

MAINTENANCE REPORT ON HIGHWAYS

IN ALASKA

by

John L. Palmer

I. Scope of Coverage

During the period of July 7 to July 14, 1957, approximately 1300 miles of principal highways were inspected in Alaska. The mileages and highways covered are as follows:

Elliott Highway	83 miles
Steese	52
Richardson	307
Alaska	152
Taylor	42
Glenn	318
Edgerton	39
Sterling	134
Seward - Anchorage	131
Nebesna	<u>15</u>
Total	1,273

In addition to the above highways, a considerable mileage of local roads and streets was inspected in the vicinity of Juneau, Fairbanks, Anchorage and Palmer.

II. Condition of Highways

(1) Bituminous pavements

Because of their comparatively recent construction, the bituminous pavements have not as yet required any major maintenance. In numerous places, however, serious settlements and waves have developed over permafrost areas which should be corrected by leveling courses. Most of these areas are marked by permanent warning signs which indicate they have been in existence for some time. Discussions with district engineers revealed that these settlements do not always appear the first year after construction but become gradually worse from succeeding summers until the permafrost layer recedes to a new permanent elevation. The worse conditions prevail where the mat was placed over the original road having little or no base. This type of construction occurred during the early stages of the resurfacing program. Current construction of 24-foot widths of plant-mix on good bases and roadbeds have very few settlements at the present time.

Alaska uses three grades of asphalt - MC-0 for primes, MC-3 for seals and RC-3 for plant mixes. It has been the practice to place a chip seal on plant mix surfaces shortly after construction in order to provide better visibility and better skid-resistant qualities.

### (2) Gravel surfaces

Much of the work being done on gravelled surfaced highways should be considered as a betterment rather than maintenance. In the past, such roads were constructed to rather low pioneer standards and were subsequently improved little by little until a fairly usable road was developed. Materials nearest at hand are currently used for surfacing and as a result many sections are very rough riding due to oversize rock, lack of binder, and sometimes complete lack of surfacing. These roads do, however, serve their purpose and it is extremely doubtful if users object to rough surfaces as long as they can get their vehicles over the road. Maintenance, however, is neglected during the summer months due to force account construction. It is the practice to blade and shape the roads in the spring and fall, and then use the personnel and equipment on construction during the summer.

### (3) Shoulders

The current construction standards for primary highways provide for a 24-foot grade with a 24-foot bituminous surface. As a consequence, there are practically no shoulders to maintain.

### (4) Drainage

In general, the maintenance of side ditches appeared to be satisfactory, but in some areas sags in the ditch line are holding water. In numerous instances, cross pipes are badly bowed under fills and there was evidence that entrapped water was saturating the road foundation. Many of these pipes are located on the Richardson Highway between Fairbanks and Big Delta, and on the Alaska Highway between Big Delta and Tok Junction. Both of these sections had little reconstruction prior to placing the bituminous surface. On the Alaska Highway portion, many of the original wooden pipes were left in place. At least one sagged pipe was observed on an active construction project on the Sterling Highway indicating that this condition does not necessarily occur after construction. It was also felt that additional cross pipes should be provided on long grades in side hill locations to avoid carrying water long distances in side ditches.

### (5) Structures

A bridge replacement program is now underway. The design appears adequate from a maintenance viewpoint except that the timber wingwalls are too short to hold shoulder material. In practically all instances shoulders were washed out at the bridge ends causing a hazardous traffic condition.

(6) Roadside

The only attempt to eliminate roadside growth that could be seen is the spraying of vegetation with the weed-killing chemical 2,4-D. This work has been done only in selected areas to improve sight distance and has not been too effective. The growth along the highways is extensive and covers the entire roadside from the shoulders and ditches to the right-of-way line. Clearing with bulldozers should be undertaken as soon as possible as this clearing together with the trees and stumps pushed to the side during original construction should be burned.

