

J.R. Paine & Associates Ltd.

**AIRPORT IMPROVEMENTS
DAWSON CITY AIRPORT
DAWSON CITY, YUKON
1998**

J.R. Paine & Associates Ltd.

REPORT NO.: 8002-252

PROJECT: Airport Improvements

LOCATION: Dawson City Airport
Dawson City, Yukon

CLIENT: Government of Yukon
Community & Transportation Services
Box 2703
Whitehorse, Yukon
Y1A 2C6

ATTENTION: Mr. Bruce Fulcher, P.Eng.

October 7, 1998

J.R.PAINE & ASSOCIATES LTD.
14 BURNS ROAD
WHITEHORSE, YUKON
Y1A 4Y9

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ATTACHED – Inspector’s Diary

1.0 INTRODUCTION

The following report outlines our firms *Resident Inspection and Related Services* that were performed in conjunction with the *Airport Improvements* conducted at the Dawson City Airport, Dawson City, Yukon between August 27, 1998 & September 16, 1998.

J.R.Paine & Associates Ltd. was retained for these services with authorization to proceed granted by Mr. Bruce Fulcher, P.Eng. manager of Geotechnical Services for the Yukon Territorial Government, Community and Transportation Services on Aug. 25, 1998.

2.0 BACKGROUND INFORMATION

In general, *Airport Improvements* conducted at the Dawson City Airport, located at km 701 of Klondike Highway # 2, included the following work:

- 1.) Clearing and Grubbing of a new vehicle parking area.
- 2.) Repairs to three separate areas (including the South Taxiway, Terminal Apron Area and Main Taxiway) and surfacing of a new aircraft parking apron. This work involved excavation of common (deleterious materials) and loading, hauling, placing and compacting of granular courses from a gravel pit located at km 688.7 Klondike Highway # 2.
- 3.) Construction of subgrade at the new vehicle parking area utilizing excavation common from the taxiway and apron repair areas.

Existing geotechnical information regarding past work conducted at the site include;

Geotechnical Services, Foundation Condition Evaluation, Dawson Airport, Yukon

J.R.Paine & Associates Limited, September, 1997

This study was reviewed in detail prior to initiating our inspection services.

3.0 SCOPE OF WORK

The scope of work undertaken by our firm is outlined in detail in the Y.T.G., *Request for Price Quote* dated July 20, 1998. However, in general, the following objectives were identified;

- 1.) Resident project inspection to ensure materials, workmanship and procedures were in compliance with the specifications.
- 2.) Quality control testing, including but not limited to material placement and compaction testing, excavation common and granular course material gradation evaluation.
- 3.) Quantity control and layout survey monitoring to confirm location and quantity measurements for unit price items.
- 4.) Inspection of associated clearing, grubbing and pit development operations and monitoring compliance with environmental operating conditions.
- 5.) Monitoring of co-ordination of airport operator's and Contractor's operations to ensure airport safety and security conditions were in compliance with the specification.
- 6.) Photographic record of all phases of project work.

Note: With respect to item 3, it should be noted that as of September 1, 1998, the Contractor Surveyor (Mr. Howard Joe) was no longer on-site. As such, the survey duties were undertaken by the Resident Project Inspector (Mr. T. Dhara, P.Eng.).

4.0 METHODOLOGY, EVALUATION & CONCLUSIONS

A detailed description of the work program conducted is described below.

4.1 Project Start-up Meeting

A project start-up meeting was held on-site on August 27, 1998. The following personnel were in attendance;

Y.T.G. Transportation Engineering Branch

Mr. Robin Walsh, P.Eng.	Director	
Mr. Jim Coxford, P.Eng.	Manager	Design and Construction
Mr. Bruce Fulcher, P.Eng.	Manager	Geotechnical Services
Mr. Dick Stilwell, P.Eng.	Aggregates and Materials Engineer	

Dawson Airport Staff

Helen Keedwell	Airport Manager
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H.R.Vance Construction Limited

H.R.Vance	President
Chris	Construction Foreman/Backhoe Operator

J.R.Paine & Associates Limited

Tares Dhara, P.Eng.	Project Engineer
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Absent

Howard Joe	Contractor Surveyor
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During the site meeting, safety issues were discussed regarding airside and construction operations. In addition to the meeting, a site walk over was conducted with all but Helen Keedwell and Howard Joe in attendance. During the site walk over, the clearing and grubbing areas were changed as described below. The extent of the repair areas were identified and marked with fluorescent spray paint by Mr. D.Stilwell and Mr. T.Dhara.

4.2 Surveying

Initially, upon project start-up, the Contractor Surveyor (Mr. Howard Joe), was informed by the Project Inspector (Mr. T. Dhara) on August 28, 1998 to obtain the original grades of the repair areas and new aircraft apron as required in the Contract Documents on a 5 meter by 5 meter grid. This duty, however, was not conducted in accordance with project specifications. Instead, cross-sections were generated at 5 meter intervals at random points.

Additional surveying (force account work) was required to establish the original grade on the existing vehicle parking lot. No clear design grade could be established following interpretation of these cross-sections. As such, it was decided (by Y.T.G. staff) to grade the existing vehicle parking lot such that it have adequate drainage and would blend into the newly created vehicle parking area. Grade stakes were established on a 25 meter by 25 meter grid by the Contractor Surveyor, Mr. Howard Joe.

Clearing and grubbing limits for the new vehicle parking area were adjusted (by Y.T.G. staff) prior to construction start-up. The proposed 0.82 ha area immediately south of the existing vehicle parking lot was changed to include approximately 0.35 ha primarily west of the existing vehicle parking lot.

It should be noted that as of September 1, 1998, the Contractor Surveyor (Mr. Howard Joe) was no longer on-site. As such, the survey duties were undertaken by the Resident Project Inspector (Mr. T. Dhara).

Force account survey work and general labour (i.e. rod-person) undertaken is enclosed in Appendix A-Force Account Work.

Survey quantity methods, calculations and layouts are summarized in Appendix F. In addition, a computer diskette with survey data was submitted to Mr. D. Stilwell on September 25, 1998.

4.3 Laboratory Work

Prior to granular material use, laboratory work was conducted to determine the Standard Proctor density for the Granular E and Granular A material on September 2 & 3, 1998. In addition, a grain size analysis was conducted on the Granular E material on September 4, 1998. These laboratory results are enclosed in Appendix B-Laboratory Test Results.

4.4 Clearing & Grubbing Operations

Clearing and grubbing operations were conducted on August 28 & August 29, 1998 utilizing a John Deere 790 Backhoe at the new area identified immediately west and south of the existing vehicle parking lot. This included clearing and grubbing approximately 0.35 ha as identified in figure 1. Due to the limited number of trees within the cleared area the material was buried in a trench along the Southwestern corner and western edge of the newly created vehicle parking lot.

4.5 Grade Existing Vehicle Parking Lot & Ditch

Grading of the existing parking lot was required on September 1 & September 2, 1998 to ensure adequate surface drainage. The entire lot was graded with an ultimate design of approximately 1 percent drainage to the west, away from the Klondike Highway, # 2.

This work was considered force account work and additional payment to the contractor would be made. The types and duration of equipment utilized during the grading of the existing vehicle parking lot is included in Appendix A-Force Account Work.

It should be noted that a portion of the existing vehicle parking lot and ditch, in the southwest corner, could not be worked due to the presence of vehicles stored in long term parking. The situation was discussed with Mr. D. Stilwell and it was decided that because the area was very close to design grade and due to the liability involved in moving the vehicles, grading of the area would not be required.

4.6 Repair Area 1 (South Taxiway)

Construction activities at Repair Area 1 were initiated on September 3, 1998 utilizing the equipment identified in Appendix C-Equipment Operation List and separately enclosed Inspector's Diary.

In general, operations consisted of excavating material from within the area identified during the project start-up meeting, by use of a Komatsu PC250LC Backhoe to an average depth of 0.75 meters. Material excavated was placed into belly-dump trucks and hauled to the newly cleared vehicle parking lot. The material was subsequently graded into even lifts, by use of a Caterpillar 14E Grader and compacted by use of a Dynapac CA-250 Packer with a 84" steel vibratory drum. The final excavated area was cut with vertical slopes in areas adjacent to the grass field and with side slopes of approximately 1 vertical to 1 horizontal along the South edge and approximately 1 vertical to 2 horizontal along the North edge, immediately adjacent to the existing taxiway areas. These angled side slopes were constructed in an effort to provide a transition between newly reconstructed areas and existing taxiway areas with deleterious materials. Deleterious materials were encountered at all margins of the completed excavation.

The VASES system cable (aircraft landing approach system) for the south end of the runway was severed during the excavation of repair area 1. Dawson Airport air traffic control was immediately notified of the break and a NOTAM was entered into the air traffic system. Upon completion of the excavation, Y.T.G. personnel were on-site to splice the severed cable and install a plastic conduit to run the length of the excavation.

Following the excavation of Repair Area 1, the backhoe was moved to the gravel pit located at km 688.7 to load Granular E material for backfill operations. Backfill of the excavated area was initiated at approximately 1700 hrs, September 3, 1998.

Compaction testing, by use of a Campbell Pacific Nuclear Densometer, was conducted on the backfilled material. These test results are enclosed in Appendix D-Compaction Test Results. In general, testing indicated that adequate compaction was achieved.

The gradation of some of the Granular E material used for backfill was coarse in nature with low sand content. More coarse areas were reworked in an effort to mix the coarse material with underlying fines. No excessively large oversize was noted in the backfilled material. No excessive amount of silt content was noted.

Backfill operations were concluded on September 4, 1998, by placing, watering and compacting Granular A material to preliminary design grade. Five loads of Granular A material were loaded directly off Nuway Crushing Limited's production belt and placed at this time. Following completion of backfill operations, the outer margins of the taxiway was re-excavated by Y.T.G. personnel in order to install pull stations for the VASES cable. During this re-excavation, some of the Granular A material was lost within the adjacent grass field area.

Upon completion of cable repairs, an additional load of Granular A material was required in order to restore the surface to design grade. This final grading and compaction was completed on September 10, 1998.

Quantity Totals for Repair Area 1 are as follows;

Excavation Common	364.8 m ³
Granular E	277.9 m ³
Granular A	66.7 m ³

4.7 Repair Area 2 (Terminal)

Construction activities at Repair Area 2 were initiated on September 5, 1998 utilizing the equipment identified in Appendix C-Equipment Operation List and separately enclosed Inspector's Diary.

In general, operations consisted of excavating material from within the area identified during the project start-up meeting and proceeding as in Repair Area 1. The final excavated area was cut with vertical slopes in areas adjacent to the grass field and terminal sidewalk, with side slopes of approximately 1 vertical to 2 horizontal along the South edge and approximately 1 vertical to 1 horizontal along the North edge, immediately adjacent to the existing apron areas. These angled side slopes were constructed in an effort to provide a transition between newly reconstructed areas and existing apron areas with deleterious materials. Deleterious materials were encountered at all margins of the completed excavation.

Following the excavation of Repair Area 2, Nuway Crushing Limited's loader was utilized to load Granular E material for backfill operations. Backfill of the excavated area was initiated at approximately 1500 hrs, September 5, 1998.

Compaction testing, by use of a Campbell Pacific Nuclear Densometer, was conducted on the backfilled material. These test results are enclosed in Appendix D-Compaction Test Results. In general, testing indicated that adequate compaction was achieved.

The gradation of some of the Granular E material used for backfill was coarse in nature with low sand content. More coarse areas were reworked in an effort to mix the coarse material with underlying fines. No excessively large oversize was noted in the backfilled material. No excessive amount of silt content was noted.

