

PROJECT IR-0A4-3(4)  
PARKS HIGHWAY  
MCKINLEY VILLAGE TO DRAGONFLY CREEK

Resident Engineer: Don Benjamin  
through 8/31/87, Joe Keeney 9/1/87 through  
Completion  
CONTRACTOR:  
WILDER CONSTRUCTION CO., INC.

PROJECT HISTORY

The project consisted of 10.92 miles of resurfacing with intervals of subgrade stabilization, reconditioning and construction of approximately 3000 feet of Center Turn Lane. The project is located between Healy and Cantwell, Alaska.

Bids were opened for the project November 18, 1986 in Fairbanks. The contract was awarded December 23, 1986. The preconstruction conference was held in Fairbanks on April 9, 1987.

Actual work began on the project on June 1, 1987 when the surveying subcontractor began staking and stationing the project. On July 7, 1987 the prime contractor began work on roadway items.

Earthwork

The earthwork primarily consisted of 23 roadway subexcavation areas. All but one were 2' in depth. The exception was a 5' deep excavation located near mile 238. From the beginning of the project at McKinley Village to the Nenana River Bridge crossing just north of the Denali Park Entrance at Mile 238 the excavated material met Borrow Type "A" and in most cases met Subbase, Grading "E" specifications. The excavated material was reused after placement of a single geotextile layer. Useable material that could not be incorporated in the embankment was hauled to a location where it could be incorporated within a Borrow Type "A" template which required it. Roadway subexcavation areas from milepost 238 north to the end of the project was primarily composed of degraded schist which did not meet Borrow Type "A" specifications and was wasted.

There were no surface manifestations which indicated any need to change any of the subexcavation limits so no changes were made. In all of the subexcavation areas a reinforcing grade geotextile was placed at the bottom of subexcavation. The brand name of the product used was Exxon GIF 200. The contractor generally had few traffic problems in subexcavation areas. His typical procedure was to excavate the area, place the geotextile and bring the roadway to top of Borrow "A" grade in the same day. The success of this method is due to the trafficability of the material excavated and the generally good weather experienced.

Reconditioning was performed with a Caterpillar PR-750B planning mill. The machine was modified by the contractor with an extra Mandrel and sizing attachment to break chunks down to less than two inches. The result was a well graded material with a negligible quantity of asphalt chunks.

Other earthwork items included underdrains at two locations and a lane widening approximately 3000 feet in length designed to accommodate a center turn lane.

The underdrain near Junco Creek was changed during construction because blasting to make a fracture zone beneath the drain aggregate was impractical. Solid bedrock had been expected in this zone but the actual material encountered was either colluvium or borrow from the original construction. The fracture blast zone was deleted and the cross-sectional area of the rock drain aggregate increased. The changes appear to have been successful since a continuous flow of clean water of approximately 2 cfs has occurred since the drain was complete. The changes to the drain were initiated by Change Order No. 1.

#### Paving History

The paving on the project consisted of two inches of asphalt concrete Type I over a reconditioned base or 6" of crushed aggregate (D-1) base. The base was primed with MC-30 with an application rate of 0.1 gal/s.y.

Paving began on August 6, 1987 and was suspended on August 12, 1987 while the contractor prepared additional grade for paving and worked his paving crew on other projects. Paving resumed on August 27, 1987 and the mainline was complete on September 2, 1987. A change document was issued to extend the paving cutoff date to September 14, 1987 at the request of the contractor. All paving was complete September 9, 1987. The total quantity of asphalt concrete placed was 31,087 tons.

Compaction for the entire paving operation was by method number 3, control by relative density. Density was determined by AASHIO T-238 or nuclear densometer.

For approximately the first half of mainline paving the following roller sequence was used: A Tampo RS116A vibratory roller for breakdown, a 10 ton Hyster pneumatic roller for intermediate rolling a 10 ton Hyster 350AD two-axle tandem steel wheeled roller for finish rolling.