(7) Traffic service

Adequate warning and informational signs are in place on the principal highways. While much of the signing is in accord with recommended practices a few minor variations were noted; for example, one railroad crossing was protected by STOP signs. Pavement marking on rural sections of paved roads has been limited to the more heavily travelled portions near municipalities and usually does not extend more than 30 to 50 miles from the larger cities. It is the intention, however, to extend this work to cover the entire mileage. Alaska uses a white broken center line and yellow barrier lines. The stripes are not reflectorized.

At the present time there is very little guardrail on highways in Alaska. Former Alaska Road Commission employees indicated some objection to guardrail from a winter maintenance standpoint although they realized its importance as a safety measure. A supply of beam-type guardrail has been acquired and is to be installed in the near future.

III. Equipment

Because of the large amount of construction work performed in past years by the former Alaska Road Commission, much of the equipment now on hand is too large and cumbersome for ordinary maintenance work. Due in part from lack of funds, a large amount of equipment has been obtained from military surpluses and in many instances was not in good condition. Replacement has been difficult. It was mentioned that three tractors, each costing about \$19,000 when new, were overhauled during the winter at a cost of \$15,000 per tractor. It was also brought out that the Road Commission had never had a new rotary snow plan. Those that they have were acquired from the military as surplus and were well worn when received. A systematic equipment replacement program should be placed in effect to obtain suitable equipment for maintenance operations. Additional equipment is also needed for maintaining bituminous pavements, pavement markings, signs, guardrail, and roadsides.

#### IV. Shops

Cursory examinations of shops and storage yards were made at the following locations: Juneau, Fairbanks, Birch Lake, Delta Junction, Tok, Slana, Glennallen, Valdez, Thompson Pass, Anchorage, Homer, and Soldotna. A number of the shops are new and were constructed from plans developed by the former Alaska Road Commission. These new shop buildings vary in size but all are timber-framed and sheathed with metal. The layout and buildings at Soldotna (Sterling Highway) are exceptional. The garage or shop is 100 ft. x 89 ft. situated in a large enclosed yard. Outside the enclosure near the bank of the Kenai River is a very modern residence, 32 ft. x 48 ft., for the foreman and his family. It is the intention to gradually replace older shop buildings with this new design which will greatly facilitate equipment repair and service especially for winter maintenance.

#### V. Recommendations

1. Additional work should be carried out to restore the sags and distortions in bituminous surfaces.
2. Delay the placing of chip seals on new bituminous mats until needed.
3. Correct sagged culvert pipes.
4. Install additional cross-pipes where needed and especially on long sidehill grades.
5. Reshape side ditches to eliminate ponding.
6. Install guardrail at hazardous places.
7. Additional blading, shaping and surfacing are needed on gravel roads.
8. A better quality of granular surfacing material should be used on certain sections. (An excess of oversize material was noted on sections of the Elliott and Steese Highways where tailings from mining operations are used.)
9. Wingwalls on many bridges should be corrected to hold shoulder material.
10. A systematic equipment replacement program should be put into effect. With the prospect of curtailing force account construction and increasing maintenance operations, smaller units are needed. A study should be made by an equipment specialist for determining the type, size, and quantity of equipment needed and also the possibility of, at least, partial standardization of makes. Only a few manufacturers maintain an adequate supply of repair parts in the larger Alaska cities.

11. Shoulders should be added to existing primary highways and should be included in all future construction (Not less than 4-ft. shoulders should be provided).

12. Immediate purchase should be made for at least two large rotary snow plows for work at Thompson Pass this coming winter. There is also immediate need for rock drilling equipment for obtaining riprap and additional equipment for maintaining bituminous surfaces.