Backfill operations were concluded on September 6, 1998 by placing, watering and compacting Granular A material to preliminary design grade.

Final grading and compaction was completed on September 15, 1998.

Quantity Totals for Repair Area 2 are as follows;

Excavation Common	612.1 m ³
Granular E	535.9 m ³
Granular A	52.0 m ³

4.8 Repair Area 3 (Main Taxiway)

In order to ensure access to the aircraft fueling area at all times, Repair Area 3 was constructed in two separate phases, with work on the second phase only being initiated once the first area was completed. The first phase (Repair Area 3-1) involved construction of the main taxiway between the grassed field areas and a portion of the existing apron, while the second phase (Repair Area 3-2) involved construction of the apron area immediately adjacent to Repair Area 3-1.

Quantity Totals for Repair Area 3 are as follows;

Excavation Common	2722.6 m ³
Granular E	2530.2 m ³
Granular A	236.6 m ³

4.8.1 Repair Area 3-1

Construction activities at Repair Area 3-1 were initiated on September 7, 1998 utilizing the equipment identified in Appendix C-Equipment Operation List and separately enclosed Inspector's Diary.

In general, operations consisted of excavating material from within the area identified during the project start-up meeting and proceeding as in Repair Areas 1 & 2. The final excavated area was

cut with vertical slopes in areas adjacent to the grass field, and with side slopes of approximately 1 vertical to 2 horizontal along the East, South and North edges (adjacent to the existing taxiway and aprons, respectively). These angled side slopes were constructed in an effort to provide a transition between newly reconstructed areas and existing apron/taxiway areas with deleterious materials. Deleterious materials were encountered at all margins of the completed excavation.

Following the excavation of Repair Area 3-1, the backhoe was moved to the gravel pit located at km 688.7 to load granular material for backfill operations. Backfill of the excavated area was initiated at approximately 1530 hrs, September 7, 1998 with Granular E material.

Compaction testing, by use of a Campbell Pacific Nuclear Densometer, was conducted on the backfilled material. These test results are enclosed in Appendix D-Compaction Test Results. In general, testing indicated that adequate compaction was achieved.

The gradation of some of the Granular E material used for backfill was coarse in nature with low sand content. More coarse areas were reworked in an effort to mix the coarse material with underlying fines. No excessively large oversize was noted in the backfilled material. No excessive amount of silt content was noted.

Backfill operations were concluded on September 10, 1998 by placing, watering and compacting Granular A material to preliminary design grade.

Final grading and compaction was completed on September 15, 1998.

4.8.2 Repair Area 3-2

Construction activities at Repair Area 3-2 were initiated on September 10, 1998 utilizing the equipment identified in Appendix C-Equipment Operation List and separately enclosed Inspector's Diary.

In general, operations consisted of excavating material from within the area identified during the project start-up meeting and proceeding as in Repair Areas 1, 2 & 3-1. The final excavated area was cut with vertical slopes in areas adjacent to the Area 3-1, and with side slopes of approximately 1 vertical to 2 horizontal along the Southwestern and Northeastern edges (adjacent to the existing aircraft apron). These angled side slopes were constructed in an effort to provide a transition between newly reconstructed areas and existing apron/taxiway areas with deleterious materials. Deleterious materials were encountered at all margins of the completed excavation. It should however, be noted that along the southern extent of the excavation, the strata of deleterious materials was in the order of 0.3 meters to 0.5 meters thick (as opposed to the anticipated 1.2 meters).

Due to the relatively shallow depths that the underlying granular stratum was encountered, (and relatively low amount of excavation common) the limits of the Northwestern side was extended 15 meters to the northwest.

Following the excavation of Repair Area 3-2, the backhoe was moved to the gravel pit located at km 688.7 to load Granular E material for backfill operations. Backfill of the excavated area was initiated at approximately 1045 hrs, September 12, 1998.

Compaction testing, by use of a Campbell Pacific Nuclear Densometer, was conducted on the backfilled material. These test results are enclosed in Appendix D-Compaction Test Results. In general, testing indicated that adequate compaction was achieved.

The gradation of some of the Granular E material used for backfill was coarse in nature with low sand content. More coarse areas were reworked in an effort to mix the coarse material with underlying fines. No excessively large oversize was noted in the backfilled material. No excessive amount of silt content was noted.

Backfill operations were concluded on September 14, 1998 by placing, watering and compacting Granular A material to preliminary design grade.

Final grading and compaction was completed on September 15, 1998.

4.9 New Aircraft Parking Apron

Construction activities for the New Aircraft Parking Apron was initiated on September 14, 1998 utilizing the equipment identified in Appendix C-Equipment Operation List and separately enclosed Inspector's Diary.

In general, operations consisted of blading approximately 0.08 meters of material from within the area identified during the project start-up meeting with the Caterpillar 14E Grader and proceeding by placing 5 loads of Granular A material. This material was subsequently watered, graded and compacted with the Dynapac CA-250 Packer with a 84" steel vibratory drum.

Deleterious material (White Channel Sands & Gravels) was encountered throughout the base of the bladed area.

Final grading and compaction was completed on September 14, 1998.

Quantity Totals for the New Aircraft Parking Apron are as follows;

Excavation Common 72.2 m³

Granular A 72.2 m³

4.10 Terminal Vehicle Parking Area

After discussion with Mr. Dick Stilwell, (Y.T.G., C. & T.S.) it was decided that one load of Granular A material would be placed on the existing terminal vehicle parking area in an effort to improve surface drainage and structure of the existing surfacing materials.

This task was carried out on September 14, 1998. Work conducted was considered force account work and additional payment to the contractor would be made. The types and duration of equipment utilized during the grading of the existing vehicle parking lot is included in Appendix A-Force Account Work.

4.11 Expand Existing Vehicle Parking Lot

Expansion to the existing vehicle parking lot was initiated by clearing and grubbing conducted, as described above. Deleterious material excavated from within the repair areas was used to construct the parking lot sub-grade. This material was graded and compacted throughout placement between September 3, 1998 and September 14, 1998 with final work conducted on September 15, 1998.

It should be noted that due to the sensitive nature of the material being used as the parking lot sub-grade, care was taken in compacting the material by using the Dynapac CA-250 Packer without engaging the vibrator.

In addition, it should be noted that inclemental weather (rain) was encountered on September 6, 7, 11, 12, 13 & 14. This extra precipitation increased the moisture content of some of the deleterious materials above optimum moisture content, creating a loss in strength and difficulty in obtaining a fully workable material near the completion of the project. As such, some locations within the newly created parking lot were in less than ideal condition upon completion.

The entire lot was graded with an ultimate design of approximately 1 percent drainage to the west, away from the Klondike Highway, # 2.

4.12 Additional Project Information

No construction work was conducted on September 7, 1998.

On September 12, 1998, the contractor (H.R.Vance) was informed by the Project Inspector (T.Dhara) that quantity estimates for material excavated was in the order of 3750-3800 cubic meters. This quantity was under the anticipated quantity of common excavation (4600 cubic meters) by approximately 800-850 cubic meters.

An option for the contractor to proceed with construction activities along the northeastern edge of Area 3 (towards the existing aircraft fueling area) until the anticipated contract total (4600 cubic meters) was realized, was given.

The contractor declined this option.

4.13 Photographic Documentation

A selection of photographs have been enclosed in Appendix E-Photographic Documentation.

5.0 CLOSURE

This report has been prepared for the exclusive and confidential use of the Government of Yukon and applies only to the inspection services performed at the areas described above.

The conclusions and evaluations provided herein are based on the information collected during the duration of the project, subsurface soil conditions encountered during the field work programs, current investigative techniques, and generally accepted engineering practices. The conclusions and evaluations may be altered or modified in writing by the undersigned.

Thank you for the opportunity to provide this service to your organization. If you should have any questions or comments, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

J.R. PAINE & ASSOCIATES LTD.



A circular professional seal for Tares Dhara, a Professional Engineer in Yukon Territory. The seal contains the text: "PROFESSIONAL", "YUKON", "TARES DHARA", "TERRITORY", and "ENGINEER". A handwritten signature is written across the seal.

Tares Dhara, P. Eng.
Project Engineer



A circular professional seal for Wilbur C. Koford, a Professional Engineer in Yukon Territory. The seal contains the text: "PROFESSIONAL", "YUKON", "WILBUR C. KOFOED", "TERRITORY", and "ENGINEER". A handwritten signature is written across the seal.

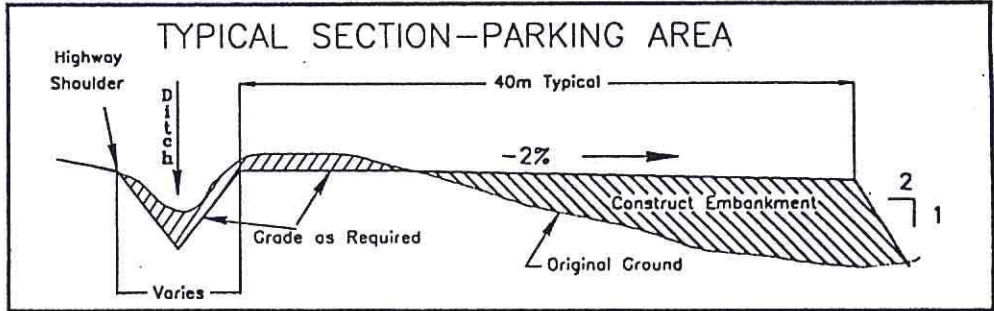
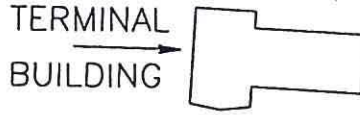
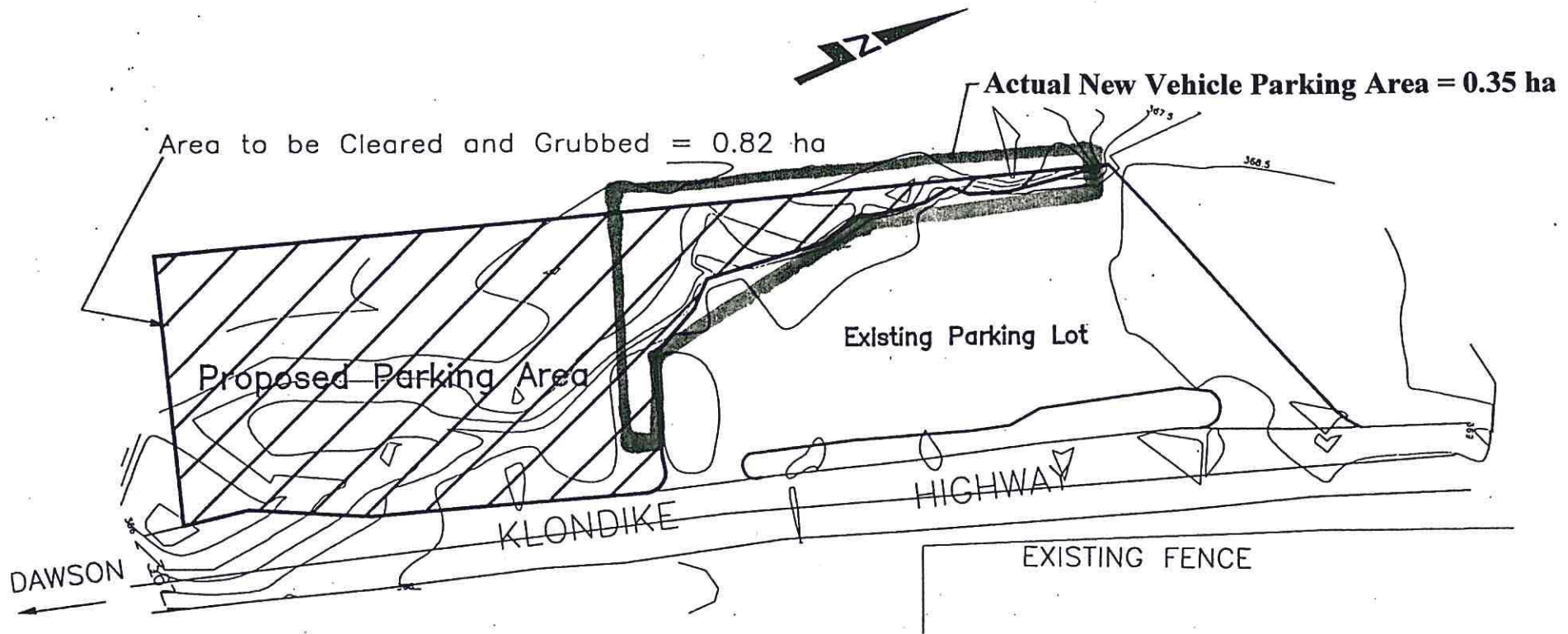
Wilbur C. Koford, P. Eng.
Office Manager

Attached: Appendices A-F

TD/td

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FIGURE 1 – New Vehicle Parking Area



J.R. Paine & Associates Ltd.

