NORTHERN ROAD INVENTORY and RATING SYSTEM

March 1979

Indian and Northern Affairs
Affaires indiennes et du Nord

Engineering and Architecture
Génie et architecture

EA-HQ-79-03

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REPORT RAPPORT

NORTHERN ROAD INVENTORY
and RATING SYSTEM

March 1979

Transportation Division

NORTHERN ROAD INVENTORY AND RATING SYSTEM

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NORTHERN
ROAD INVENTORY AND RATING SYSTEM

1.0 INTRODUCTION

The Department of Indian and Northern Affairs has approximately 3,300 miles of roads under its jurisdiction in the Yukon and Northwest Territories combined. In addition, there are a number of winter roads and approximately 600 miles of initial access roads.

As noted in the report "Northern Roads Task Force - November 1971", produced by the Northern Roads Task Force, the emphasis in future road program development is shifting from the construction of new roads to the upgrading of existing road.

Greater emphasis is therefore required on establishment of technical priorities for reconstruction of the northern roads. These technical priorities, in addition to establishing priorities for reconstruction, should provide a foundation for establishing long range maintenance programs.

The purpose of this report is to present a priority rating system for the road system in the Yukon and Northwest Territories.

2.0 SCOPE

The priority rating system includes the physical inventory of the roads network and the priority rating of the individual links in the road network.

2.1 Physical Inventory

By compiling a physical inventory of the road system and comparing the data with established design standards for such roadways, an indication of the deficiency level of the roadway can be obtained. The concept of roadway deficiency includes design, service and maintenance factors.

2.2 Priority Rating

The priority rating, based on the physical inventory, can be used to determine a reconstruction schedule for the individual sections evaluated.

The priority rating system is designed to evaluate reconstruction priorities solely on a functional basis. Priority considerations which are unrelated to design, service, or maintenance factors are not included in the

priority rating system. Therefore, in developing a reconstruction program from a priority rating scale, judgement is required to provide the type of subjective input which is explicitly excluded from the rating formulae.

3.0 SYSTEM METHODOLOGY

3.1 Road Classification System

The purpose of road classification is to provide a standard for the identification and description of roads within a limited number of classes, grouped according to function and level of service.

"The Northern Roads Policy," 1971 (Appendix A Part I, II and III) established two main categories of roads -- resource roads, and communication roads, with five sub-categories under each. While these categories reflected to some degree the service function of the roads involved, they were primarily administrative groupings which do not fully reflect traffic function, level of use, and level of service.

A supplementary technical classification system was therefore required to provide for a closer relationship between roadway geometric and structural standards, and traffic function, volume and level of service.

The classification system developed by the Roads and Transportation Association of Canada (RTAC) has been adopted for roads in the Yukon and Northwest Territories. Provision is made in the RTAC system for separate grouping of the development roads, and this grouping has been accepted for all gravel roads in the Yukon and Northwest Territories which fall below minimum traffic volume requirements for hot mix paving.

A chart of the detailed classification breakdown is shown in Appendix I. This classification system provides for major variations in terrain conditions and for varying design speeds and provides sufficient flexibility to meet foreseeable needs in the North.

Geometric and structural design standards are based on design speeds and terrain types for the various road classes as shown on the chart (Appendix I).

3.2 Tolerable Standards

A number of existing roads are below current or proposed design standards. This situation will be a recurring one, created either by design standard revisions or a change in function or level of use.

Universal and immediate upgrading of all roads which are below the minimum design standards is obviously impracticable. It is therefore necessary to establish a second, lower standard which is still sufficient to ensure traffic safety and capacity. An example of this practice is bridge design standards, i.e., although new bridges on major roads should be designed to HS 25 loading, existing bridges designated for lower load ratings are still accepted as serviceable.

These tolerable standards are linked to the classification system.

4.0 ROAD EVALUATION

4.1 Evaluation System

An evaluation system has been developed to provide a qualitative analysis of existing conditions in comparison to tolerable standards (see Appendix II).

The system is based on a detailed analysis of three major areas.

- Geometric Design Adequacy
- Maintenance Factors
- Service Factors.

4.1.1 Geometric Design Adequacy

Geometric design adequacy is measured by comparison of existing dimensions to those specified as tolerable under the relevant classification. Numerical values are assigned to each deficiency. (See Appendix II for more detailed explanation).

4.1.2 Maintenance Factors

Maintenance factors are measured by assignment of numerical values to a subjective comparison of existing conditions to defined "Bench Mark" levels. A further assessment of maintenance demand is based on a subjective evaluation of existing maintenance demand compared with estimated reductions in that demand which might be obtained through reconstruction to improved design standards. (See Appendix II for more detailed explanation).

4.1.3 Service Factors

Service factors are measured by assignment of numerical values to recorded traffic volumes, service, function and level. (See Appendix II for more detailed explanation).

4.2 Length of Roads

Tables 1 and 2 describe the mileage variation by road class for the Territories. The Northwest Territories maintain the largest portion of development arterial roads (327 miles) of which the Mackenzie Highway accounts for 296 miles. In terms of development collector roads, the Yukon manages the longest length (678 miles) and of this the Campbell Highway accounts for 362 miles. Because of the 283 mile Canol Road, the Yukon maintains the longest portion of development local roads (605 miles). Neither Territories maintain any development access roads.

Overall, the Territories manage more development collector roads than any other class of roads (1,071 miles). Development local roads (726 miles) and development arterial roads (582 miles) are the next largest category of roads under Territorial responsibility.

4.3 Condition of Roads (Design Rating)

The design rating is such that the higher the score the farther the road design falls below the tolerable design standards. This rating provides information about the physical state of the roads in the Territories. Overall, the roads are in good to very good condition.

The roads of the Northwest Territories are designed to a higher standard than those in the Yukon Territory (see figures 1 and 2). In the Yukon Territory, there are on the average 2 horizontal deficiencies per mile (in terms of inadequate horizontal curves or insufficient horizontal stopping sight distance) as compared to one deficiency per mile in the Northwest Territories. The roadbed width deviates on the average 1 foot short of the tolerable standards in the Yukon Territory, and only .2 of a foot in the Northwest Territories. The vertical alignment of the Yukon roads varies on the average with 1.5 deficient vertical curves or 3 inadequate opportunities to provide a suitable vertical stopping sight distance every mile as compared to .5 deficiencies every mile in the Northwest Territories.

These observations indicate that the design standards expressed in terms of the vertical and horizontal alignment are higher in the Northwest Territories. In both Territories, the roadbed width deviates very little from the tolerable standards.

NORTHERN ROAD

TABLE 1

INVENTORY (IN MILES)

TERRITORY: N.W.T.

DEVELOPMENT ROADS

HIGHWAY	Arterial		Collector			Local			Access		SUB-TOTAL
	60	50	60	50	40	60	50	40	50	40	
Mackenzie Highway (Alberta Border to Ft. Simpson)	296										296
Hay River Highway (Enterprise to Hay River)	31										31
Yellowkife Highway (Mackenzie Highway to Yellowknife)			214								214
Ingraham Trail (Yellowknife to Cameron River)								43			43
Ft. Smith Highway (Hay River to Ft. Smith)			179								179
Ft.Resolution Highway						13	44				57
Liard Highway						21					21
	327		393			34	44	43			841

NOTE: These mileage figures reflect only those sections of roadway that were driveable as of 1976.

Therefore the following road sections are excluded:
Mackenzie Highway miles 296 to 425.5, 931 to 971
Dempster Highway miles 290 to 417

NORTHERN ROAD

TABLE 2

INVENTORY (IN MILES)

TERRITORY: YUKON

HIGHWAY	DEVELOPMENT ROADS										SUB-TOTAL
	Arterial		Collector			Local			Access		
	60	50	60	50	40	60	50	40	50	40	
Whitehorse-Keno (Alaska Highway towards Stewart Crossing to Keno)	142						141				283
Dawson (Stewart Crossing to Dawson)	113										113
Carcross-Skagway (Carcross to B.C. Border)				45							45
Tagish Road (Jake's Corner to Carcross)							34				34
Atlin Road (Tagish Road to B.C.Border)							27				27
Canol Road (Johnson's Carcross past Ross River)							145	138			283
Campbell Highway (Watson Lake to Carmacks)				363							363

(.../2)

NORTHERN ROAD

INVENTORY (IN MILES)