#### VI. Proposed Plan for Reporting Maintenance Performance

Since all maintenance activities are under the immediate control of the Bureau of Public Roads, any system for inspecting and reporting maintenance performance would in effect constitute a self-appraisal. In lieu of such a system, it is proposed to have the regional engineer submit, at his convenience, an annual report on over-all maintenance operations. The annual report should include the following data:

##### A. Summer Maintenance

- (1) Mileage of graded roads maintained by Bureau of Public Roads
- (2) " " gravel " " " " " " "
- (3) " " bit. " " " " " " "
- (4) " " F.A. Systems " " cities " "

##### B. Winter Maintenance

- (1) Routes and mileage kept open by Bureau of Public Roads
- (2) Routes of F.A. Systems and mileage kept open by cities

##### C. Type and amount of work performed by Bureau of Public Roads on a reimbursable basis.

##### D. Maintenance Problems

- (1) Highway and bridge deficiencies
- (2) Equipment
- (3) Shops
- (4) Other

E. Expenditures

- (1) Summer maintenance by Bureau of Public Roads
- (2) Winter " " " " " "
- (3) Maintenance by others on F.A. Systems

F. Major equipment purchased during the year

G. Inventory of major equipment

H. Shops or other buildings constructed or under construction

I. Brief discussion of the adequacy of maintenance

VII. Miscellaneous Notes

(1) The maintenance cost accounts that have been developed by the Washington office accounting personnel are too broad and do not cover all necessary work items. It was stated that workmen in the field are at a loss as to which account certain types of work are to be charged. It is recommended that the regional office set up new descriptions of accounts to fit their needs. Typical of the work items not covered by present accounts are:

- (1) Ditch cleaning and reshaping
- (2) Shoulder maintenance
- (3) Roadside maintenance - Chemical weed control, brush and tree cutting
- (4) Erosion control
- (5) Resealing bituminous surfaces

(2) Decision was made not to accept any bid for construction unless the bid bond is either with the bid or in the office at the time of bid opening.

(3) A program for erecting guardrail is to be initiated as soon as possible.

(4) Centerline striping to be extended until all paved surfaces are marked.

(5) The placing of chip seals on new bituminous mats is to be postponed until a preservative treatment is actually needed.

(6) Consideration to be given for constructing shoulders on new projects where bituminous mats are to be built. Present practice of placing 24-ft mats on 24-ft. graded widths leaves no shoulders and insufficient lateral support and in addition provides no space for guardrail.

(7) The regional office is in dire need of legal advice for obtaining rights-of-way, and for clarifying other legal questions. Mr. Swick advised that the services of an experienced attorney for as little as a two-week period would be most helpful.

July 16, 1957

ALASKA - CONSTRUCTION  
By John H. Wall

Purpose:

The purpose of this trip was to cover the road system of Alaska and visit the various maintenance shops, construction camps and going construction operations so as to familiarize ourselves insofar as possible with existing conditions and acquaint ourselves to some degree with the country and the engineers involved in our work.

We were also to assist by our advice and aid relative to administration, construction and maintenance matters and discuss with the field office engineers such Federal-aid procedures as might be desirable.

Existing Roads:

In discussing some construction features of the various highways covered I shall designate the several road types involved which would be applicable to both primary and secondary system roads.

Macadam:

These previously constructed highways vary considerably in width and condition. Mostly they are of plant mix construction although some few of them are penetration.

These plant mixes are generally a 1.5 inch mat and vary in width from 20 to 26 feet. Much of this work was laid over old pavement and some on newly prepared base.

Prior to the laying of the mat, corrective measures were taken in subsidence areas and other fault spots. Apparently it is quite impossible to accurately anticipate such fault areas, especially where permanent frost conditions prevail as an apparently stable area may fault one year and tighten up the next. Slippage of poor and unstable side hill cut areas has also contributed to road movement and some road subsidence.

The mix used in this pavement is quite dense and builds a good tight pavement. The several roads which have been laid in the past year or two and left unsealed show little if any ravelling and very little if any surface moisture penetration. This appears to be a sound construction procedure as leaving the road to cure out for a year or two permits corrective measures to be taken, if needed, before sealing, then when the chips are applied the result is practically a new roadway with less likelihood of pavement failure roughness.