APPENDIX A – Force Account Work

J.R. Paine & Associates Ltd.

FORCE ACCOUNT WORK

Conducted by H.R.Vance Construction Limited

<u>DATE</u>	<u>WORK</u>	<u>HOURS</u>
August 28, 1998	Survey Existing Parking Lot Survey Crew (3) – Howard Joe	5.0 *
August 30, 1998	Set Grade Stakes for the Existing Parking Lot Survey Crew (3) – Howard Joe	3.0 *
September 1, 1998	Grade Existing Parking Lot '9? John Deere 790 Backhoe w/ blade '76 Dynapac CA-250 84" Drum Packer '72 Caterpillar 14E Grader '77 Kenwood Belly Dump Truck	10.0 4.5 10.0 6.0
September 2, 1998	Grade Existing Parking Lot '9? John Deere 790 Backhoe w/ blade '76 Dynapac CA-250 84" Drum Packer '72 Caterpillar 14E Grader '77 Kenwood Belly Dump Truck	3.0 4.0 4.5 2.0
September 13, 1998	Survey Final Grade Area 1 (South Taxiway) General Labour	0.5
September 15, 1998	Grade Terminal Parking Lot '76 Dynapac CA-250 84" Drum Packer '72 Caterpillar 14E Grader '77 Kenwood Belly Dump Truck	1.0 1.5 1.0
	Grade Existing Parking Lot Ditch '72 Caterpillar 14E Grader	1.0

* - Indicates that these hours are estimates only. Actual hours worked were not submitted by the contractor surveyor, Mr. Howard Joe, as requested.

APPENDIX B – Laboratory Test Results



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS
EDMONTON - GRANDE PRAIRIE - WHITEHORSE - PEACE RIVER

COMPACTION TEST

Project: DAWSON AIRPORT UPGRADING

Client: YTO-C&T-S, TRANSPORTATION ENG.

Sample: STOCKPILE Depth: _____

Made By: MRS

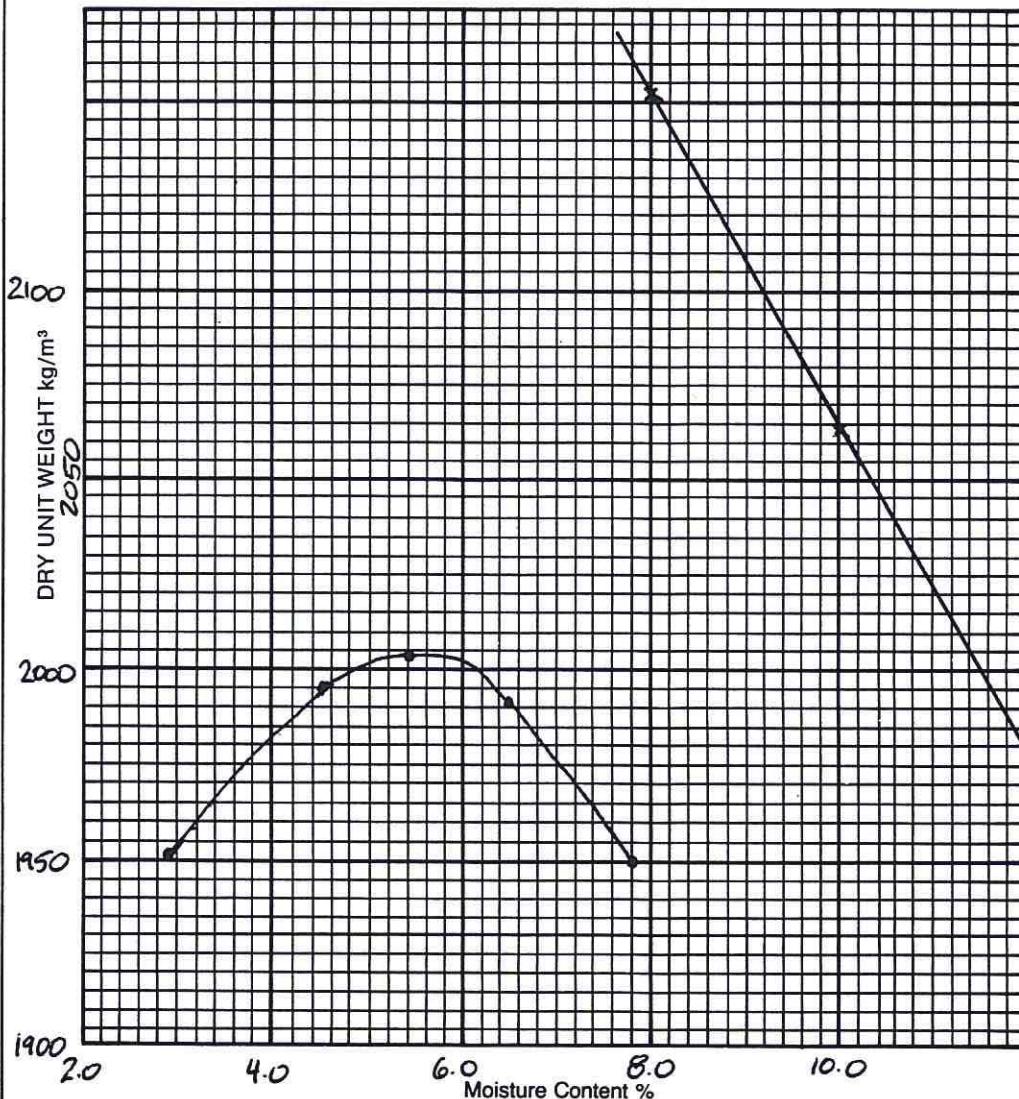
Job No.: 8002 -

Location: km 68.7 RKS KLONDIKE HWY.

CK'd By: wcic

Date: 98 09 03

TRIAL NUMBER		1	2	3	4	5		
UNIT WEIGHT DETERMINATION	Mold No.							
	Wt. Sample Wet + Mold							
	Wt. Mold							
	Wt. Sample Wet							
	Volume Mold							
	Wet Unit Weight kg/m ³							
	Dry Unit Weight kg/m ³	1951	1995	2004	1991	1950		
MOISTURE CONTENT DETERMINATION	Container No.							
	Wt. Sample Wet + Tare							
	Wt. Sample Dry + Tare							
	Wt. Water							
	Tare Container							
	Wt. Dry Soil							
	Moisture Content	2.9	4.5	5.4	6.5	7.8		



MAXIMUM UNIT WEIGHT kg/m³
= 2004

OPTIMUM MOIST. CONTENT = 5.4 %

METHOD OF COMPACTION STANDARD MODIFIED ()

SAMPLE DESCRIPTION
PITRUN / NATIVE MATERIAL

REMARKS:
• specific gravity @ 2.60
• 23.4% rock correction (+ 20mm size)



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

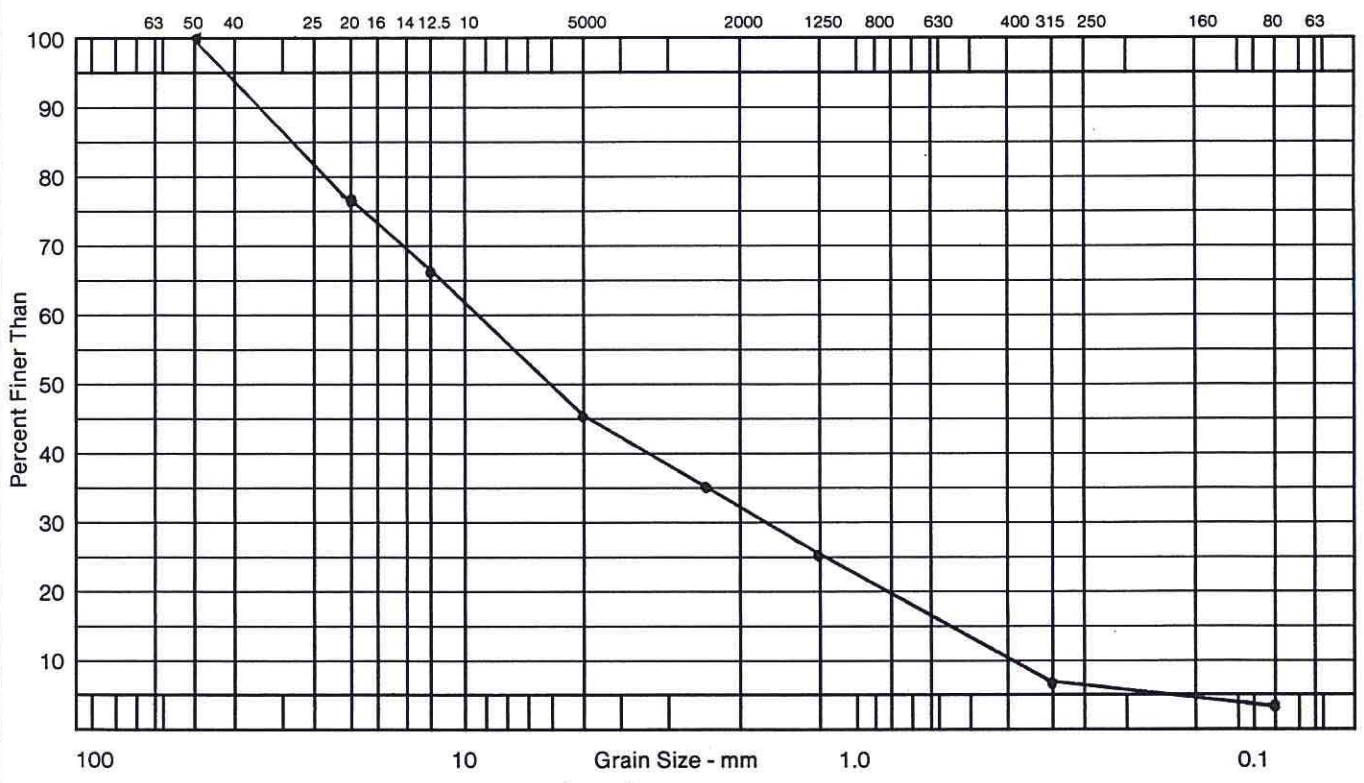
Sample: PITRON Depth: _____
 Location: STOCKPILE - km 688.7 RHS
KLONDIKE HWY.