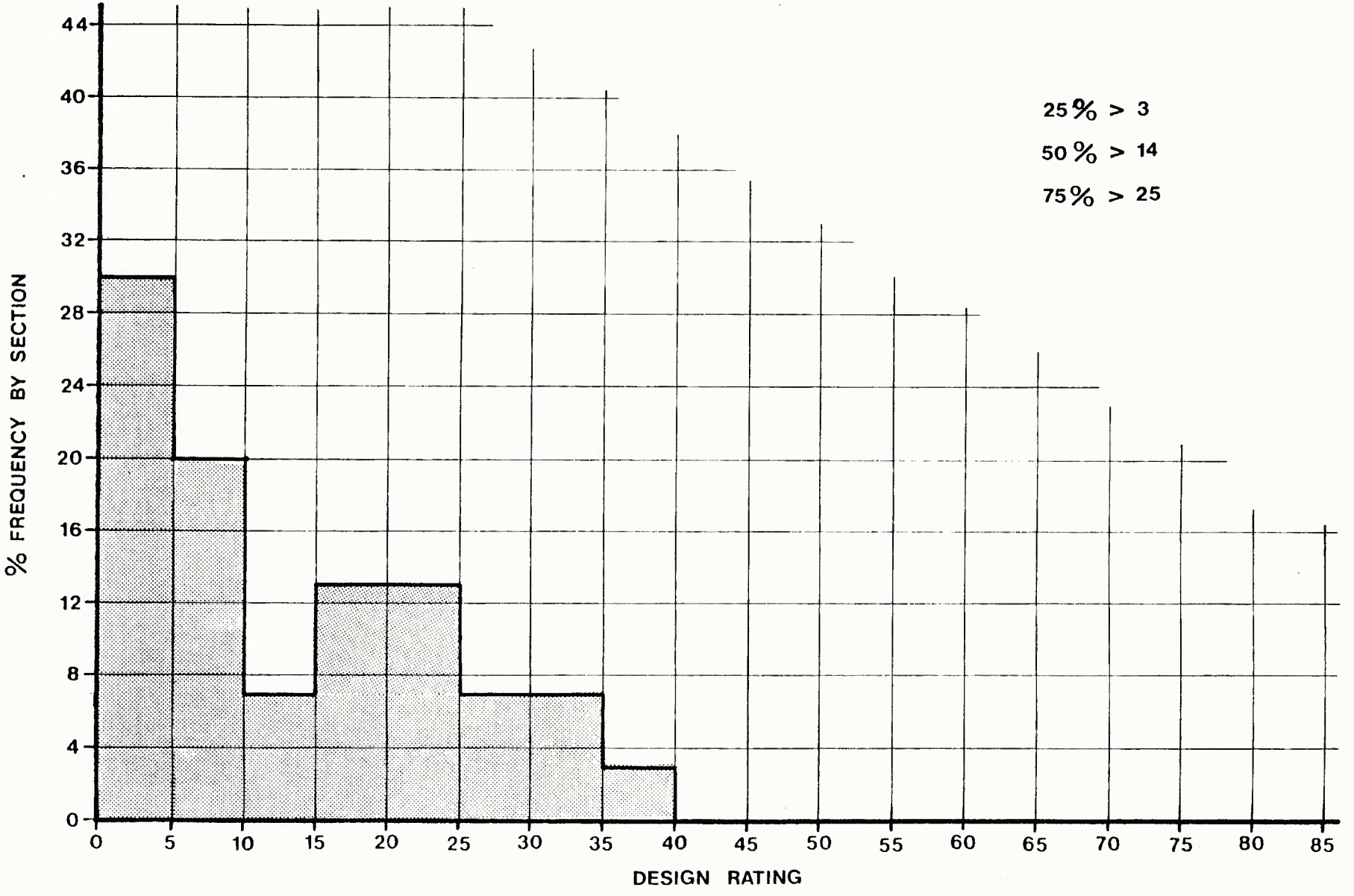
TERRITORY: YUKON

HIGHWAY *	DEVELOPMENT ROADS										SUB-TOTAL
	Arterial		Collector			Local			Access		
	60	50	60	50	40	60	50	40	50	40	
Nahanni Range Road (From Campbell Highway)							80				80
Dempster Highay (Flat Creek to N.W.T. Border)				270							270
Boundary Road (Dawson to Alaska Boundary)							67				67
	255			678			494	138			1,565

* excludes the Alaska Highway

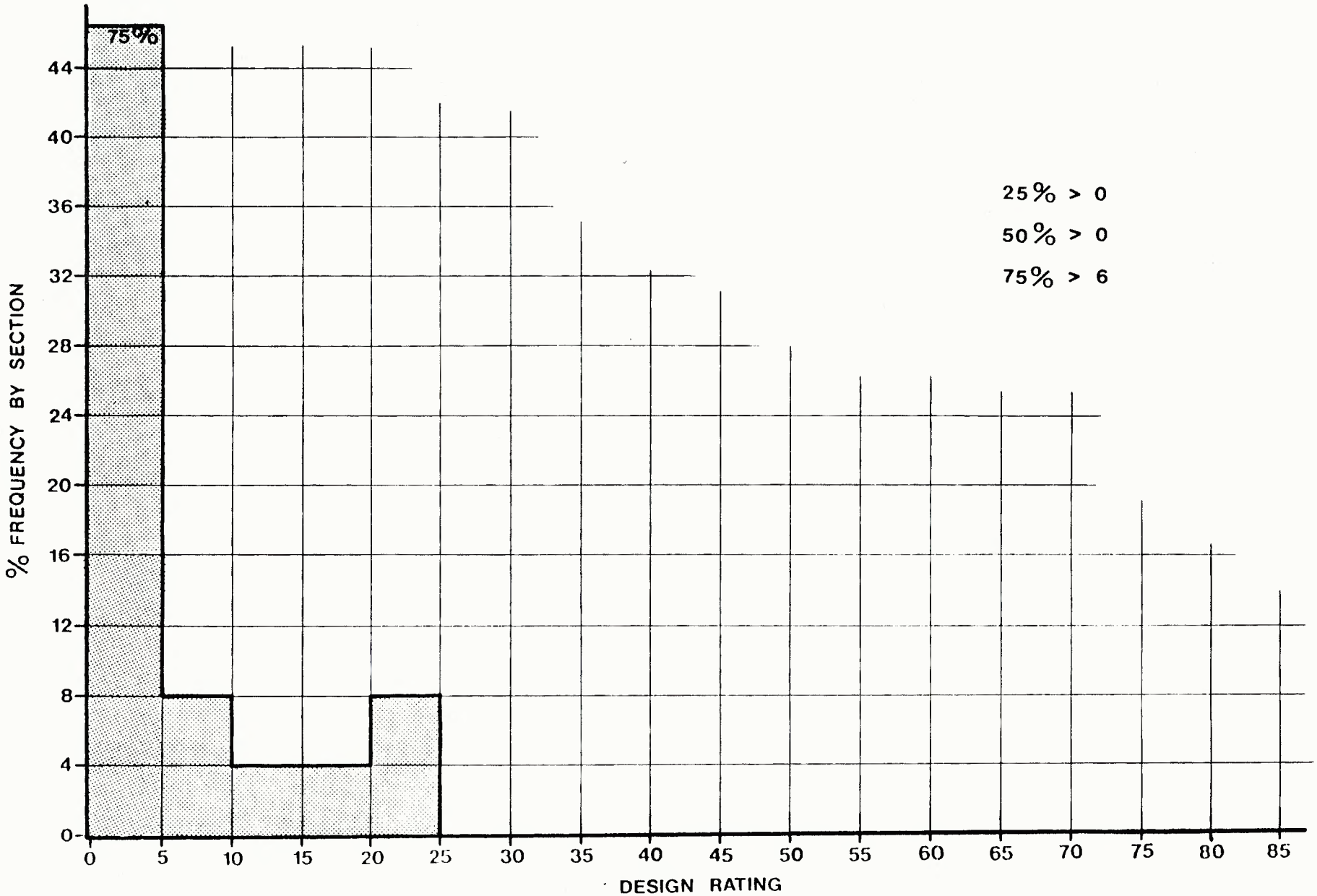
NOTE: These mileage figures reflect only those sections of roadway that were driveable as of 1976

Therefore the following road sections are excluded:
Dempster Highway miles 254 to 290
Carcross Skagway miles 50.3 to 85



YUKON – ROAD NETWORK – GRAPH

FIG. 1



NWT – ROAD NETWORK – GRAPH

FIG. 2

4.4 Usage of Roads (Service Rating)

Low service ratings for a road are good and indicate that is has low traffic volumes, is part of an access network to an area, and does not serve as a special function route such as a mine haul road or school route. Overall 87 per cent of the Territorial roads have ratings less than 8 out of a possible 25 (see Figures 3 and 4). The traffic volumes of the Yukon Territory are lower than those of the Northwest Territories (less than 200 vehicles per day in the Yukon Territory as compared to 300 vehicles per day in the Northwest Territories).