The immediate sealing of roads may be of some advantage in some parts of the country as a possible protection against frost and freezing action but generally such argument could hardly be practical for general



application where deep freeze is the general rule. Another advantage could be for night driving visibility but other and cheaper means such as striping could be utilized.

The feather edging of the pavement into the existing shoulder area, without shoulder build up, rather than to square off the pavement edge and build up the shoulder can, I think, show justification only because of the local policy of constructing little or no shoulders with their pavement. In the present instance it does permit a car to regain the highway when it has run off the pavement, without the possibility of holding the wheels and perhaps throwing the car out of control. Such danger spots would, of course, be more acute where the road is on a high fill or side hill cut with little or no outside shoulder. While the construction of adequate shoulders may involve additional costs, it is believed that both from a utilitarian and psychological standpoint it would be well worth the difference.

#### Gravel:

The many miles of gravelled roads that we traversed showed a continuing loss of road metal due to not having applied any apparent means of surface stabilization. As a result the fines are working to the bottom or else blowing away and the coarse and large stone is surfacing, causing insecure traction and skidding. In some areas there is a definite lack of gravel material available for such work and it could become more costly to haul in gravel to repair such lost road metal before paving operations than it would be to apply some sort of temporary surfacing to protect the base material.

While it is recognized that there must be a continuing desire from the outlying areas for some sort of a usable roadway, it may be advisable not to get too far in advance of paving operations with these gravelled roads unless some retentive application is included in their construction.

#### Grading:

The one section of graded roadway that we went over appeared very good as to line and grade and it is understood that this road is programmed for paving in the near future. Otherwise the same argument as mentioned under gravel roads would apply here also - either protect what has been constructed or else hold off the work until there is a reasonable possibility that the sequence of operations up to a finished pavement can be consummated without the danger of deteriorating delays between operations.

#### Initial Construction:

The breaking open of new alignment areas for several roads we visited were typical of all new construction operations. One thing was

noted, however, and that was the ease of alignment and the apparent good grade possible of attainment.

Shoulders:

Throughout our traveling we noted the great lack of adequate shoulders when compared with our standards of construction in the States. The shoulder widths varied from practically none at all to a foot or two.

Why adequate shoulders were not constructed may have stemmed from a cost factor, or desire for a quick snow shove off, or the fear of developing an additional traffic lane potential, or any number of other reasons. None of these reasons, however, are valid in view of the dangers involved when a car may drive too close to the edge of pavement and slip off or perhaps have tire trouble with no place to go and as a result will stay on the pavement proper and become a traffic hazard.

I am of the opinion that at least a 4-foot shoulder and possibly a 6-foot should be a must on all highways unless some urgent or special reason to do otherwise exists. With such a shoulder it should then be possible to construct any new pavement to its planned width and thickness and in the case of reconstruction the feather edging could be eliminated and the shoulder brought up to the new surface elevation.

Such shoulders should not only provide adequate safety features to the traveling public but should also assist in stabilizing the roadway itself in that the pavement edge would be more nearly retained to its constructed line which should be a factor in edge breaking prevention.

Such shoulder widths would also assist in the creation of a snow or ice berm during the winter months without the attendant reduction in usable roadway width for the traveling public.

Such costs as may be involved in constructing adequate width shoulders are greatly absorbed by the value of such work to the traveling public. An additional safety factor would be the providing of ample space for the erection of guard rail.

Guard Rail:

In some few instances the presence of a somewhat modified type of guard rail was noted but in most needed instances there was no rail at all. This apparently was omitted to provide easier push off of snow or it may have been because of the lack of shoulder width upon which to erect such a guard.

From a safety standpoint the installation of guard rail at danger points is a must. Admittedly it is possible that a vehicle striking the rail may continue over the barrier but the natural reaction to the presence of a barrier on the cliffs edge is more relaxed driving and the elimination to a great degree of center of the road driving which in itself is dangerous.