Client: ITG-CET-S. TRANSPORTATION ENG
 Project: DAWSON AIRPORT UPGRAIDING
 Made by: MRS Job No.: 8002 -
 CK'd by: WUL Date: 98 09 04

Sieve No.	Size of Opening MM	Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
125,000	125.0				
80,000	80.0				
50,000	50.0				100.0
40,000	40.0				
25,000	25.0				
20,000	20.0	371.5			76.6
16,000	16.0				
12,500	12.5	532.9			66.4
5,000 10,000	5.0 10.0	853.3			46.2
2,500 5,000	2.5 5.0	1026.4			35.2
1,250	1.25	1184.9			25.4
630	0.630				
315	0.315	1491.1			6.1
160	0.160				
80	0.080	1528.7			3.7

Description of Sample _____
PITRON/NATIVE MATERIAL
 Time of Sieving _____ Min. 15

Method of Preparation _____ Dry _____ Washed X
 Remarks _____
% gravel: 53.8 * 25.4% sample (+20mm size)
% sand: 42.5
% fines: 3.7
% moisture: 3.0





J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS
EDMONTON - GRANDE PRAIRIE - WHITEHORSE - PEACE RIVER

COMPACTION TEST

Project: DAWSON AIRPORT UPGRAIDING

Client: YTG-C&T.S., TRANSPORTATION EXP.

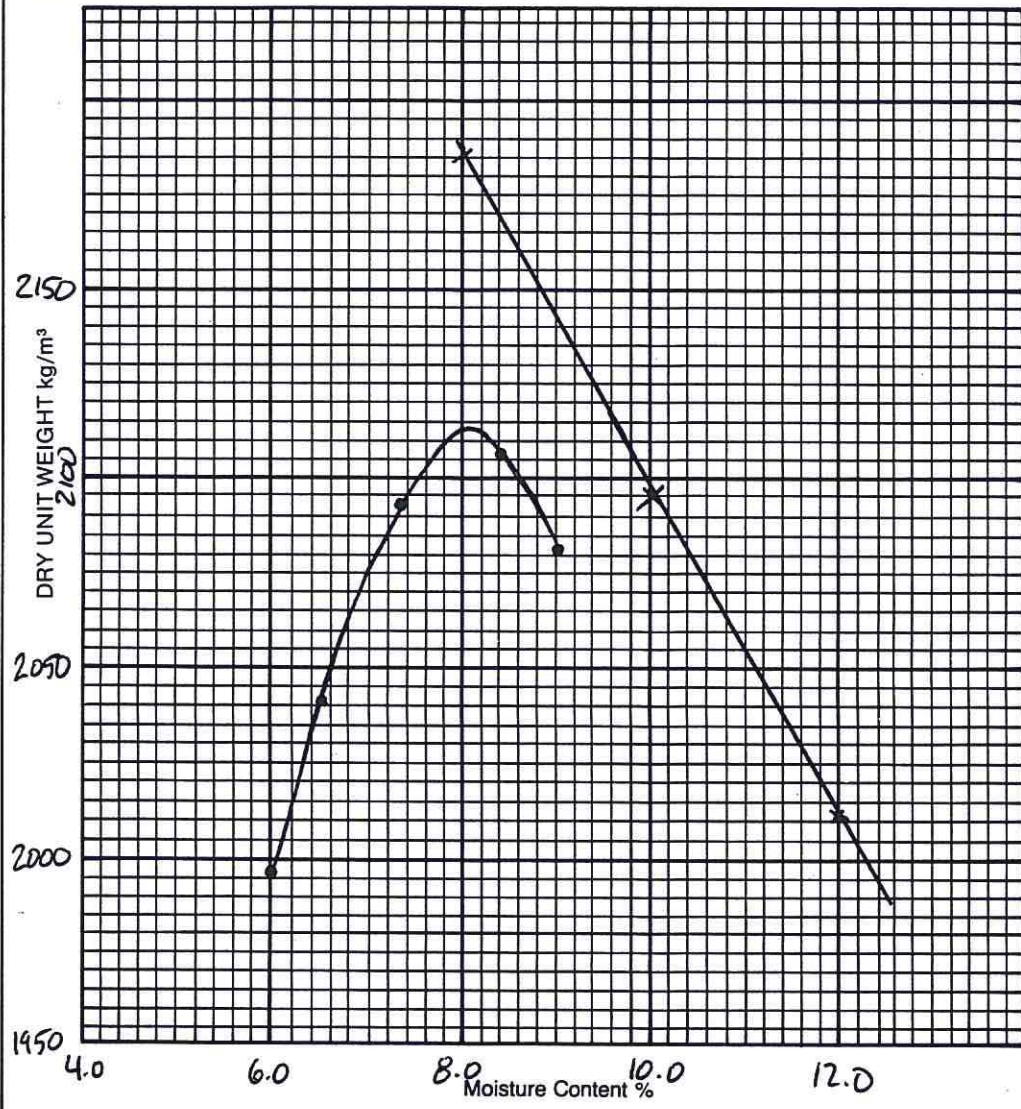
Sample: STOCKPILE Depth: _____

Made By: MRS Job No.: 8002-

Location: km. 688.7 Rhs KLONDIKE HWY.

Ck'd By: WCL Date: 98 09 02

TRIAL NUMBER		1	2	3	4	5		
UNIT WEIGHT DETERMINATION	Mold No.							
	Wt. Sample Wet + Mold							
	Wt. Mold							
	Wt. Sample Wet							
	Volume Mold							
	Wet Unit Weight kg/m ³							
	Dry Unit Weight kg/m ³	1997	2041	2093	2106	2081		
MOISTURE CONTENT DETERMINATION	Container No.							
	Wt. Sample Wet + Tare							
	Wt. Sample Dry + Tare							
	Wt. Water							
	Tare Container							
	Wt. Dry Soil							
	Moisture Content	6.0	6.5	7.3	8.4	9.0		



MAXIMUM UNIT WEIGHT kg/m³
= 2113

OPTIMUM MOIST. CONTENT = 8.1 %

METHOD OF COMPACTION STANDARD MODIFIED ()

SAMPLE DESCRIPTION
20mm BST

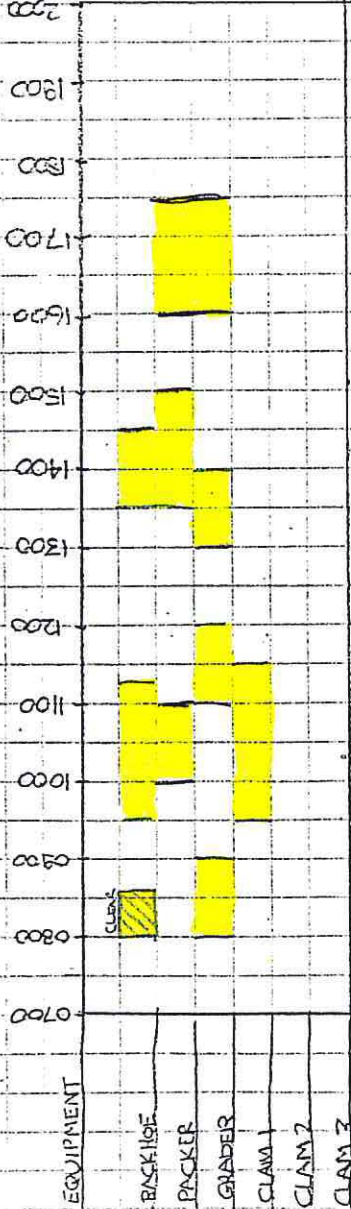
REMARKS:
• specific gravity @ 2.65

APPENDIX C – Equipment Operation List

DATE: SEPT 2, 98

GRADE EXISTING PARKING LOT
NOTE BACKHOE CLEARING

3.0
4.0
4.5
2.0



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

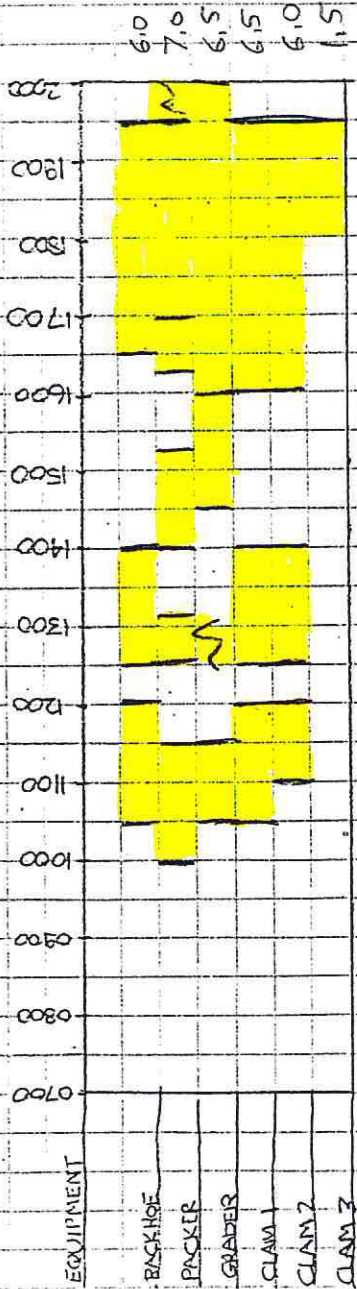
Date

Scale

Plate No.

DATE: SEPT 3, 98.

EXCAVATE AREA #1



J. R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Dwn. By

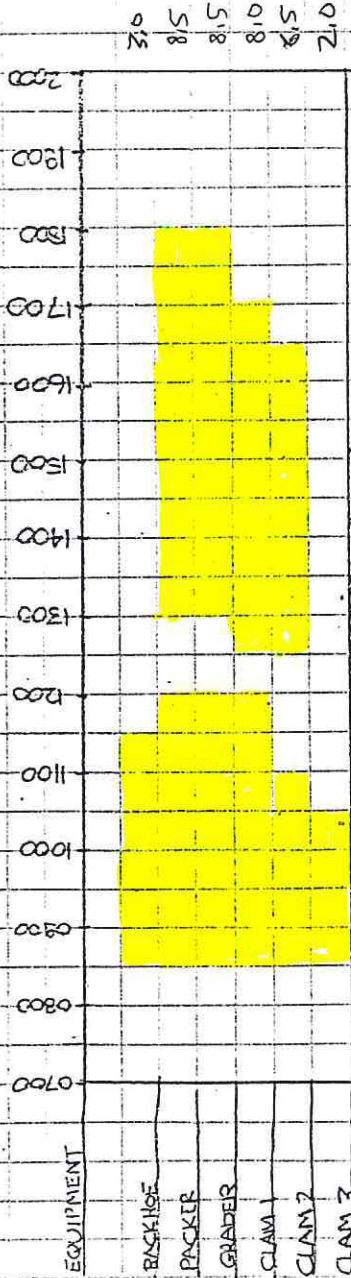
Date

Scale

Plate No.