Due to breakdown of the vibratory roller the contractor used the following rolling sequence for the second part of the paving project: A 10 ton Hyster pneumatic roller for breakdown and two 10 ton Hyster 350AD two-axle tandem steel wheeled rollers for intermediate and finish rolling.

A Bomag BW 220AD was set up with bars welded on the front drum to make the indentations for the rumble strip. The roller was generally run with the vibratory feature turned on. The pass with this machine was generally made prior to the final finish roller pass.

The asphalt cement used was Mapco A.C. 2.5 with an optimum oil content of 5.9% (by weight of dry aggregate). Although this oil was manufactured in Fairbanks it had been transported and stored in Anchorage for the past year. Compacting temperature ranged between 245° and 250° and mixing temperature between 260° and 271°. Percent anti strip was 1/4 of 1 percent. The mix design gradation was as follows:

<u>Screen Size</u>	<u>Percent Passing</u>	<u>Specifications</u>
1 inch	100	100
3/4	95	87-100
3/8	78	71-85
No. 4	56	49-63
No. 10	37	31-43
No. 40	16	12-20
No. 200	7	4-10

Wilder Construction Company's plant was a Barber Green DM-65. The rated capacity was 450 tons per hour. The plant was in good condition. Asphalt laydown was performed with a Barber Green SA 150 tracked paver. A CMI asphalt pick-up machine was used for all mainline paving. The approaches were paved with a Barber Green Leyton Box.

#### Major Changes

The major changes made to this contract were additional items of work performed by the contractor on behalf of DOT&PF Maintenance and Operations. The contractor provided stockpiles of 8000 C.Y. of Crushed Aggregate Base Course, 5000 C.Y. of "E" chips, and 5,000 C.Y. of Winter Maintenance Sand. In addition the contractor performed an additional subexcavation beyond the project limits to repair a failing roadway segment.

All work was complete on September 28, 1987 and the final inspection held October 1, 1987. During the life of the project no complaints were received from nearby businesses or Denali Park personnel. Few public complaints were received.

#### Recommendations For Future Projects

1. The area from the Denali Park Entrance to Dragonfly Creek (the end of the project) would benefit from additional planning and development. The type of improvements which should be considered are
  - a. Cutting down of the crest vertical curve centered near station 3614+75. This would greatly improve sight distance for traffic entering the commercial zone concentrated in the area 3/4 miles north of the vertical curve.
  - b. Additional work to remove sliding material and stabilize the slopes in selected areas of the Nenana Canyon.

Our project required that approximately 700 cubic yards of ditch cleaning be performed. This amount was not of sufficient magnitude to clean the ditches and restore normal drainage. The project did include a barrier adjacent to the roadway to stop falling rock. This barrier should be examined and perhaps extended to cover rock falls outside of present limits. Alternately a more comprehensive repair laying back the failing slopes and perhaps benching and sealing the tops of the benches should be considered.

In its present state it is likely that Maintenance and Operations will still have some rocks to pick up off the roadway and will have to perform excavation to clean the ditches after heavy rains.

- c. The area should be reviewed and projects considered to enhance the useability of the general traffic safety area. Improvements that could be considered include surfacing and safety improvements to the waste area near milepost 238. Also, frontage roads, controlled access and pedestrian facilities in the commercial area south of Nenana Canyon and development of a rest area/campground in conjunction with other appropriate agencies on the Hornet Creek waste area. This entire corridor contains other areas that are now used by campers and others. Each of these areas should be examined and evaluated for either improvements or restriction of access.

Other recommendations for future contracts include the following:

2. An item for replacing rail elements and an item for end sections should be considered. There are areas where these items are damaged after advertising and prior to award. Contingent sum items would be desirable.
3. Enforcement criteria need to be added to the 5-day cover limits for subbase and base course. This contractor performed the work as desired on this project but the specifications still need to state the consequences of non-compliance.
4. The contractor and DOT&PF contract administrators would both benefit from improved mining plans for material sites. The present system which requires the contractor to submit mining plans for approval by the Engineer does not provide the comprehensive planning effort which the DOT&PF would seem to need and benefit from. The most common problem is that pit provisions in DOT&PF contracts are usually rather superficial. This means that the contractor supplied plans do not address important points such as the location of stockpiles scheduled to remain after project completion and location of equipment during construction such as crushers and hot plants. A most critical weakness of the present system is that contractors often do not know during the bidding period the entire criteria that will be used to approve their mining plans. An Engineer evaluating a contractor's mining plan with the goal of seeing the State's materials resources efficiently used will often find that the contract doesn't have all the provisions that the Regional Geologist thinks necessary or may find that DOT&PF files contain permits which hold provisions which have unresolved conflicts within

themselves or with contract specifications.