4.5 Maintenance of Roads (Maintenance Rating)

High maintenance ratings indicate a road requiring a lot of maintenance, and a low score indicates a road requiring little maintenance.

This score is based on: the cross-sectional configuration of the roadway (the condition of the side and back slopes); the surface condition (the ease of maintaining the roadbed surface); the draining ability of the roadbed, culverts and ditches; and the maintenance demand due to deficiencies in meeting the design standards.

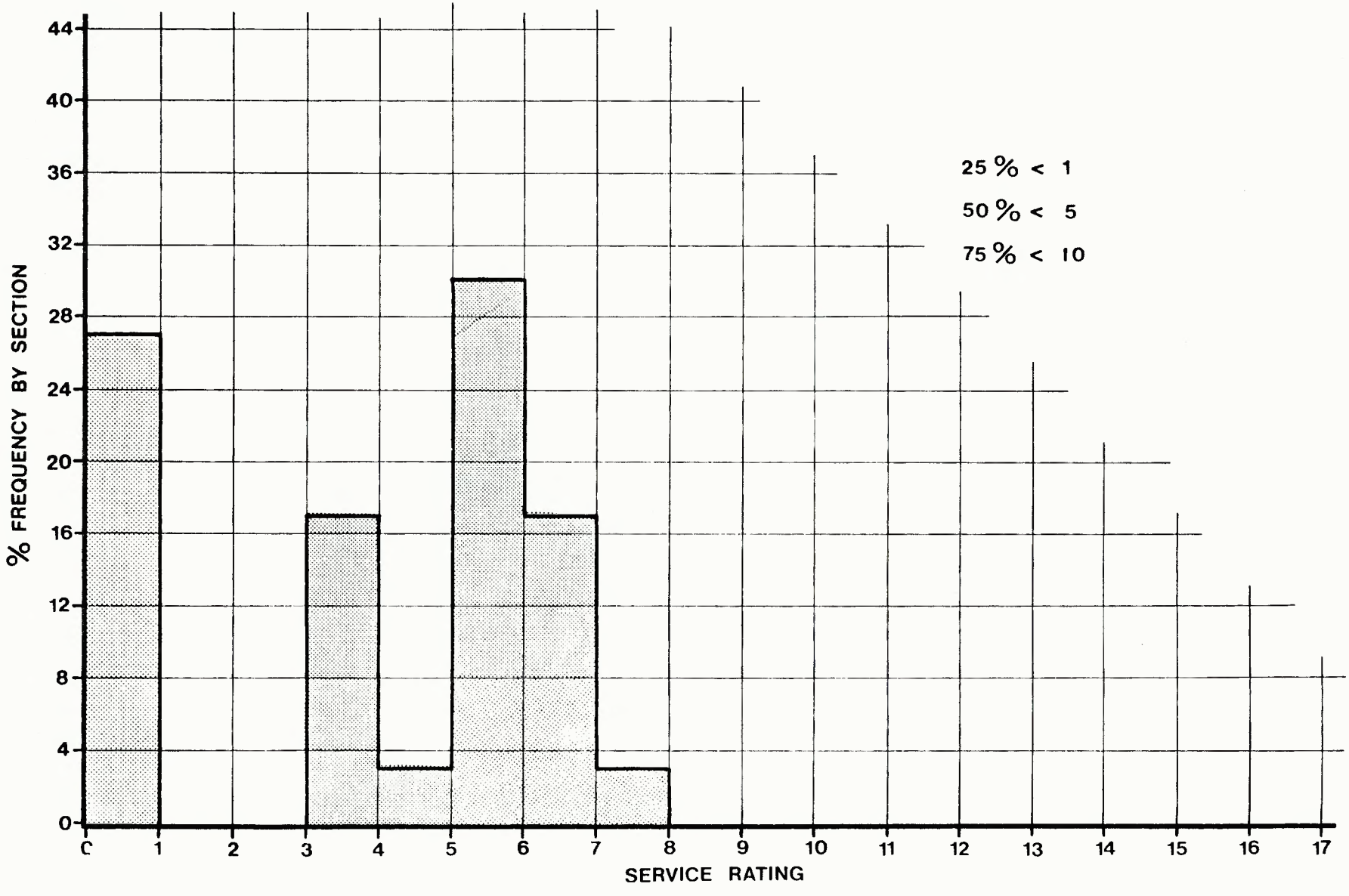
The overall maintenance requirements are similar in the two Territories (both average between 17 and 18 out of a possible 35), (see Figures 5 and 6). Deviation is accounted for by the cross-section and maintenance demand factors; the Northwest Territories register 15 to 17 per cent lower than the Yukon Territory. Since both factors are dependent upon the design standards, these figures support the previous observation - i.e., the roads in the Northwest Territories are designed to a higher standard than those in the Yukon Territory.

5.0 ROAD PRIORITY RATING

5.1 Priority Rating

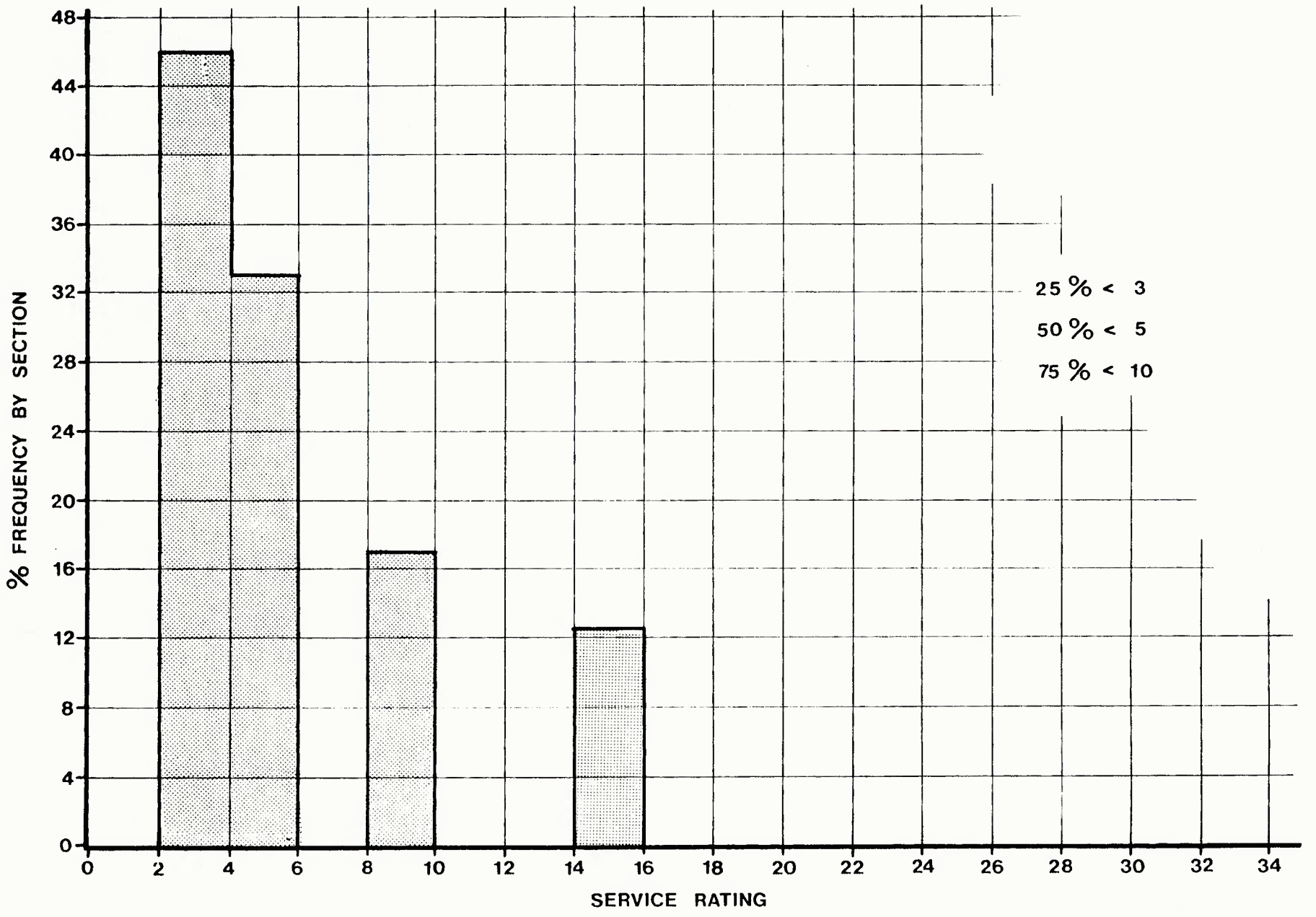
A technical priority rating (in relative terms rather than absolute) can then be obtained by summing the numerical values obtained under the headings, Design Factors, Maintenance Factors and Service Factors. (See Tables 3 and 4).