DATE: SEPT 4, 98

BACKFILL AREA # 1



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

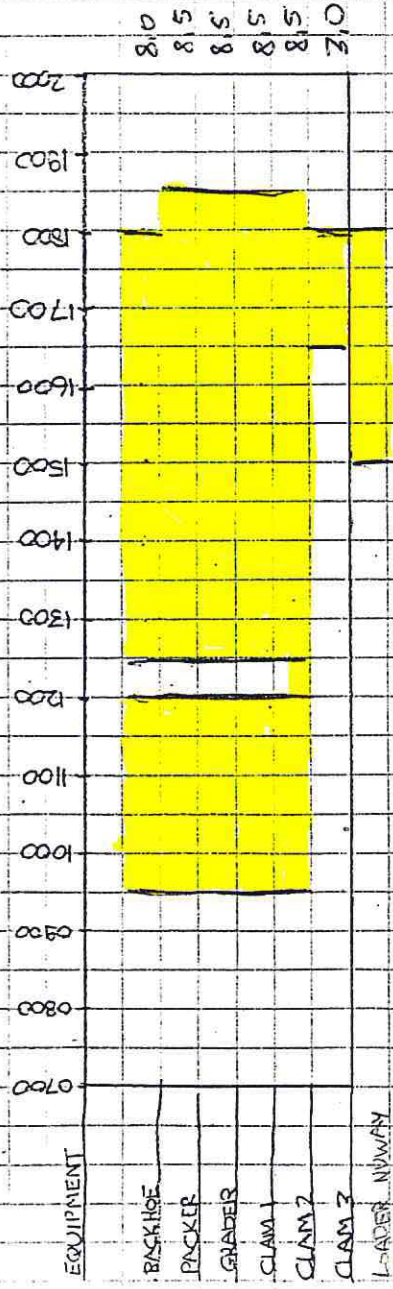
Date

Scale

Plate No.

DATE: SEPT 5, 98

EXCAVATE & BACKFILL AREA #2



J. R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Dwn. By

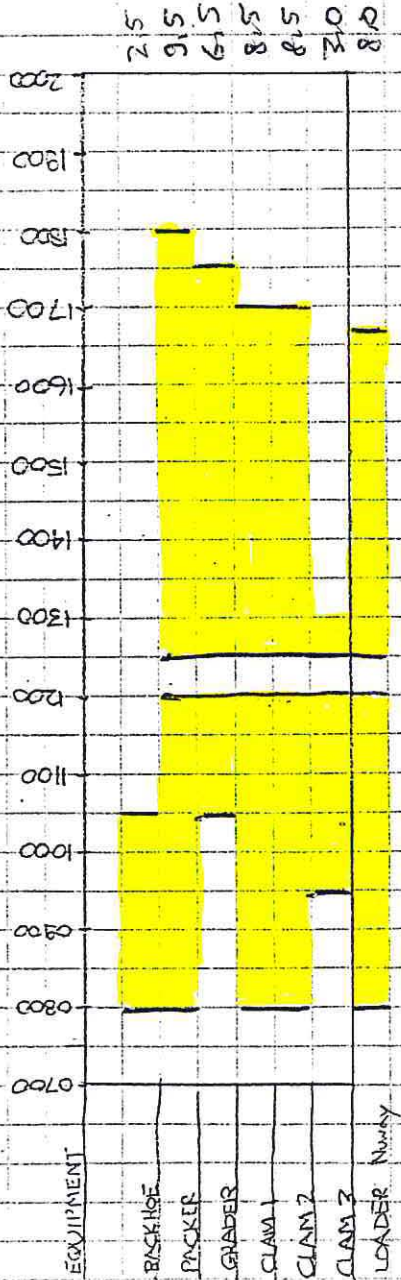
Date

Scale

Plate No.

DATE: Sept. 6, 98

BACKFILL OF AREA 2



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

Date

Scale

Plate No.

DATE: SEPT 7, 98

NO CONSTRUCTION WORK
CONDUCTED



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

Date

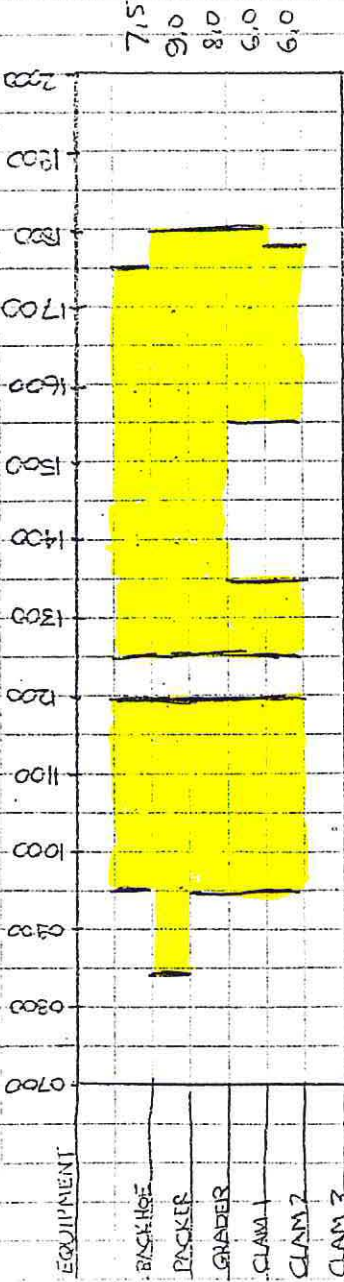
Scale

Plate No.

DATE: SEPT 8, 98

EXCAVATE AREA 3-1

BACKFILL AREA 3-1



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

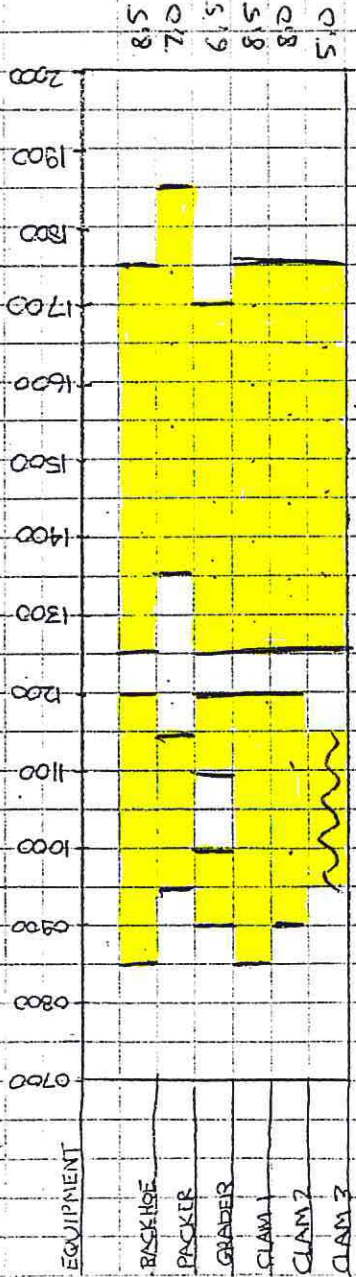
Date

Scale

Plate No.

DATE: Sept 9, 98

BACKFILL AREA 3-1



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

Date

Scale

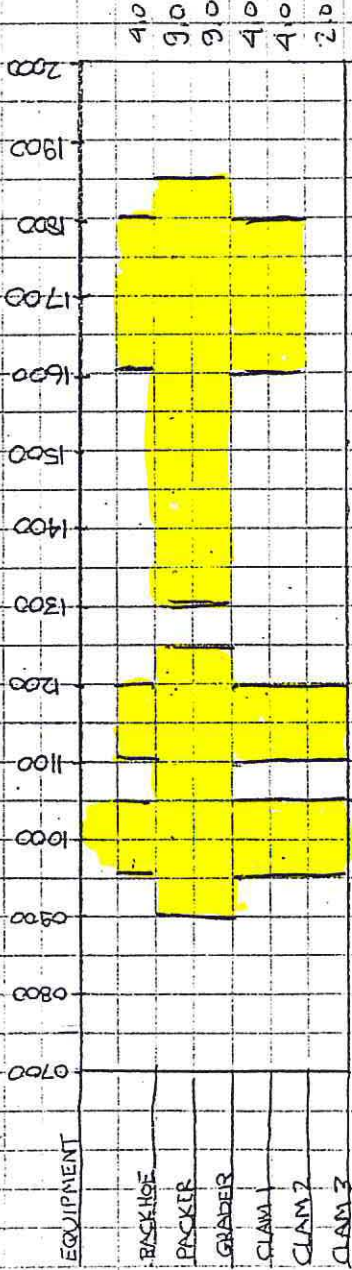
Plate No.

DATE: SEPT 10, 98

GRADE & PACK GRANITE - AREA 3-1

FINAL AREA 1

EXCAVATE AREA 3-2



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

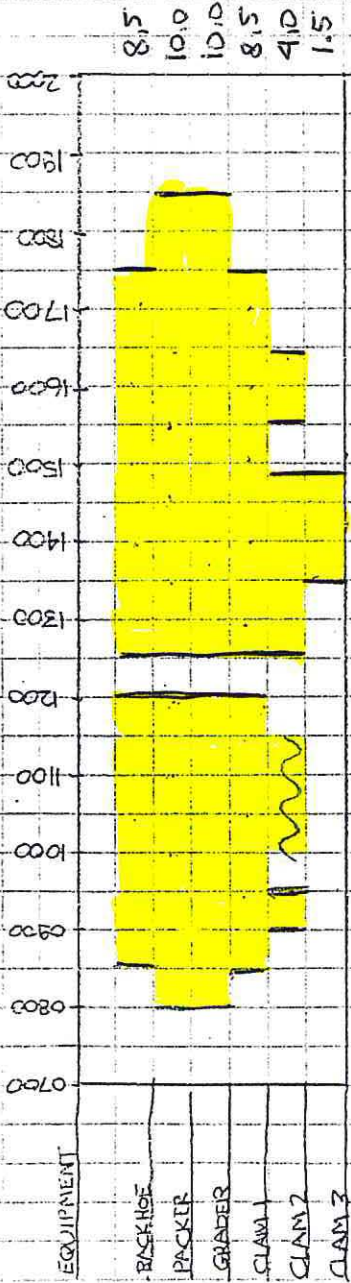
Date

Scale

Plate No.

DATE: Sept. 11, 58

EXCAVATE AREA 3-2



J. R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Dwn. By

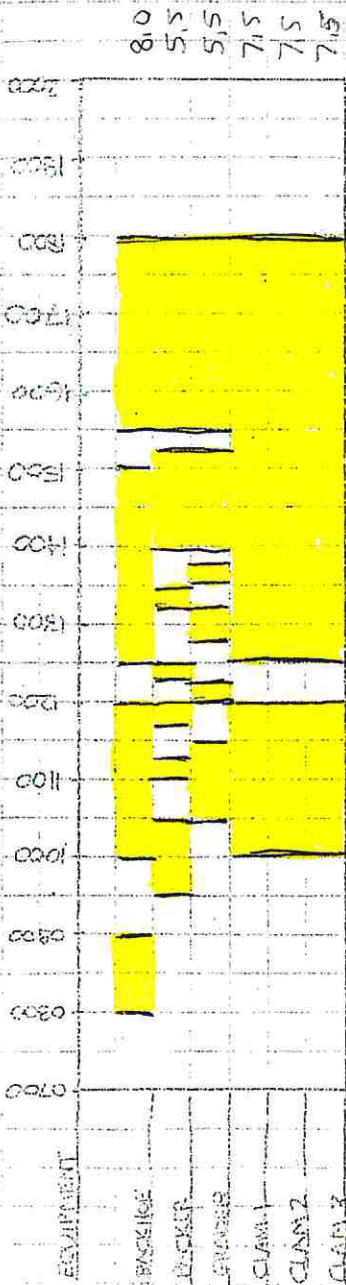
Date

Scale

Plate No.