It is further believed that the guard rail as installed is not too much of a difficulty or deterrent to snow removal as to eliminate it from consideration. The coloring should be optional to offset the local snow conditions.

Drainage:

While drainage is usually a problem everywhere it is somewhat difficult here in some localities because of the rapid accumulation and run off.

It is believed that in view of the many unstable areas involving fills and subsurface support, that the drainage should be carried across the roadway area as quickly as possible and should not be retained by longitudinally carrying it any great distance. This may entail some additional culvert costs but in view of the inherent instability of soils and advantages obtained by a quick run off, such costs should not be too difficult to justify.

Striping:

This operation was most conspicuous by its absence. Except for a few sections there was very little of this work performed and where it has not been done it was noticed that center of the road driving was prevalent.

Striping is a built in safety factor for the car operators and also is usually accepted as a factor legally in that their establishment and operation are made and controlled by State or highway regulations and/or laws.

Color should be optional to conform to the local conditions encountered.

Ditches and Back Slopes:

The ditching and back slope areas observed were generally somewhat irregular. Some of this may have been caused by subsequent slides and weather sluffing, if so it then becomes a maintenance problem.

However, I am not too sure that some of this deterioration could not be avoided by some sort of back slope stabilization.

As stated previously it is believed that the lateral ditching should disperse into cross drains as soon as possible so as to avoid any chance of foundation material saturation and ultimate roadbed movement or failure.

Inspection Reports:

Until we have become more familiar with Alaska operations, procedures and customs in their construction work, it would be expedient to furnish the Washington office with copies of all construction inspection reports prepared.

So far as to who shall make the inspection - the resident engineer should not make it - that is the responsibility of the district engineer. The district engineer can, of course, delegate such work to some designated representative such as the area engineer or construction engineer of the area involved.

After a highway department has been established, such inspections for Federal-aid construction should always, if possible, include an Alaska highway representative.

General Discussions:

Some of the topics generally discussed were:

1. City street snow removal (maintenance) to be performed by the cities on a reimbursable basis.
2. Right-of-way Costs. Previously furnished free by owners - now held up by some owners for payment---policy now established by division is to pay for all R/W, which requires additional funds to cover property evaluations and purchase. Would not be fair to accept free from some and pay for others up here.
3. Snow and ice removal from highways is major problem most of the winter months in some areas. The equipment now in use was observed and while worn it appears to be in fair condition. The Swiss snow plowing machine seen at the air force base may perform satisfactorily under certain conditions but as to whether or not it is rugged enough to handle rough going would require seeing it in operation.
4. Lack of sufficient abutment wing wall construction was noted on many of the bridges resulting in scouring and deterioration of approaches and fill slopes. A general program of riprapping abutment fill slopes and culvert inlets and outlets would assist greatly in installation protection. Lack of cover plates between bridge floor and approach slab were noticed. Void between slab and approach was filled with bituminous

material which was slipping out and exposing the opening.

5. Bid bonds, letting procedures, agreement forms, letter of authority and personnel needs were discussed to some extent and a practical application of the lack of bid bond was demonstrated at the letting held in Juneau on July 16 when a bid was declared ineligible and not read when it was found the bond was missing.

J. H. Wall

JHW:cek

*Master copy for Mr. Eckart.*  
*EHL*

P. O. Box 1600  
Fairbanks, Alaska

September 16, 1957

Mr. E. H. Swick  
Regional Engineer  
Bureau of Public Roads  
Juneau, Alaska

Situation Report  
August 1, 1957 to August 31, 1957

Dear Mr. Swick:

Maximum and minimum temperatures reported for Fairbanks during the period were 83 degrees on August 16th and 40 degrees on August 20th. Total moisture since January 1, 1957 is .80 inches.