Appendix IV shows the final ranking of road sections by priority rating.



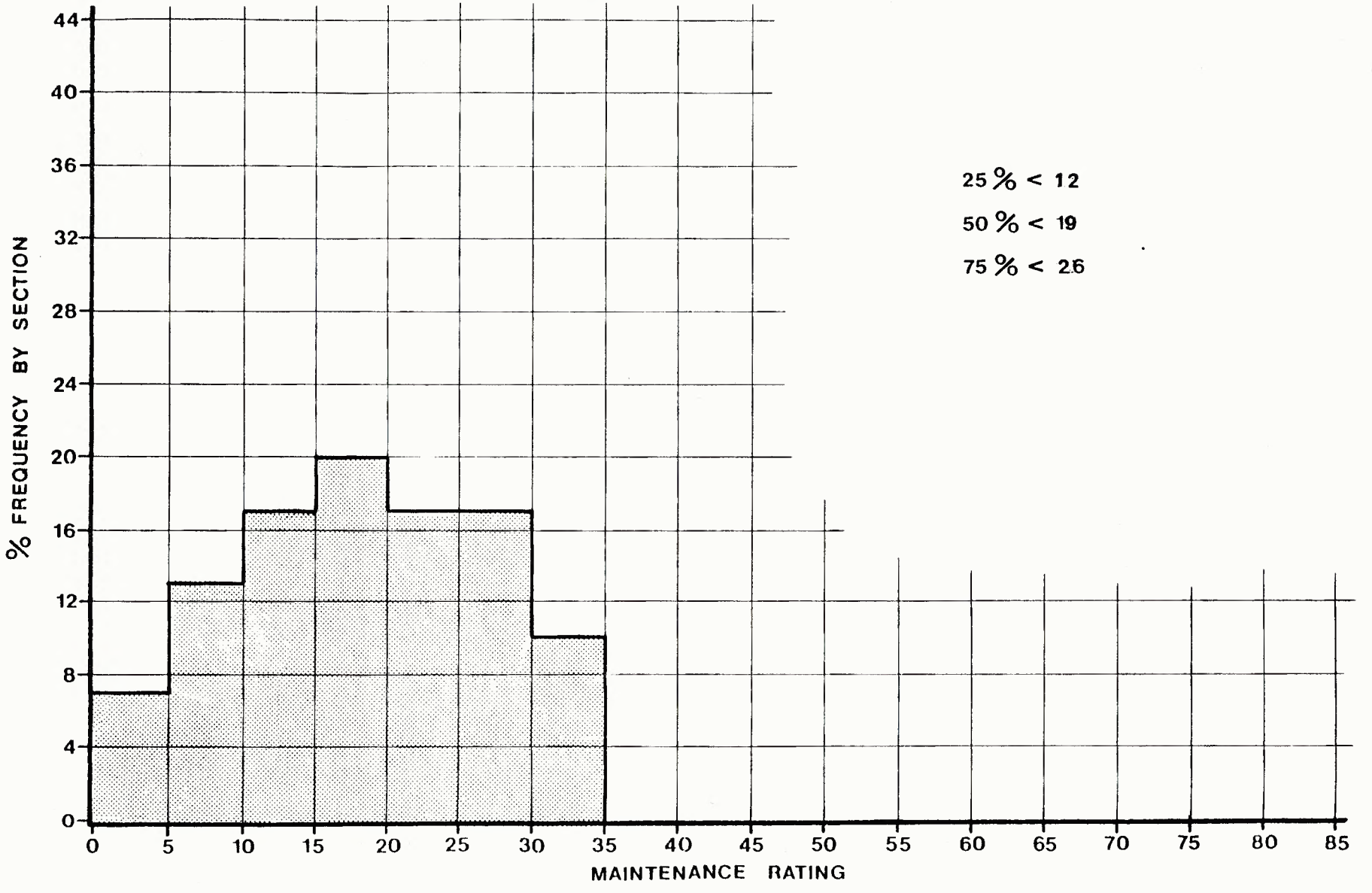
YUKON - ROAD NETWORK – GRAPH

FIG. 3



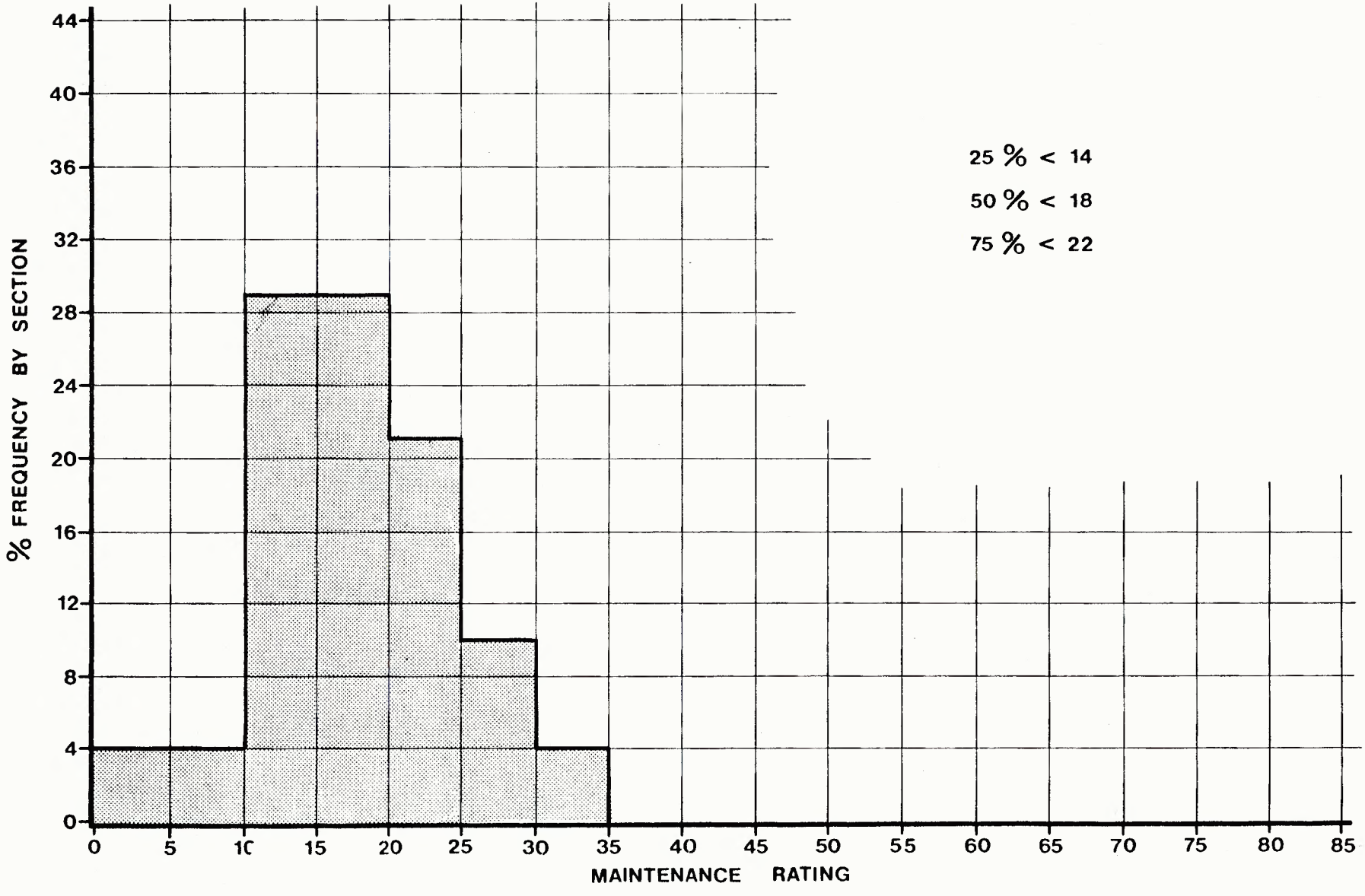
NWT – ROAD NETWORK – GRAPH

FIG. 4



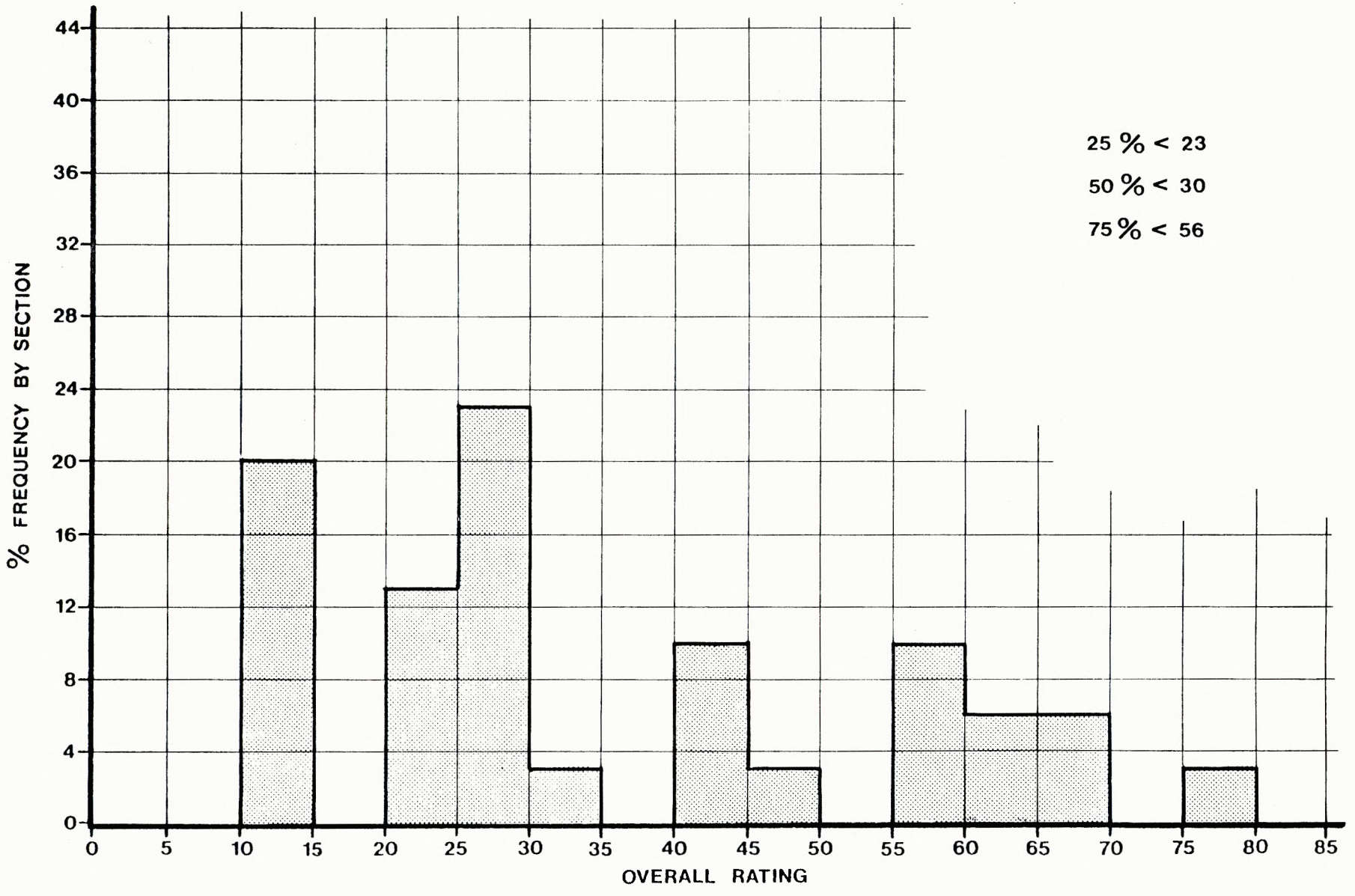
YUKON – ROAD NETWORK – GRAPH

FIG. 5



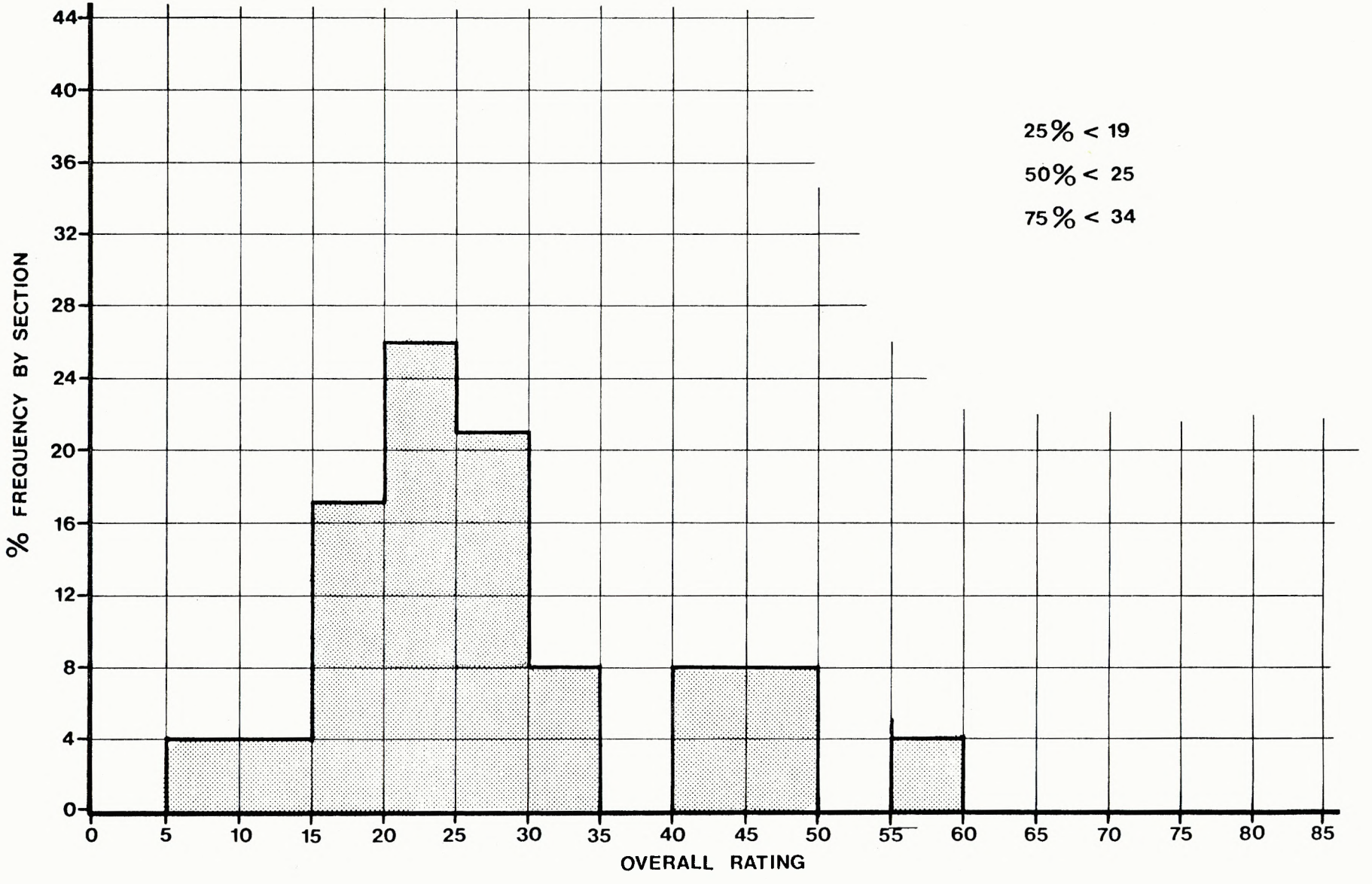
NWT – ROAD NETWORK – GRAPH

FIG. 6



YUKON – ROAD NETWORK – GRAPH

FIG. 7



N W T – ROAD NETWORK – GRAPH

FIG. 8

NORTHERN ROAD INVENTORY AND RATING SYSTEM

TABLE 5

(STATISTICAL ANALYSIS)

TERRITORY	No. of Links	RATING	RANGE	AVERAGE	PERCENTILE 25th	50th	75th
NORTHWEST	24	Design	0 - 24	4	0	0	6
		Service	3 - 15	5.5	3	5	10
		Maintenance	5 - 31	1 8	14	18	22
		Priority	8 - 60	28	19	25	34
YUKON	30	Design	0 - 40	13	3	14	25
		Service	1 - 7	3.5	1	5	5
		Maintenance	4 - 35	17	12	19	26
		Priority	11 - 78	34	23	30	56

5.2 Reconstruction Priority for Roads

The priority ratings are ranked in the same manner as the maintenance and service ratings i.e., the high score indicating a high priority for reconstruction and a low score indicating a low priority for reconstruction. Generally, both Territories have low ratings, 50 per cent of the Yukon road network has ratings below 25, and 75 per cent of the Northwest road network has ratings below 34 (see Figures 7 and 8). The Yukon Territory does have high ratings (greater than 56) for a small portion of its roads (25 per cent). This fact is attributred to lower design standards.