DATE: Sept. 12, '98

Backfill Area 3-2



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

Dwn. By

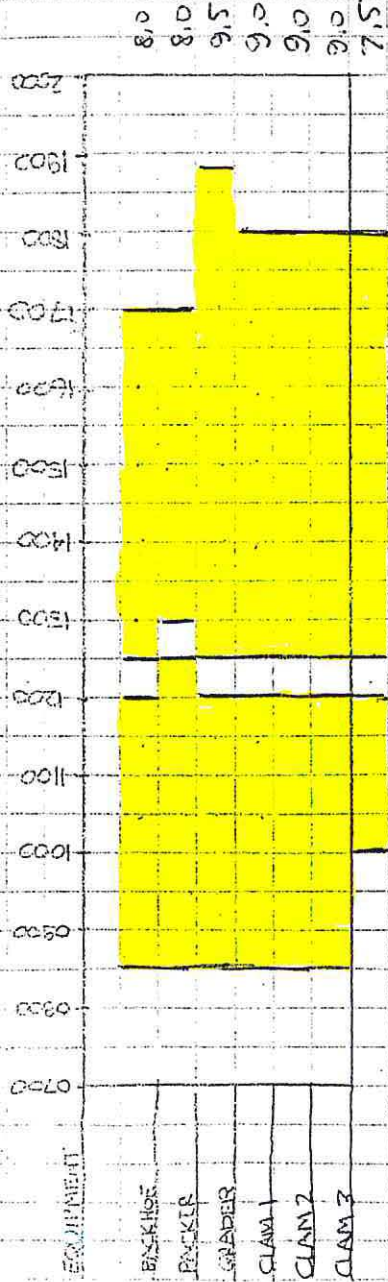
Date

Scale

Plate No.

DATE: Sept. 13, 198

Backfill Area B-2



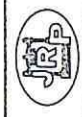
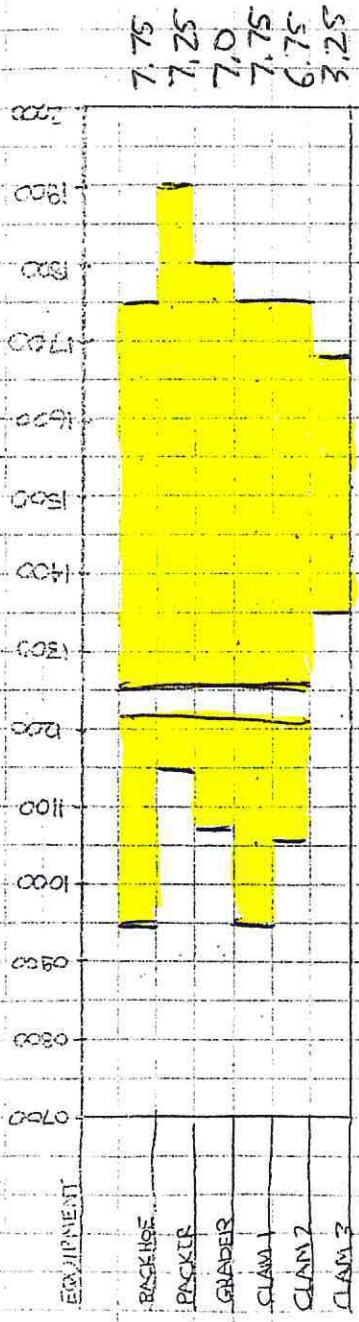
J. R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Dwn. By
Scale

Date
Plate No.

DATE: Sept. 14, 98

Complete Backfill Area 3-2
Surface Apron
around R.L. 1



J. R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Dwn. By

Scale

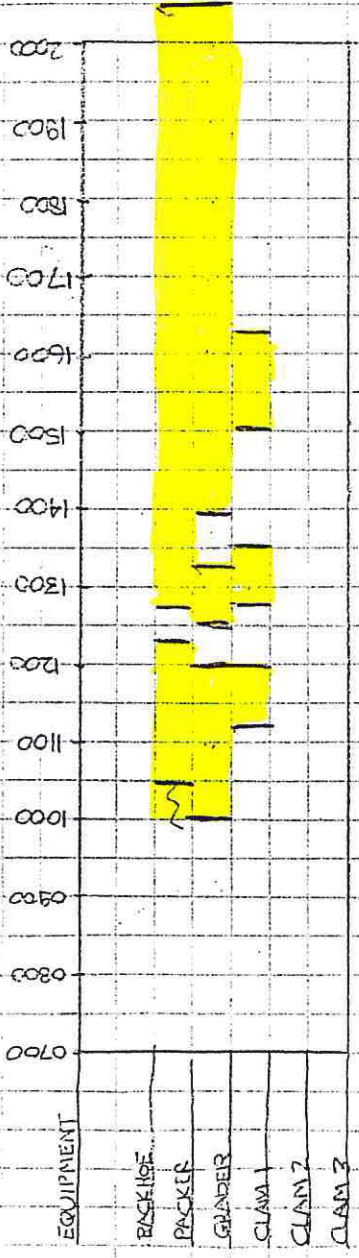
Date

Platg No.

DATE: SEPT 15, 98

FINAL AREA 3
FINAL PARKING LOT
FINAL NEW APRON
FINAL AREA 2

9.5
9.25
2.75



J. R. Paine & Associates Ltd.
CONSULTING AND TESTING ENGINEERS

Dwn. By

Date

Scale

Plate No.

Appendix D – Compaction Test Results



J.R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

EDMONTON - GRANDE PRAIRIE - WHITEHORSE - PEACE RIVER

SUMMARY OF FIELD DENSITY TESTS

CLIENT: YTG, Transportation Engineering JOB NO: 8002-252

DATE TESTED: Sept. 04/98

PROJECT: Dawson Airport Improvements DATE REPORTED: Sept. /98

Area 1

TEST NO.	LOCATION	DEPTH	DRY UNIT WT. kg/m ³	FIELD MOIST.%	PROCTOR DENSITY	OPTIMUM MOISTURE	PROCTOR DENSITY %
	Pit Run						
	Southwest corner	1 lift	2122	4.9	2114	5.4	100.4
	Northeast corner	1 lift	2092	4.8	2114	5.4	99.0
	Northwest corner	3 lift	2164	5.0	2114	5.4	102.4
	Northeast corner	T.P.	2192	5.1	2114	5.4	103.7
	Southwest corner	T.P.	2181	5.0	2114	5.4	103.2
	Granular "A"						
	Northwest corner	GRD	2123	7.8	2113	8.1	100.5
	Northeast corner	GRD	2131	7.7	2113	8.1	100.9
	Center	GRD	2128	7.9	2113	8.1	100.7

CONTROL PROCTOR ONE POINT
 STANDARD
 MODIFIED

REMARKS Note - pit run corrected for approximately 30% rock
 correction.

CC FAXED TO _____

TESTED BY TD APPROVED BY Wck



J.R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS
EDMONTON - GRANDE PRAIRIE - WHITEHORSE - PEACE RIVER

SUMMARY OF FIELD DENSITY TESTS

CLIENT: YTG, Transportation Engineering JOB NO: 8002-252

DATE TESTED: Sept. 12,13 &14/98

PROJECT: Dawson Airport Improvements DATE REPORTED: Sept. /98

Area 3-2

TEST NO.	LOCATION	DEPTH	DRY UNIT WT. kg/m ³	FIELD MOIST.%	PROCTOR DENSITY	OPTIMUM MOISTURE	PROCTOR DENSITY %	
	Pit Run							
	Northwest corner	12-Sep	1 lift	2090	4.1	2114	5.4	98.9
	Southeast corner	12-Sep	1 lift	2141	4.7	2114	5.4	101.3
	Northeast corner	13-Sep	0.3m	2121	4.2	2114	5.4	100.3
	Northwest corner	13-Sep	0.3m	2151	4.4	2114	5.4	101.8
	Center	13-Sep	0.3m	2131	4.4	2114	5.4	100.8
	Northeast corner	14-Sep	T.P.	2158	4.6	2114	5.4	102.1
	Southwest corner	14-Sep	T.P.	2161	4.8	2114	5.4	102.2
	Granular "A"							
	Northwest corner	14-Sep	GRD	2121	7.8	2113	8.1	100.4
	Southeast corner	14-Sep	GRD	2116	7.6	2113	8.1	100.1
	Northeast corner	14-Sep	GRD	2131	7.9	2113	8.1	100.9

CONTROL PROCTOR ONE POINT
 STANDARD
 MODIFIED

REMARKS Note - pit run corrected for approximately 30% rock
 correction.

CC FAXED TO _____

TESTED BY TD APPROVED BY WCL

J.R. Paine & Associates Ltd.

Appendix E – Photographic Documentation



PHOTO # 1 – New Vehicle Parking Area – Clearing and Grubbing Operations



PHOTO # 2 – Existing Vehicle Parking Area – Grading Operations



PHOTO # 3 – New Vehicle Parking Area – Construction of Subgrade (Southwest corner)



PHOTO # 4 – Existing Vehicle Parking Area – Note ditch conditions



PHOTO # 5 – Repair Area 1 – Excavation Base Note location of VASES cable



PHOTO # 6 – Repair Area 1 – Granular E Backfill Operations

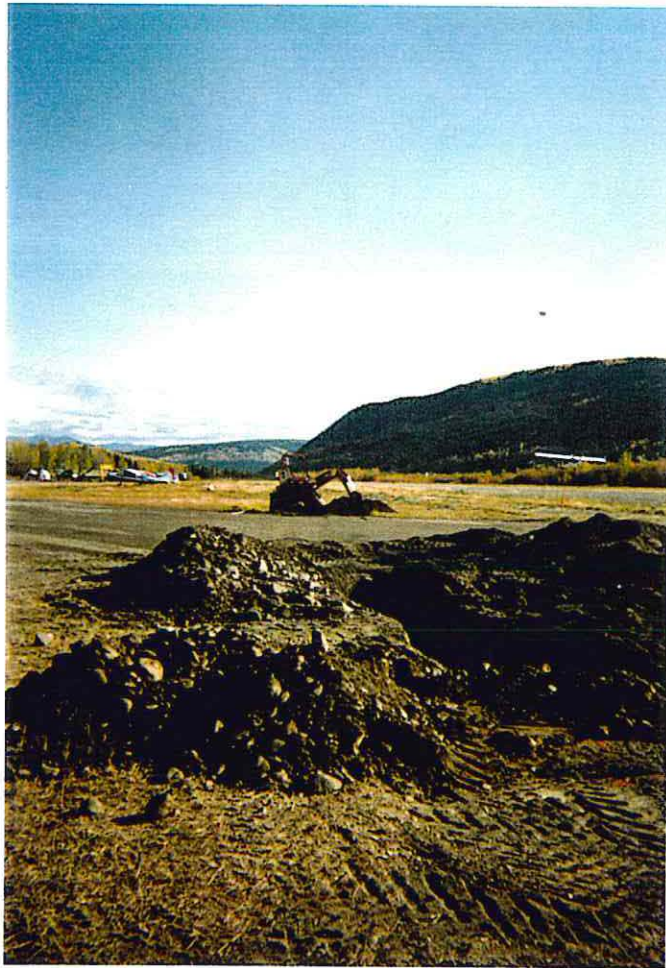


PHOTO # 7 – Repair Area 1 – Additional Repairs to VASES Cable



PHOTO # 8 – Repair Area 1 – Final Grading and Compacting



PHOTO # 9 – Repair Area 1 – Final Grade – Note the runway location in the background.



PHOTO # 10 – Repair Area 2 – Excavation Base



PHOTO # 11 – km 688.7 – Loading of Granular E material from existing stockpile.