Visitors during the period were as follows:

E. H. Swick, Regional Engineer - Juneau  
Wm. H. Niemi, Assistant Regional Engineer - Juneau  
Paul Royster, Act. Asst. Comm. for Operations - Washington Office  
Adam Marshall, Chief, Engineer (Construction Div) - Juneau  
A. K. MacLean, Chief, Facility Design Section (Bldgs) - Juneau  
W. S. Klockenteger, Chief, Materials Branch - Juneau  
E. V. Chatfield, Highway & Construction Engr., Road & Survey Design Branch - Juneau

GENERAL

The Tanana Valley Fair was held August 15-19 at the Fair Grounds. It was well attended and financially a success; however, the farm exhibits were very poor when compared to exhibits of former years. The dry summer season has definitely affected farm production in the Tanana Valley.

Mr. E. H. Swick

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FEDERAL AID PRIMARY

Project F-062-L(2) - Replace 3 wooden bridges with pipe

Work on this project started August 19th.

Timber bridge at Mile 347.5 was removed and replaced with 36" x 50' corrugated metal utilidor type culvert.

The timber bridges at Mile 355.3 and at Mile 356.0, crossing Clear Creek were removed and replaced with twin 36" x 50' corrugated metal utilidor type culverts.

Gravel fills were placed and sub-base primed.

Final cleanup and placing of driving course remains to complete this project.

At the end of period project was 60% complete.

FEDERAL AID SECONDARY

Project #S-0645(1) - Chena Pump Road, Reconstruction

Final grading and shaping was completed on the areas covered by this project as of August 10th.

The replacement of two timber trestles was completed on August 3rd with completion of ditch bridge on Chena Pump Road.

The construction work on this project is now 100% complete.

Project #S-0645(2) - Chena Ridge Road

Grading and drainage work covered by this project was started August 10th and completed August 23rd.

The grading and drainage work outlined for this project is now 100% complete.

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Project #S-0650(1) - Fairbanks-Chena Hot Springs

Grading and surfacing of 10,000 feet access road to gravel pit south of Station 1109 / 00 was completed during the period.

Rough grading was completed from Station 951 / 00 to Station 853 / 00 and finish grading was completed from Station 994 / 00 to Station 853 / 00. Surfacing from rock pit at Station 1109 / 00 and gravel pit south of Station 1109 / 00 was placed from Station 1000 / 00 to Station 924 / 00.

Installation of corrugated round metal culverts during the report period were as follows:

1 - 12" x 40'; 1 - 18" x 42';  
3 - 18" x 42'; 2 - 18" x 46';  
1 - 30" x 40'; 1 - 30" x 44'.

As of the end of the month, work on this project was 65% complete.

Project #S-0651(1) Sheep Creek Road

Grading and gravelling work on this project completed August 5th.

Construction work on this project is now 100% complete.

Project #S-0670(2) - Steeps Reconstruction - Chatanika to Long Creek

Grade improvement and drainage control work covered by this project started on August 6th.

During the period grade raising and shaping with tractor carryall equipment was completed from Mile 31 to Mile 33.8.

At the end of August, this project was 15% complete.

Project #S-0680(1) - Livengood-Eureka

Two construction crews were engaged on this project during the month.

The Eureka crew working east toward Livengood completed 8 miles



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Project #S-0680(1) - Livengood-Eureka - Cont'd.

of stripping between Mile 10.5 and Mile 18.5. Rough grading was accomplished for 8.9 miles between Mile 7.6 and Mile 16.5. The following culverts were installed on the project:

1. Mile 4.8 - 18" x 28'
2. Mile 5.2 - 18" x 32'
3. Mile 6.0 - 18" x 32'
4. Mile 6.8 - 18" x 32'

A temporary native timber culvert 10' x 10' was built as a crossing for Silver Bow Creek at Mile 3.0. The culvert originally planned was used at Kentucky Creek and a metal culvert will be ordered this winter for Silver Bow Creek.

The Livengood crew working west toward Eureka completed 2.4 miles of stripping from Mile 15.0 to Mile 17.4. Rough grading was completed for a distance of 2.6 miles between Mile 13.5 and Mile 16.1. Finish grading and surfacing was completed from Mile 13.3 to Mile 15.8, a distance of 2.5 miles.

