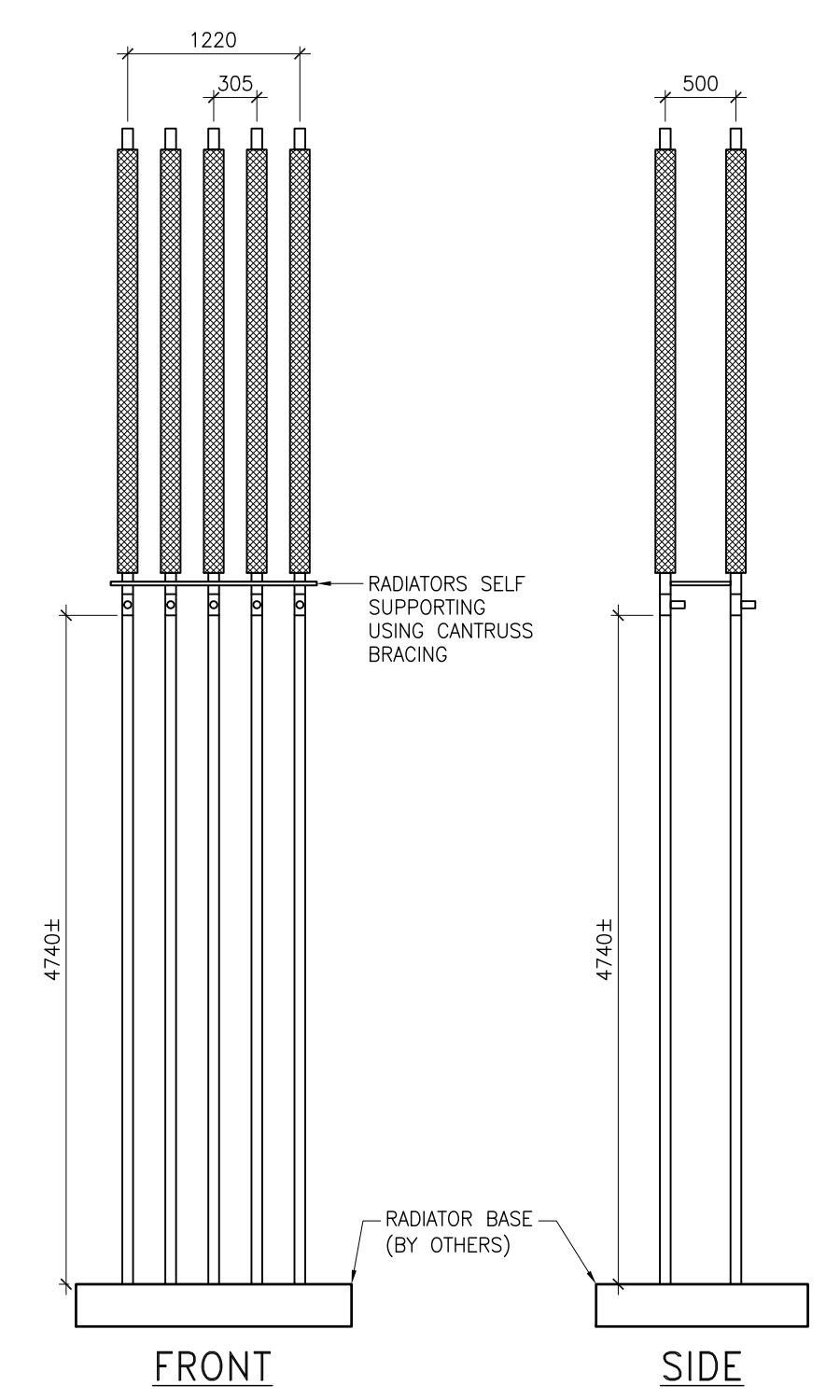


2 SECTION
T101
1:100

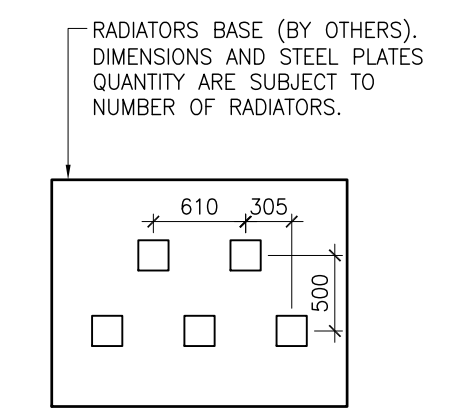
LEGEND
○ PILES (DESIGN BY OTHERS)
● VERTICAL THERMOSYPHON. SEE DETAILS



A RADIATORS FOR THERMOSYPHONS @ BRIDGE FOUNDATION
T101
1:50



B RADIATORS DETAIL TYP.
T101
1:50



C RADIATOR BASE TYPICAL DETAIL
T101
1:50

GENERAL NOTES:

- SCOPE OF WORK - TO IMPLEMENT THE THERMOSYPHON DESIGN AS IDENTIFIED IN THE KIGGIAK-EBA THERMAL ANALYSIS AND DESIGN RECOMMENDATIONS FOR ADDRESSING PILE FOUNDATION, GUNGHI CREEK, INUVIK-TUKTOYAKTUK HIGHWAY DATED DECEMBER 19, 2019. THE KIGGIAK-EBA REPORTED THAT THE DESIGN LIFE IS 75 YEARS FROM 2021. BASED ON EMAIL CORRESPONDENCE WITH KIGGIAK-EBA, ARCTIC FOUNDATIONS OF CANADA (ENCOMPASS INC.) AND ACHIEVE ENGINEERING HAVE BEEN AUTHORIZED TO USE THIS REPORT FOR DETAILED DESIGN PURPOSES.
- BASED ON JANUARY 26, 2021 EMAIL CORRESPONDENCE RECEIVED FROM ALLEN SERVICES AND CONTRACTING, TETRA TECH, DILLON CONSULTING, WOODS CONSULTING, GNWT ACKNOWLEDGE THAT THE PILES INSTALLED AND DESIGNED DO NOT MATCH THE PILE LENGTH AS IDENTIFIED IN THE KIGGIAK-EBA REPORT. ACHIEVE ENGINEERING AND ARCTIC FOUNDATIONS OF CANADA HAVE ADVISED ALLEN CONSULTING THAT WE STRONGLY RECOMMEND THE