6.0 APPLICATION OF PRIORITY RATINGS

Using the technical priority ratings as a base, an overall reconstruction program can be planned by superimposing other considerations (economic and political) to develop recommended project phasing and scheduling. Descriptive statistical data can also be extracted for general information.

APPENDIX I

NORTHERN DEVELOPMENT ROAD

CLASSIFICATION SYSTEM

1.0 DESCRIPTION OF CLASSES

1.1 Development Arterial

Development arterials are intended to carry higher volumes of long distance, high speed traffic in isolated areas. Their primary function is traffic movement, and as such, direct access to abutting lands should be restricted. These facilities should be designed for uninterrupted free-flow of traffic, and average running speeds of 40 to 60 mph.

It can be anticipated that a very high percentage of the total traffic using these roads will be heavy truck traffic.

1.2 Development Collector

Development collectors provide the hierarchical link between development locals and development arterials. Their land service function is equally important to their traffic service function and as such they generally will provide direct traffic service to tourist areas, mining or resource development areas, and small towns and villages. Due to the land service function development collectors provide, traffic flow will be interrupted by traffic control measures, and vehicles leaving or entering adjacent properties.

Running speeds will range from 30 to 50 mph and it can be anticipated that because of the importance of trucks as a means of goods and resource movement in the north, a high percentage of the total traffic will be heavy trucks.

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1.3 Development Local

The main function of development locals is to provide land access. Due to the low intensity of development in the North, such locals may traverse long uninterrupted distances however and in such cases should be designed accordingly.

Running speeds may range from 25 to 50 mph and, since such roads will generally serve mining or other resource development areas, it can be anticipated that heavy units will predominate in the traffic flow.

2.0 DESIGN STANDARDS

In setting design standards for each of the above categories the previously discussed constraint regarding rugged terrain was considered. Two sets of standards have been developed: one for ordinary terrain and one for rugged terrain. Such an approach recognizes the economic realities of highway construction in the north. TABLE I illustrates the proposed standards for normal and rugged terrain application.

2.1 Tolerable Standards

In addition, it was necessary to develop a set of "tolerable" design standards for each of the facility categories in both types of terrain.

These tolerable standards represent conditions considered as acceptable in assessment of existing roads.

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In the case of new road construction or the reconstruction of an existing road which falls below "tolerable" standards, the road should be designed and constructed to the design standards previously established and shown in TABLE I.

TABLE I contains the proposed "tolerable" standards.

DEVELOPMENT ROAD DESIGN STANDARDS

CLASSIFICATION	ARTERIAL				COLLECTOR						LOCAL								ACCESS				
TERRAIN TYPE	NORMAL		SEVERE		NORMAL			SEVERE			NORMAL				SEVERE				NORMAL		SEVERE		ALL
DESIGN SPEED	60	50	60	50	60	50	40	60	50	40	60	50	40	30	60	50	40	30	50	40	50	40	–
MAX. CURVATURE	5	7	6	8	5	8	10	6	8	12	5	8	10	15	6	8	12	25	8	10	8	12	35
MAX GRADIENT	5	6	7	7	5	6	8	7	8	10	6	7	8	10	7	8	10	12	8	10	10	12	14
TRAVEL SURFACE	24	24	24	24	24	22	22	22	20	20	22	22	20	20	22	22	20	20	20	20	20	20	12 wi...
SHOULDER WIDTH	4	3	3	3	3	3	2	3	2	2	3	2	2	2	3	2	2	2	3	2	2	2	–
STOPPING SIGHT	475	350	475	350	475	350	275	475	350	275	475	350	275	200	475	350	275	200	350	275	350	275	40
PASSING SIGHT	2000	1700	2000	1700	2000	1700	1300	2000	1700	1300	2000	1700	1300	800	2000	1700	1300	800	1700	1300	1700	1300	–

DEVELOPMENT ROAD TOLERABLE STANDARDS

CLASSIFICATION	ARTERIAL		COLLECTOR			LOCAL					
DESIGN SPEED	60	50	60	50	40	60	50	40	30	50	40
MAX. CURVATURE	6	8	6	8	12.5	6	8	12.5	25	8	12.5
MAX. GRADIENT	8	10	8	10	10	10	11	12	12	12	14
TRAVEL SURFACE	22	20	20	18	18	18	18	18	18	18	18
SHOULDER WIDTH	3	3	3	3	3	3	3	3	2	2	2
STOPPING SIGHT	475	350	475	350	275	475	350	275	200	350	275
PASSING SIGHT	2000	1700	2000	1700	1300	2000	1700	1300	800	1700	1300

TABLE 1

APPENDIX II

NORTHERN DEVELOPMENT ROAD

INVENTORY PROCEDURES -

EVALUATION MANUAL

DEVELOPMENT ROAD

PRIORITY RATING SYSTEM PROCEDURES

EVALUATION MANUAL
JUNE 1976

TRANSPORTATION DIVISION

ENGINEERING AND ARCHITECTURE BRANCH

DEPARTMENT OF INDIAN AFFAIRS

AND NORTHERN DEVELOPMENT

NOTE: This version of the manual was used to evaluate the field data and is presently being updated.

The manual is intended to be used by personnel involved in the evaluation of data collected from the inventory of Development Roads.

The manual describes the procedures to be used in assigning point values to road section deficiencies and calculating priority indices.

A sample inventory field sheet is attached, and this manual is organized in the same numerical item sequence as that field sheet, each item providing the necessary description of procedures to be followed.

This manual should be used in conjunction with the following reports:

1. Northern Roads Inventory and Rating System
2. The Northern Development Road Classification System
3. Field Manual: Northern Development Road Inventory Procedures

NOTE: Items #1 through #9 are not rateable items, and consequently no action is required for these items.

Item #10: Horizontal Alignment

Using the total number of deficiencies shown under "item value" on the evaluation sheet for the section and the selection length (Item #6 on evaluation sheet) calculate the average number of deficiencies per mile.

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Assign 15 points per deficiency per mile up to a maximum of 18 points, and enter the points as obtained under the "points assigned" column for item #10 on the evaluation sheet.

Item #11: Roadbed Width

By comparing the actual width of the roadway indicated on the evaluation sheet for the section with the tolerable width for the roadway classification and design speed (see Appendix I) obtain the number of feet of deficiency.

Assign 2 points per foot of deficiency up to a maximum of 16 points and enter the points so obtained in the "points assigned" column for item #11 on the evaluation sheet.

Item #12: Vertical Alignment

Using the total number of deficiencies shown under "item value" on the evaluation sheet for the section and the section length (item #6 on the evaluation sheet) calculate the average number of deficiencies per mile.

Assign 5 points per deficiency per mile up to a maximum of 6 points, and enter the points so obtained under the "points assigned" column for item #12 on the field evaluation sheet.

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NOTE: At this point the points assigned for items #10 through #12 should be totalled and entered in the "subtotal" box provided for this purpose on the evaluation sheet.

Item #13: Service Class

Using the entry under VMH (vehicle mile factor) and the table attached as Appendix "A" determine the point value to be assigned to this category. The maximum number of points is 25. This entry should then be made in both the point value column for item #13 and the "subtotal" box provided for service factors.

NOTE: For items #13 through #17, point values will have been assigned in the field.

The point values for these items should now be totalled and entered in the "subtotal" box provided for this purpose on the evaluation sheet.

The three subtotals should now be added to provide the total points assigned to the road section, and entered in the box provided as item #18.