During the month of July, the following culverts were installed by the Livengood crew:

1. Mile 9.85 - 18" x 40'
2. Mile 10.66 - 18" x 40'
3. Mile 10.83 - 18" x 40'
4. Mile 11.10 - 18" x 40'
5. Mile 11.40 - 18" x 40'
6. Mile 15.30 - 36" x 40'

During the month progress has been very good on the Eureka end of the project. Progress from Livengood has been slower due to continuing soft ground that requires heavy overlay to support roadway.

As of the end of the month, work on this project was 65% completed.

Project #S-0680(3) - Elliott Highway Reconstruction Mile 11 thru 13

Grade raise and bridge renewal work for this project started in July and was completed August 17th. Grade raise was accomplished with rock from quarry at Mile 11.4 topped with pit run gravel from

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Project #S-0690(3) - Elliott Hx. Reconstruction - Cont'd

pit at Mile 10.5. A new timber bridge 20' x 17' was constructed over Willow Creek at Mile 12.8.

Construction work on this project is now 100% complete.

Project #S-6041(1) - Harding Lake Road

Work was started August 19th on this project. Shaping and finish grading together with surfacing is progressing north and east on portion rough graded during 1956 season.

As of the end of the report period, this project is 20% complete.

Project #S-6121(1) - Lawrence Road

Work started during July and was completed as of August 3rd. Work completed was on 0.8 mile of the north-south portion of section. This final finish grading and surfacing was accomplished with tractor and carryall scraper.

Work covered by this project is now 100% complete.

Project #S-6161(1) - Bradley-Badger Road

During this period, surfacing by truck gravel crew was carried out from August 7th to August 15th. Surfacing was placed on half mile of portion rough graded last season.

At the end of the month, work on this project is 80% complete.

Project #S-6451(1) - Chena Pump Small Tracts, Farm Road

Final gravelling on this project was completed August 2nd. Construction work on this project is now 100% complete.

Project #S-7911(1) - Northway Road

Work on this project was started August 6th and hand clearing and corduroying of three-fourths mile completed on Northway Village end of the project. Work on this project was suspended due to extreme

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Project #3-7911(1) - Northway Road - Cont'd

high water in Nabesna River causing flooding of borrow pits.

Work on this project is 5% complete.

Work Order #321 - Taylor Highway - Canyon the job

Installation of new bulkheads and decking on Discovery Fork and American No.1 and No.2 bridges in American Creek Canyon was completed during August.

Bridge at Star Gulch has been removed and replaced with a 60" x 60" round metal culvert. As this creek is subject to winter icing, two overflow culverts will be installed in the fall this coming work period.

At Mile 126, near old Upper O'Brien Campsite, 2 - 24" x 34" round metal culverts were set. These culverts are to replace original culverts that collapsed.

Rock work was carried on at Mile 112, the hill just south of 40-Mile river crossing. Widening and removal of rock points in this area continues.

Strutting of timber bents on Alder Creek Bridge, Mile 117, was completed during the month and hand rails for O'Brien Creek Bridge, Mile 113, were installed.

Abutment work on north abutment of the South Fork Bridge, Mile 75.7, was completed and rock fill made.

Regrading of the Boundary Spur has continued with a total 5.5 miles completed. Stripping work is 2.5 miles ahead of grade work.

Gravelling operations continue from a mobile camp located at West Fork, Mile 49. Gravelling is now complete between Mile 75.0 and Mile 47.0.

Work on this work order is now 75% complete.

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PRIMARY MAINTENANCE PROJECTS

F-8037 - Fairbanks-Nenana

General maintenance was carried out over the entire section. A 48" x 50" metal culvert was installed at Mile 6.2, St. Patrick Creek, to replace 72" x 44" arch type culvert that collapsed earlier in the season.

F-8046 - Tok Cutoff

Brush spraying was accomplished from Tok to Little Tok River.