THERMAL ANALYSIS BE REVIEWED RELATIVE TO THE REVISED PILE LENGTH. THE EMAIL STATES THAT TETRA TECH, DILLON CONSULTING, WOODS CONSULTING, GNWT HAVE INSTRUCTED ARCTIC FOUNDATIONS TO DESIGN AND INSTALL THE THERMOSYPHONS AS NOTED IN THE DECEMBER 19, 2019 KIGGIAK-EBA REPORT. ACHIEVE ENGINEERING AND ARCTIC FOUNDATIONS ASSUME NO RESPONSIBILITY OR LIABILITY FOR THIS DECISION.
- SURROUND ALL BURIED THERMOSYPHON PIPING WITH "GRAN A 20-MM CRUSH". PROTECT ALL THERMOSYPHON PIPING FROM DAMAGE POTENTIALLY CAUSED BY HEAVY BouldERS AND ROCKS THROUGH THE LIFE OF THE PROJECT (TO THE YEAR 2070).
- THE PLACEMENT OF THE THERMOSYPHON RADIATOR BANKS IS SHOWN AS A SUGGESTION ONLY AND IS SUBJECT TO THE FINAL APPROVAL OF THE ROADWAY ENGINEER. THE DESIGN OF PROTECTION TO PEOPLE AND VEHICLES CAUSED BY POTENTIAL VEHICLE COLLISION WITH THE THERMOSYPHON RADIATOR BANKS IS BY OTHERS AND OUTSIDE OF ACHIEVE ENGINEERING'S SCOPE OF WORK. THE CLEARANCE BETWEEN THE EDGE OF THE ROADWAY AND THE FOUR RADIATOR BANKS IS TO BE CONFIRMED BY THE ROADWAY DESIGN ENGINEER.
- DESIGN OF RADIATORS BASE AND ASSOCIATED PILE FOUNDATION, SUPPORTING THE FOUR RADIATOR BANKS IS BY OTHERS.
- DESIGN OF RADIATOR BASE, STRUCTURAL AND THERMAL, BY OTHERS.