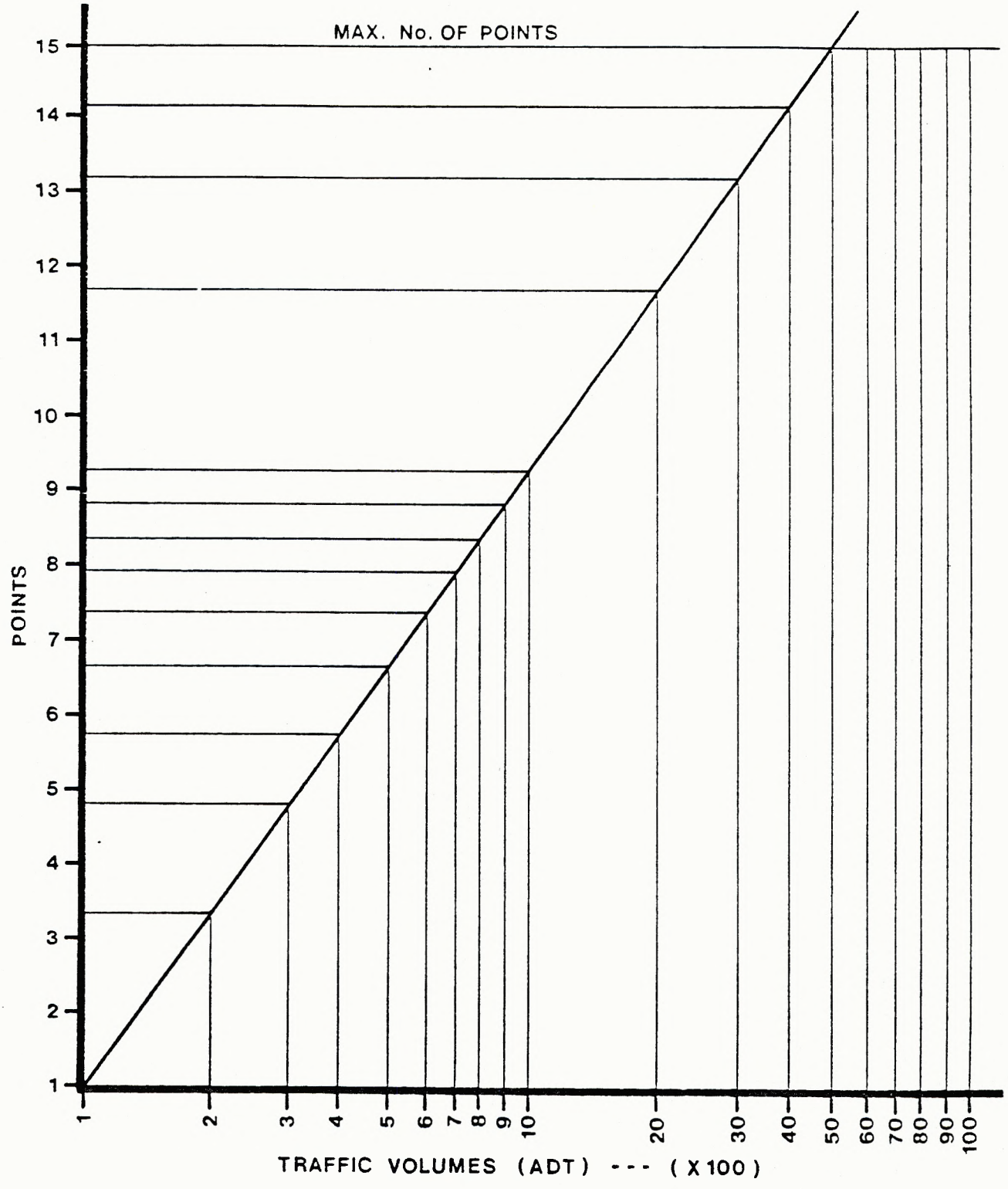
DEVELOPMENT ROAD PRIORITY RATING SYSTEM — EVALUATION SHEET

1. DATE: 17 AUG 76 2. TERRITORY: YUKON
3. HIGHWAY NAME & NUMBER: ATLIN ROAD 7
4. CLASSIFICATION: LOCAL 50 5. SECTION NO:
6. SECTION LENGTH: 27 7. MILEAGE START: 0 MILEAGE END: 27
8. SURFACE TYPE: PIT RUN GRAVEL + $CaCl_2$ 9. DESIGN SPEED: 50 M.P.H.

	ITEM	TITLE	RATING GUIDE	MAX. RATING	FIELD NOTES	POINTS ASSIGNED
DESIGN FACTORS	10	HORIZONTAL ALIGNMENT	15 ~~8~~ PTS. / DEFICIENCY / MILE	18	NO. OF DEFICIENCIES 56	8
	11	ROADBED WIDTH (FT.)	2 PTS. / FOOT DEFICIENCY	16	0 FT.	0
	12	VERTICAL ALIGNMENT	~~52~~ PTS. PER DEFICIENCY PER MILE	6	NO. OF DEFICIENCIES 3	6
						SUBTOTAL
SERVICE FACTORS	13	SERVICE FACTOR	SEE GUIDE	25 (ALL ITEMS)	ADT: 165 UNIQUE ACCESS? YES ☑ NO ☐ SP. FUNCTION RTE? YES ☐ NO ☑ V. M. F.	3 5 0
						SUBTOTAL
MAINTENANCE FACTORS	14	CROSS SECTION	GOOD: 0 FAIR: 4 POOR: 7	7		5
	15	SURFACE CONDITION	GOOD: 0 POOR: 10	10		10
	16	DRAINAGE	GOOD: 0 POOR: 10 (INTERMEDIATE VALUES ALLOWED) SEE GUIDE	10		5
	17	MAINTENANCE DEMAND	LOW: 0 AVERAGE: 4 HIGH: 8	8		8
						SUBTOTAL 2

18 TOTAL POINTS 15

NOTES ON REVERSE YES ☐ NO ☑



VEHICLE NUMBER FACTORS

APPENDIX A

APPENDIX III

NORTHERN DEVELOPMENT ROAD

INVENTORY PROCEDURES

FIELD MANUAL

DRAFT

NORTHERN
DEVELOPMENT ROAD
INVENTORY PROCEDURES

FIELD MANUAL

TRANSPORTATION DIVISION
ENGINEERING AND ARCHITECTURE BRANCH
DEPARTMENT OF INDIAN AFFAIRS
AND NORTHERN DEVELOPMENT

May 1976

section numbers to be assigned to each portion of road to be surveyed is attached to this manual, and the appropriate code number from this list should be entered in this item.

Item #6 Section Length. The mileage length of the section should be measured in the field using an odometer calibrated to hundredths of a mile, and the length so obtained entered here, to the nearest tenth of a mile.

Item #7 Road Mileages. The appropriate accumulative road mileage readings at the start and end of the section should be entered. The accumulative road mileage should be the distance between Mile "0" of the highway, and the point at which the reading is taken.

Item #8 Surface Type. The type of road surface on the section should be described in the following terms:

(a) Pit Run Gravel

(b) Crushed Gravel

(c) Low cost bituminous surfacing treatment

(d) Hot Mix Bituminous

Item #9 Design Speed. A list of designated design speeds for each road section has been appended to this manual. This list should be consulted to obtain the design speed for the road section being surveyed, and the information entered here.

Item #10 Horizontal Alignment. Method 'A' assessed where as constructed drawings are available.

From the tolerable standards for development roads. (App.A) determine the maximum degree of curvature and the minimum

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Item #11 Roadbed Width. The average width of the roadway for the section (excluding rounding) should be measured and the entry made on the field sheet. The "point value" box should be left blank for completion at a later date by office staff.

Item #12 Vertical Alignment. For the roadway classification and design speed the maximum grade and minimum stopping sight distance should be determined according to the tolerable standards. The number of deficient grades and the number of locations having deficient stopping sight distance should then be determined. Where a deficient grade is combined with a deficiency in stopping sight distance, these should be treated as one deficiency.

Where "as constructed" drawings are available the existing grades and stopping sight distances may be checked from the plans or where such material is not available., a clinometer should be used to determine existing grades.

The number of deficiencies should then be determined and the entry made. The "points assigned" box should be left blank for office completion.

Item #13 Service Factor. The ADT value should be entered by office staff. Field staff should note whether the road provides the only ground access to a community or facility, under the "unique access" question. Field staff should also note whether or not the route is a school bus route.

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Item #16 Drainage. Points should be assigned on a scale from 0 to 9 for this item, with good drainage being assessed at 0, and poor drainage at 9. Bench mark descriptions for these ratings are as follows:

(a) Good. The whole of the roadway must be well drained with adequate culverts in size and number, no water ponding in the ditches, and no major areas of scour. No. of points 0.

(b) Fair. Some ponding in the ditches with culverts generally adequate in size and number. No. of points 5.

(c) Poor. Insufficient culverts, water ponding, major scouring and ditches not functioning. No. of points 10.

The appropriate point value should be entered in the "points assigned" box.

Item #17 Maintenance Demand. The intention of this item is to provide some indication of the extent to which the maintenance demand on given road sections is due to deficiencies in the road itself. Necessarily the evaluation of this item will be quite subjective. The deficiencies of each section as it exists should be related to what the deficiencies would be if the road were to be reconstructed to design standards. The primary question standards and/or re-location would in fact reduce the amount of maintenance required.

... 8

APPENDIX B

METHOD "B" CHART

ROAD CLASS	ARTERIAL			COLLECTOR			LOCAL		
Design Speed	60	60	60	50	40	60	50	40	30
Maximum Tolerable Curvature	6^{o}	8^{o}	6^{o}	8^{o}	12.5^{o}	6^{o}	8^{o}	12.5^{o}	25^{o}
Mid-Ordinate for 200' Chord	5.3 ft.	7.0 ft.	5.3 ft.	7.0 ft.	11.1 ft.	5.3 ft.	7.0 ft.	11.1 ft.	23.0 ft.