5. An effort needs to be made to improve the "engineering" which goes into our material usage and material site decisions. We have sites shown on the plans for which little information is known such as degradation values and gradations. If the material is not suitable for use on the project claims usually result. This project had material lift thicknesses specified which were thinner than the size of cobbles and boulders in the sources.

There should be a requirement that these oversize materials cannot be incorporated in a layer and must be hauled to a waste area. Alternatively a requirement that all material pass a sieve such as 2" could also be considered. Another example would be material that is poorly graded with few fines that if not blended or processed cannot easily carry traffic. These items affect both constructability and trafficability during construction and should be addressed in the documents.

6. The project development process should be changed so that work performed for Maintenance and Operations can be included in the contract prior to bidding. This means M&O must be able to program their funding more than one year in advance for such things as materials stockpiles. Adding them as changes to an existing contract likely increases costs and certainly increases the project paperwork. To accommodate M&O receiving or not receiving funds these items could be bid with "Notice to Proceed", held until after the start of a new fiscal year, etc.
7. It is also recommended that M&O be further encouraged to review and advise design on project features or problems so that they may be addressed in that phase. Making changes during the construction phase is usually more difficult and more costly. Also, since they generally must be made with less consideration than they would be if developed in the design phase can lead to dissatisfaction by the Resident Engineer and/or M&O staff.
8. It is recommended that more specific attention be given approaches by design. This means more exact culvert length, grades and paving limits should be drawn on the plans.
9. The National Park Service objected to the use of the specified seed which is not native to the Park area. It is recommended that adjacent public landowners such as Parks be contacted during the Design Phase so that an acceptable seeding specification can be developed.
10. On this project seeding was required for waste areas only and incidental to Borrow. No estimated quantity was provided. The contractor did not have any waste areas complete until after the specified seeding cutoff of August 1, 1987. Another method of seeding such as dormant seeding could not practically be adopted because the completion date (September 30) occurred prior to freeze up. It is recommended that seeding not be incidental to other items and that an estimated quantity be provided in the contract.
11. On this project the first set of the signs for "Icworm Gulch" and "Dragonfly

Creek" were stolen and had to be replaced by the Contractor. It is recommended that a mounting system that is as secure as possible be developed for signs.

12. The designation of possible waste areas on the plans such as occurred on this job is very desirable.
13. A roadway settlement likely caused by melting of deeply buried ice became subtly evident by the time of final inspection. This area located in a through cut near mile 232 should be monitored and perhaps repaired in any future projects in the area.
14. It is recommended that specifications not be placed on plan sheets as notes. The placement of specifications on plan sheets has the effect of "hiding" them from some contractors. An example from this project is General Note 17 which specifies the 5-day cover requirements for Subbase and Base Course. This requirement can have a definite effect on a contractor's work plan and was missed by several people involved with the project.
15. Some stretches of guardrail which did not require upgrading under the contract did not have reflectors. Consideration should be given to placing reflectors on rail that is not reflectorized in future projects.
16. The note suggested by Construction concerning monument case caps (sheet 4 of the plans) proved to be most desirable and should be used on future projects requiring this type of work.
18. We had some problems with the construction survey item on this project. The Construction Section intends to work at addressing the difficulties which center around insufficient notice prior to beginning work as well as sequence of the survey work.
19. M&O foremen have told me they need to know what kinds of materials we have left for them in Maintenance stockpiles. Maybe a report indicating quantities, and gradation should be prepared by the project for distribution to Maintenance.

jgp