Hand rails and posts on the Ford Creek Bridge, Mile 92.5, and Elizabeth Creek Bridge, Mile 97.4, were repainted during the month.

The rock crushing plant, from the Valdez District, was moved from Glenallen August 5th and 6th. The plant was set up at Mile 92.6 and crushing started August 16th. The Valdez District has portable asphalt plant in operation at Mile 92 and as of August 24th, we had produced 3100 tons of crushed material. We have stockpiled 2000 tons of this material and supplied Valdez plant with 1100 tons for plant mix material.

F-8061 - Fairbanks-Fox

Routine surface maintenance including spot gravelling, surface blading and ditch cleaning was carried out over the entire section.

F-8062 - Alaska Highway

Surface blading and spot gravelling has been accomplished as required from the Canadian Border to Mile 1292. Hand cutting of trees and heavy brush along roadway was started at Northway Junction, Mile 1264. This work is progressing west toward Tok and as of the end of the period, six miles have been cleaned up.

Brush and weed spraying was completed over the entire route on August 11th.

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F-8062 - Alaska Highway - Cont'd

Road signs and milepost markers are being reset and replaced where necessary on the A1-B2 section between Tok and Johnson River, following the completion of contract work on this section.

Culvert cleaning and checking is in progress from the Alaska-Canada border to Shaw Creek.

F-8071 - Richardson Highway - Rapids to Big Delta

General maintenance was carried on over entire section. Sags in pavement between Mile 233 and 234 were filled. Shoulder repair, where sloughing had occurred, was accomplished as required over entire section.

F-8080 - Depot Improvement

Fairbanks Apartments: Repairs to chimneys have been completed with installation of heavy metal flue liners in concrete chimneys.

O'Brien Creek Camp: Metal roof has been placed on O'Brien Camp Building #3201.

Big Delta Underground Fuel Storage: All work on this installation has been completed with exception of installation of electrical connections and fuel dispensing pumps.

SECONDARY MAINTENANCE PROJECTS

S-8050 - Tok

Taylor Highway - Route 785: Surface blading has been carried out over entire route. Spot gravalling has been accomplished as required. Weed and brush spraying was carried out from Tetlin Junction to Mile 42.0.

Taylor Locals - Routes 786 and 7851: Surface blading was carried on over both routes. Ditch cleaning and shoulder shaping was carried out on Eagle Mission Road, Route 7851.

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S-8051 - Big Delta

Remington Road - Route 7111: Routine maintenance was carried out including surface blading.

Shaw Creek Road - Route 76011: Surface maintenance and culvert cleanout and inspection was accomplished during the month.

Buffalo Center Road - Route 70711: General maintenance accomplished as required.

S-8052 - Birch Lake

Surface maintenance was accomplished as required.

S-8053 - Fairbanks

Routine surface maintenance was accomplished on all routes. All local roads in the Fairbanks area were checked for name signs and replacements and additions installed as required.

The following culvert work was accomplished:

1. Geist Road - 12" x 32' round
2. Badger Road, Mile 8.5 - 12" x 30' round
3. Badger Road, Mile 10.0 - 12" x 30' round
4. Nordale Road, Mile 0.0 - 13" x 18" x 6' arch - extension
5. McGrath Road, Mile 1.5 - 18" x 22' round
6. Steese Highway, Mile 14.0 - 18" x 30' round - reset

On the Henderson Road, four and one half miles of side stripping was accomplished to clear heavy brush and improve drainage.

The south abutment of the Washington Creek Bridge, Mile 21, on the Elliott Highway was loaded with heavy rock and the creek channel under the bridge was levelled with heavy rock to eliminate heavy scour caused in last spring runoff.

One man was sent to Wiseman on August 10th. By the end of the month, the Nolan and Hammond roads had been bladed. Slide areas along the Hammond River have been cleaned out and re-ditched. The upper end of the Nolan River is being ditched and regraded with tractor-doxer.