PHOTO # 12 – Repair Area 2 – Granular E Backfill Operations



PHOTO # 13 – Repair Area 2 – Granular A Grading and Compaction



PHOTO # 14 – Repair Area 3-1 – Excavation Base



PHOTO # 14 – Repair Area 3-2 – Excavation Base



PHOTO # 15 – Repair Area 3-2 – Granular E Backfill Operations



PHOTO # 16 – Repair Area 3-2 – Preliminary Grading near top of Granular E



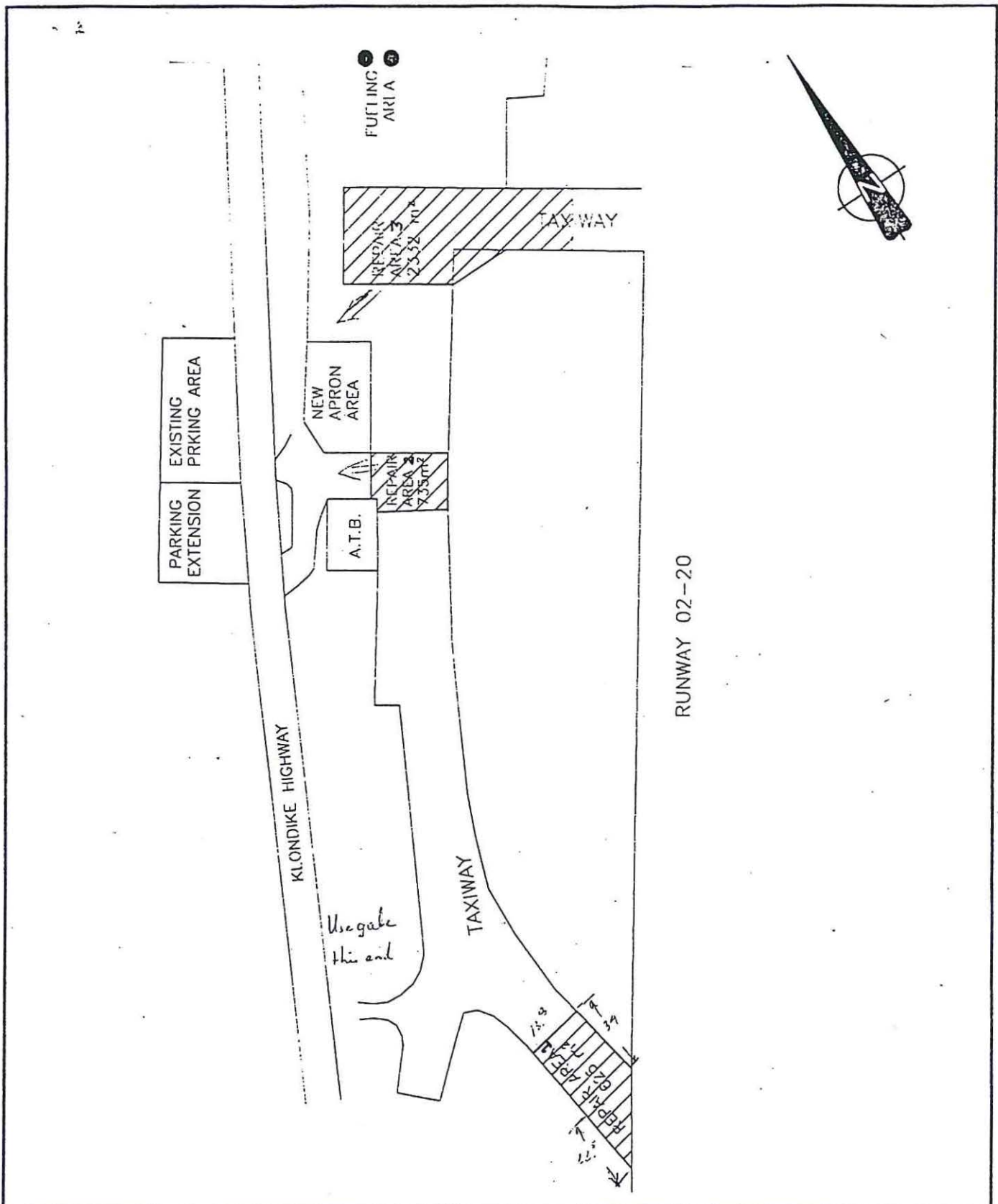
PHOTO # 17– Repair Area 3 – Near completion of final grade
View to the Southeast – Note the runway in the background

**Appendix F – Survey Quantity Calculations
& Layout**

Quantity Calculations
 Dawson Airport Improvements
 Sept. 1998

	Total	Total	Total	Prior to Sept.11, 98		After Sept.11, 98	
	Excavation Common	Gran E	Gran A	Gran E	Gran A	Gran E	Gran A
Area 1 South Taxiway	364.8	277.9	66.7	277.9	66.7	0	0
Area 2 Terminal	612.1	535.9	52	535.9	41.6	0	10.4
Area 3 Main Taxiway	2722.6	2530.2	236.6	675.9	103.1	1854.3	133.5
New Apron Area	72.2	0	72.2	0	0	0	72.2
Terminal Parking Lot	0	0 0.5 load (6.3 m3)		0	0	0	6.3
Project Totals	3771.7	3344	433.8	1489.7	211.4	1854.3	222.4

NOTE: Quantities for Areas 1 - 3 determined through average end area calculations
 New Apron Quantities Determined as follows:
 $(44.0m)(20.5m)(0.08m)=72.2m^3$
 Corralates to 5.5 loads placed @ 12.6 m³ = 69.3m³
 Terminal Parking Lot Quantities determine through load counts
 0.5 loads placed @ 12.6 m³ = 6.3 m³
 Total load counts for Gran A placed - 35 loads @ 12.6 m³ = 441m³

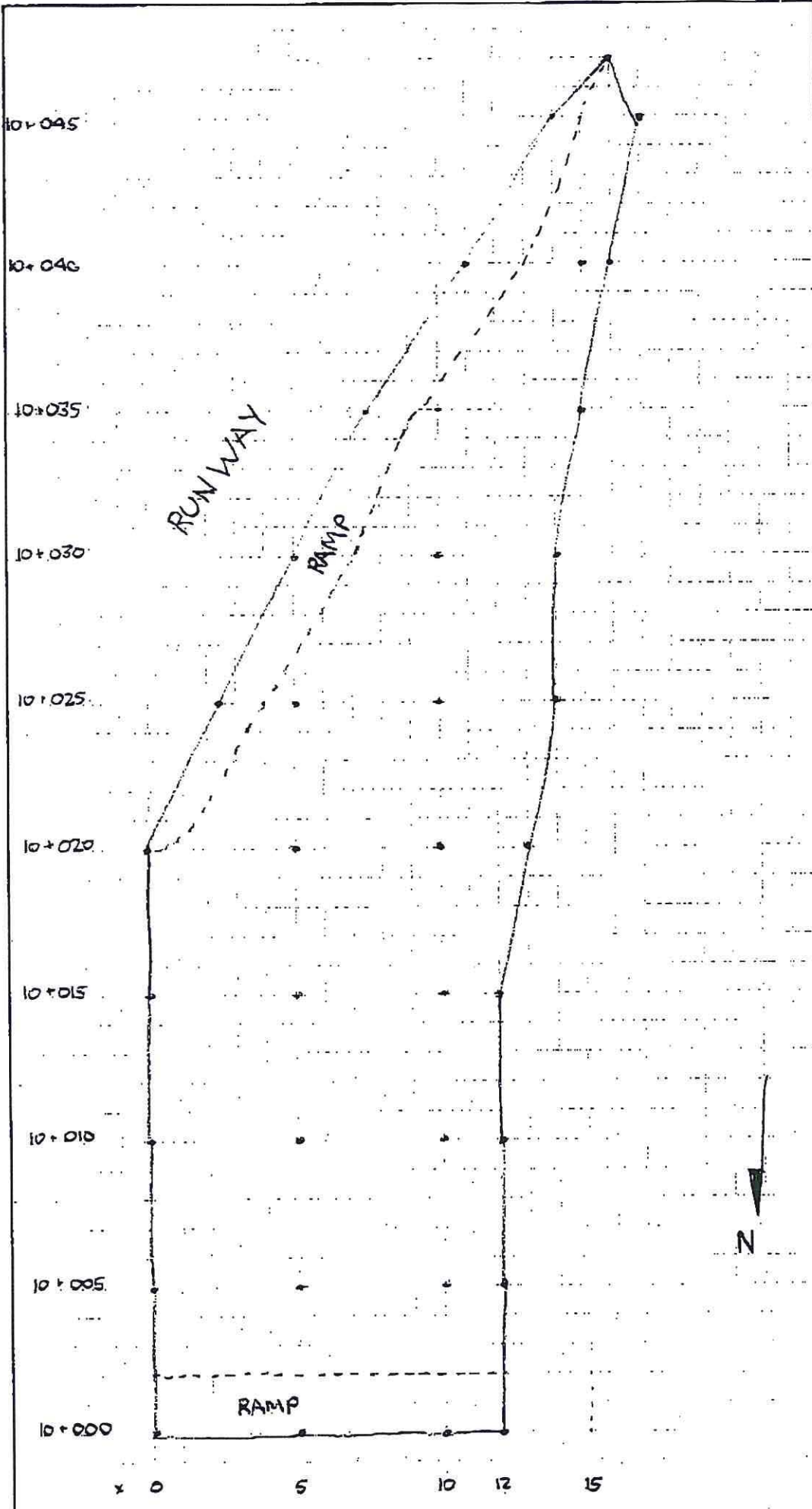



Yukon
Community and Transportation Services

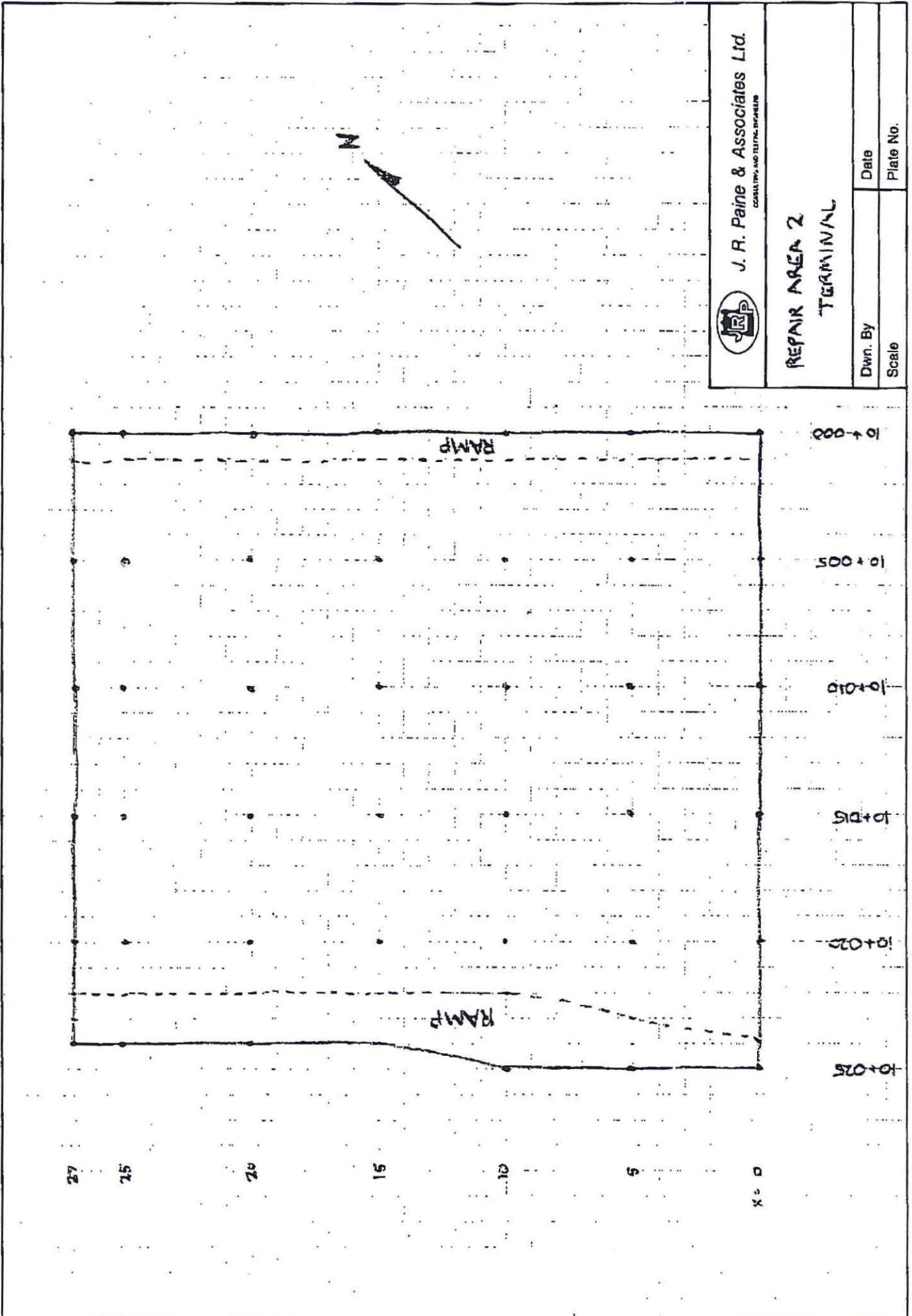
Transportation Engineering Branch

SITE PLAN
PARKING APRON AND
TAXIWAY IMPROVEMENTS
DAWSON CITY AIRPORT
DAWSON CITY, YUKON

designed:	B. FULCHER
drawn:	DS
app'd:	
date:	98-07-15
scale:	N.T.S.
drwg:	CYDA-03