KEYNOTES:

- THERMOSYPHONS IN LINE WITH CENTERLINE OF PILES.
- INSTALL VERTICAL THERMOSYPHONS MIDWAY BETWEEN PILES. DISTANCE BETWEEN EACH THERMOSYPHON SHOWN ONLY FOR REFERENCE.
- THERMOSYPHON SCHEDULE

TYPE	LENGTH OF VERTICAL EVAPORATOR PIPE (BELOW EL. 0.000)	RADIATOR AREA	QTY.
B	18.0M	9.75m ²	10
C	11.0M	9.75m ²	12
- ELEVATION AT BOTTOM OF RADIATOR IS DETERMINED BASED ON TOP OF THERMOSYPHON EVAPORATOR ELEVATION, MAINTAINING MINIMUM 6R SLOPE, AND HORIZONTAL LENGTH OF SLOPED PIPE.
- LENGTH OF LATERAL PIPE IS PLAN VIEW AND DOES NOT CONSIDER ELEVATION CHANGE.
- THE VERTICAL PORTIONS OF THE EVAPORATOR PIPING MUST BE INSTALLED AS PER THE DECEMBER 19, 2019 KIGGIAK-EBA REPORT. THIS INCLUDES: THE PROCEDURES FOR DRILLING THE HOLE FOR INSTALLATION OF EACH VERTICAL THERMOSYPHON EVAPORATOR PIPE AND BACKFILLING THE ANNULUS BETWEEN THE HOLE WALL AND THE OUTSIDE SURFACE OF THE EVAPORATOR PIPE ARE SIMILAR TO THOSE FOR ADDRESSING PILES. THE HOLE SHOULD BE DRILLED TO A DIAMETER AT LEAST 100 MM LARGER THAN THE OUTSIDE DIAMETER OF THE EVAPORATOR PIPE. THE ANNULUS SHOULD BE PROPERLY FILLED WITH SATURATED GRANULAR BACKFILL SUCH THAT NO OPEN VOIDS IN THE ANNULUS EXIST. AS AN ALTERNATIVE, A GROUT MIXTURE CAN BE USED TO BACKFILL THE ANNULUS USING A TREMIE PIPE. NO LOADING SHOULD BE APPLIED TO THE EVAPORATOR PIPES BEFORE THE ANNULUS BACKFILL IS COMPLETELY FROZEN OR THE GROUT IS SET TO GAIN A REASONABLE STRENGTH. IT IS RECOMMENDED THAT A QUALIFIED GEOTECHNICAL ENGINEER OR TECHNOLOGIST MONITOR THE EVAPORATOR PIPE INSTALLATIONS.
- ALL WATER TO BE DIVERTED AWAY FROM POSSIBLE BURIED PIPING. PIPING TO REMAIN AS DRY AS POSSIBLE.
- ALL PIPING BETWEEN POINTS A AND B, AS NOTED ON 2/T101, ARE TREATED WITH CORROSION RESISTANT COATING:
 - 3ML FLAME OR ARC SPRAY ALUMINUM APPLIED AS PER AWS C2.2
 - 2 PART WHITE POLYURETHANE TOP COAT FINISH.

REV	DESCRIPTION	OWN	APP	REV DATE
0	ISSUED FOR CONSTRUCTION	VCV	BKW	JAN 27 2021

46 Riverhaven
Winnipeg, Manitoba, Canada
R2M 5S7

ACHIEVE ENGINEERING INC.
bwall@achieveeng.ca
ph. 204.415.1558
www.achieveeng.ca

PERMIT TO PRACTICE
ACHIEVE ENGINEERING INC.
Signature: _____
Date: JAN 27 2021
PERMIT NUMBER: P 739
NWT/NU Association of Professional Engineers and Geoscientists

CLIENT
ARCTIC FOUNDATIONS OF CANADA

PROJECT
GUNGHI CREEK NWT

SHEET TITLE
THERMOSYPHON PLAN, SECTION AND THERMOSYPHON DETAIL

DRAWN BY	CHECKED BY	SCALE	SHEET NO
VCV	BKW	AS NOTED	T101
DESIGNED BY	JOB NUMBER	DATE	REVISION NO
BKW	0016	JAN 27 2021	0