Highway Atlin Road — Section TAGISH ROAD – MILE 27 (B.C. BORDER) — Date 10/11 AUG. 76

No. 7 — Designation LOCAL 50 — Page 1 o

7 Odometer Reading	Mile Post	10 Hor. Curve > 8°	12 Crest Curve < 350 ft.	12 Sag Curve < 350 ft.	Grade > 11 %	11 Road Width	14 Cross Section	15 Surf. Cond.	16 Drainage	Remarks
26716.03	0									JCT. ALASKA HIGHWAY
17.0								F-G	F RT.	JCT. ATLIN & TAGISH ROADS
17.18			✓							0% 200' 8% →
17.29										ENT. RIGHT TO OLD BORROW PIT
17.3				✓		22	G	F	P	
17.58			✓							2% 7% 150' 300' →
17.77			✓							2% 5% 200' 150' →
18.05			✓							7% 6% 150' 150' →
18.1	2					25	G	F-G	G	
18.32			✓							3% 350' 350' 5% → PHOTO 7-2-1
18.4	2.2									LITTLE ATLIN CREEK
18.5			✓							7% 200' 2% 100' →
18.1			✓	✓				F-G		6% 150' 3% 200' →
18.12			✓							2% 150' 5% 150'
18.85										ENT. RIGHT
18.3			✓				F-P BACK SLOPE 5:1	F-G	G	0% 150' 7% 200' → PHOTO 7-2-2
19.05								"	F-P LEFT	TYP. CROSS SECTION IN BOOK, PAGE
11 Aug 26868.0	0									
70.05	2									
* 71.03	3									
71.15			✓							-1% 200' -6% 100' 2% 150' 1% 100' →
71.2				✓						
71.28			✓							
* 72.12	3							F-G	F-P LT.	
72.43									N	ENT. RIGHT TO LITTLE ATLIN LAKE PICNIC

NORTHERN

DEVELOPMENT ROAD

INVENTORY PROCEDURES

FIELD MANUAL

MAY 1976

TRANSPORTATION DIVISION

ENGINEERING AND ARCHITECTURE BRANCH

DEPARTMENT OF INDIAN AFFAIRS

AND NORTHERN DEVELOPMENT

NOTE: This version of the manual was used to collect the field data and is presently being updated.

APPENDIX IV

NORTHERN DEVELOPMENT ROAD

INVENTORY AND RATING SYSTEM -

ROADS RANKED BY PRIORITY RATING

NORTHERN ROADS INVENTORY AND RATING SYSTEM

YUKON TERRITORY ROADS

RANKED BY PRIORITY RATING

PRIORITY	ROAD	HIGHWAY	CLASSIFI-CATION	SECTION	DESIGN SUB-TOTAL	SERVICE SUB-TOTAL	MAINTENANCE SUB-TOTAL	TOTAL
1	CANOL ROAD	8	DLU 50	(150-172)	40	6	32	78
2	CARCROSS-SKAGWAY	5	DCU 50	(35-48)	30	5	35	70
3.	CANOL ROAD	8	DLU 50	(172-283)	35	6	26	67
4	CANOL ROAD	8	DLU 50	(138-150)	30	6	26	62
5	BOUNDARY ROAD	12	DLU 50	(38-67)	25	5	31	61
6	DEMPSTER HIGHWAY	11	DCU 50	(25-78)	33	1	26	60
7	WHITEHORSE-KENO	2	DLU 50	(272-283)	24	6	26	56
8	TAGISH ROAD	6	DLU 50	(0-34)	24	3	29(23)	56(5
9	CANOL ROAD	8	DLU 40	(0-138)	25	1	23	49
10	ATLIN ROAD	7	DLU 50	(0-27)	14	3	28(23)	45(4
11	NAHANNI RANGE	10	DLU 50	(50-65)	19	1	22	42
12	CARCROSS-SKAGWAY	5	DCU 50	(0-32)	16	5	21	42
13	NAHANNI RANGE	10	DLU 50	(0-50)	18	1	16	35
14	CAMPBELL HIGHWAY	9	DCU 50	(0-226)	9*	1	20	30*
15	NAHANNI RANGE	10	DLU 50	(65-80)	14	1	15	30
16	CAMPBELL HIGHWAY	9	DCU 50	(226-258)	8*	1	19	28*

Notes: * Figures calculated from inventory classification of the highway as DLU 60, using the assumption that 75% of the deficiencies would not exist had the classification been DLU 50.

: Dempster Highway not complete due to unavailability of information at this time.

: Figures on Cross Section, Surface Condition and Maintenance Demand came from RJA, except those in brackets which are from D.P.W.

PRIORITY	ROAD	HIGHWAY	CLASSIFI-CATUIB	SECTION	DESIGN SUB-TOTAL	SERVICE SUB-TOTAL	MAINTENANCE SUB-TOTAL	TOTA
17	WHITEHORSE-KENO	2	DLU 50	(246-272)	0	6	22	28
18	WHITEHORSE-KENO	2	DAU 60	(85-130)	9	5	14	28
19	DAWSON	3	DAU 60	(99-101)	18	3	6(9)	27(3
20	CAMPBELL HIGHWAY	9	DCU 50	(258-363)	4*	5	18	27*
21	WHITEHORSE-KENO	2	DAU 60	(20-55)	8	5	12	25
22	WHITEHORSE-KENO	2	DAU 60	(142-214)	7	4	14	25
23	WHITEHORSE-KENO	2	DAU 60	(130-142)	2	5	16	23
24	WHITEHORSE-KENO	2	DAU 60	(55-85)	1	5	16	22
25	WHITEHORSE-KENO	2	DAU 60	(0-20)	3	7	5	15
26	DAWSON	3	DAU 60	(0-50)	1	3	11	15
27	DAWSON	3	DAU 60	(50-99)	0	3	10	13
28	DAWSON	3	DAU 60	(101-113)	0	3	10	13
29	BOUNDARY ROAD	12	DLU 50	(0-38)	1	5	6	12
30	WHITEHORSE-KENO	2	DLU 50	(214-246)	6	1	4	11

NORTHERN ROADS INVENTORY AND RATING SYSTEM

NORTHWEST TERRITORIES ROADS

RANKED BY PRIORITY RATING

PRIORITY	ROAD	HIGHWAY #	CLASSIFI-CATION	SECTION	DESIGN SUB-TOTAL	SERVICE SUB-TOTAL	MAINTENANCE SUB-TOTAL	TOTAL
1	INGRAHAM TRAIL	4	DLU 40	(3-18)	24	10	26	60
2	INGRAHAM TRAIL	4	DLU 40	(2-3)	24	10	14	48
3	MACKENZIE HIGHWAY	1	DAU 60	(51-85)	11	4	31	46
4	INGRAHAM TRAIL	4	DLU 40	(18-43)	19	10	14	43
5	HAY RIVER HIGHWAY	2	DAU 60	(23-27)	0	15	27	42
6	HAY RIVER HIGHWAY	2	DAU 60	(0-23)	0	15	20	35
7	FT. SMITH HIGHWAY	5	DCU 60	(11-143)	7	3	24	34
8	INGRAHAM TRAIL	4	DLU 40	(0-2)	6	10	14	30
9	MACKENZIE HIGHWAY	1	DAU 60	(0-38)	0	6	24	30
10	MACKENZIE HIGHWAY	1	DAU 60	(38-51)	1	6	22	29
11	HAY RIVER HIGHWAY	2	DAU 60	(27-31)	1	15	11	27
12	FT. SMITH HIGHWAY	5	DCU 60	(0-11)	0	3	24	27
13	YELLOWKNIFE HIGHWAY	3	DCU 60	(170-212)	0	5	20	25
14	FT.RESOLUTION HWY.	6	DLU 50	(42-57)	0	4	21	25
15	YELLOWKNIFE HIGHWAY	3	DCU 60	(0-150)	2	5	17	24
16	YELLOWKNIFE HIGHWAY	3	DCU 60	(150-170)	0	5	18	23
17	FT.RESOLUTION HWY.	6	DLU 50	(13-42)	0	4	18	22
18	MACKENZIE HIGHWAY	1	DAU 60	(85-296)	0	3	18	21
19	FT.SMITH HIGHWAY	5	DCU 60	(143-158)	0	3	16	19
20	LIARD HIGHWAY	7	DLU 60	(0-21)	0	3	15	18
21	YELLOWKNIFE HIGHWAY	3	DCU 60	(212-214)	0	5	12	17
22	FT. RESOLUTION HWY.	6	DLU 60	(0-13)	0	4	13	17
23	FT.SMITH HIGHWAY	5	DCU 60	(167-179)	0	3	8	11
24	FT. SMITH HIGHWAY	5	DCU 60	(158-167)	0	3	5	8