 J. R. Paine & Associates Ltd. <small>CONSULTING AND SURVEY ENGINEERS</small>		REPAIR AREA 1 SOUTH TAXIWAY	
		Dwn. By _____ Scale _____	Date _____ Plate No. _____



J. R. Paine & Associates Ltd.
CIVIL, MECHANICAL AND ELECTRICAL ENGINEERS

REPAIR AREA 2
 TERMINAL

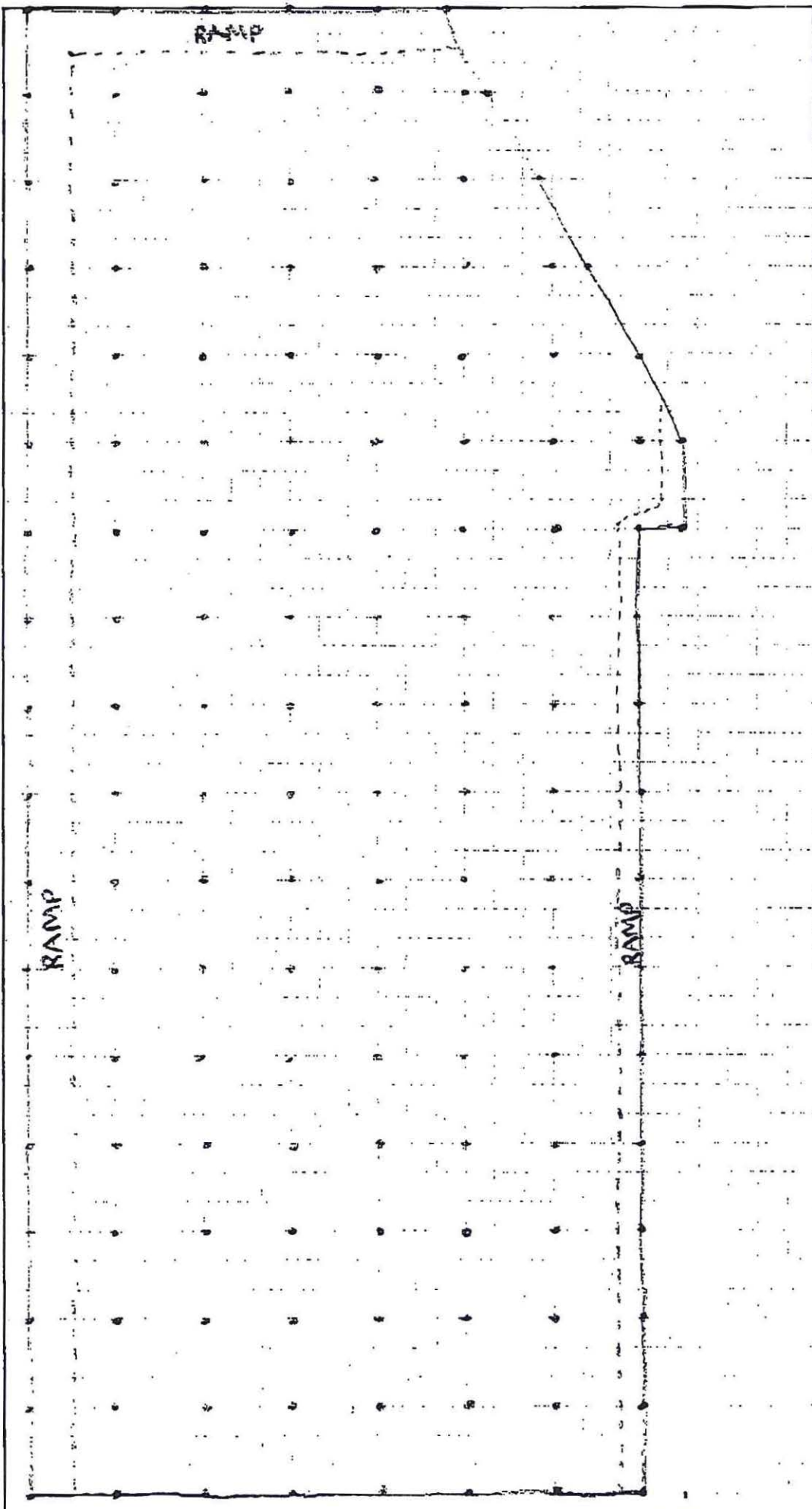
Date


Dwn. By

Plate No.

Scale

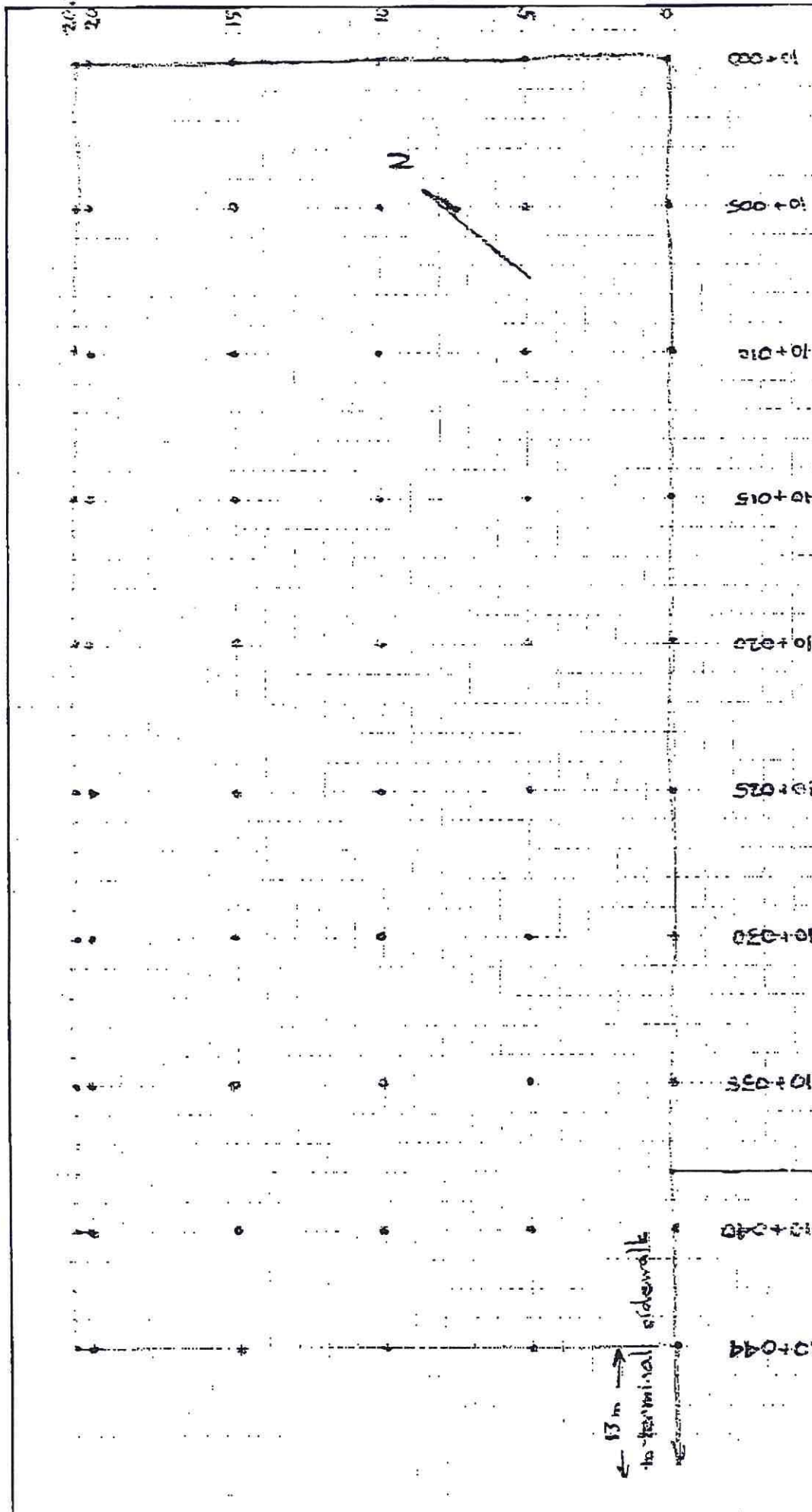
10+070
 10+065
 10+060
 10+055
 10+050
 10+045
 10+040
 10+035
 10+030
 10+025
 10+020
 10+015
 10+010
 500+0
 10+005
 10-005
 10-010
 10-015




J. R. Paine & Associates Ltd.
CIVIL ENGINEERS

REPAIR AREA 3
MAIN TAXIWAY

Dwn. By	Date	Plate No.
	Scale	



J. R. Paine & Associates Ltd.
ENGINEERS, ARCHITECTS AND TRADING CORPORATION

NEW APRON AREA

Dwn. By	Date
Scale	Plate No.

REPAIR
 AREA 2

13 m
 to terminal
 sidewalk



J.R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

EDMONTON — GRANDE PRAIRIE — WHITEHORSE — PEACE RIVER

ADDRESS ALL CORRESPONDENCE TO:

14 Burns Road
Whitehorse, Yukon
Y1A 4Y9

File No:8002-146

October 8, 1998

Government of Yukon
Community & Transportation Services
Box 2793
Whitehorse, Yukon
Y1A 2C6

Attention: Mr. Dick Stillwell, P.Eng.

Dear Sir:

**Re: Airport Improvements
Dawson City Airport
Dawson City, Yukon, 1998**

Please find enclosed our report with respect to the above noted project inspection and related services.

Thank you for the privilege of providing this service to your organization. We trust that the enclosed information is suitable for your purposes. If there are any questions or comments please feel free to contact the undersigned at your convenience.

Yours Truly,

J.R.PAINE & ASSOCIATES LTD.

Tares Dhara, P.Eng.
Project Engineer

EDMONTON
462-1288

TD/td

GRANDE PRAIRIE
532-1515

Wilbur C. Kofoed, P.Eng.
Office Manager

WHITEHORSE
668-4648

PEACE RIVER
624-4966