

Agency: Commerce, Community and Economic Development**Grant Recipient: Community & Economic Dev****Project Title:****Project Type:** Planning and Research

Alaska Canada Rail Link Phase II Feasibility Study

State Funding Requested: \$1,100,000
One-Time Need**House District:** Statewide (1-40)**Brief Project Description:**

The University of Alaska Fairbanks has completed several major investigations on the economic feasibility of both extending the Alaska Railroad in-state as well as connecting the Alaska Railroad to the North American Railroad grid. This project will replace \$1.1 million in federal funding in order to complete the five remaining Tasks for the Phase II Feasibility Investigation for Alaska Canada Rail Link Project. The Final Feasibility Investigation shall be completed by December 31, 2013.

Funding Plan:

Total Project Cost:	\$1,900,000
Funding Already Secured:	(\$800,000)
FY2013 State Funding Request:	<u>(\$1,100,000)</u>
Project Deficit:	\$0

*Funding Details:**FY2010 - \$800,000 federal grant***Detailed Project Description and Justification:**

The University of Alaska Fairbanks has been engaged in investigations of an Alaska Canada Rail Link and railroad extensions in Alaska to access the mineral and energy resources of the State for the past decade (see attached Bibliography of Work Products). The University has received funding from the U.S. Department of Defense, the U.S. Department of State, and the U.S. Department of Transportation passed through the Alaska Department of Transportation and Public Facilities for such investigations. Major work products have included the, "Preliminary Design and Engineering Economic Analysis of Alternate Modes of Access to the Tanana Flats Training Area, Fort Wainwright Alaska", 2005 also known as the Eielson to Delta Junction Railroad Extension and Tanana River Bridge Project"; the "Rails to Resources to Ports -- The Alaska Canada Rail Link Project, Phase I Feasibility Study", 2007; data compilation for the Mat-Su Borough in support of the Borough's "Economic Analyses of the Railroad Extension from Port MacKenzie to the Mainline of Alaska Railroad and its presentations to the Alaska State Legislature in support of funding for the extension, 2008 through 2011. Over the past decade, the work has included 56 products specifically by the University of Alaska Fairbanks or its sub-contractors including 14 completed over the past twelve months.

These work products and the proposed railroad extensions to the mineral and energy resources of Alaska are very critical to the economy of interior Alaska in particular and the economy of Alaska in general. The studies have demonstrated that the 7,200 plus known mineral occurrences in Alaska and the 16,000 plus known mineral occurrences along the proposed Alaska Canada Rail Link route in Yukon Territory and northwestern British Columbia could make significant long-term contributions to the economies of the State of Alaska, the Provinces of northwestern Canada and to the economies of the United States and Canada. The work products have also demonstrated the positive role the Alaska Canada Rail Link

Project could have on the development of North Slope natural gas.

The sole source of current funding for the investigations is a Reimbursable Service Agreement (RSA) between the University of Alaska Fairbanks and the Alaska Department of Transportation and Public Facilities that began in October 2006. The source of the funding for the RSA was U.S. Department of Transportation funds provided to the State of Alaska. The remaining balance in the RSA was \$1.9 million as of the end of 2011. Of this remaining balance \$1.1 was returned to the ADOT&PF to provide immediate funds for the completion of an Alaska Railroad Master Plan. This plan must be completed by ADOT&PF by the end of 2012 in order for the Alaska Railroad to remain eligible for Federal Railroad Administration Funding. In the absence of the returned funding, it was highly unlikely that ADOT&PF could complete the Master Plan within the calendar year. At the time UAF had proposed the return of part of the federal funding, ADOT&PF had prepared a capital budget request for this amount and UAF anticipated replacement of the \$1.1 million from the State of Alaska FY2013 Capital Budget. Subsequently, ADOT&PF removed the line item from its Capital Budget Request.

Without the replacement of the \$1.1 million on the RSA, the continued work on the Alaska Canada Rail Link Project shall be limited to only to Task 1 of the six remaining Tasks as outlined below:

- Task 1. Field investigations including engineering geologic mapping and material site delineation between Livengood and the Yukon River. Estimated cost \$800,000 from remaining balance on RSA (To be completed during 2012 Field Season).
- Task 2. Editing and supplementing incomplete mineral deposit data in the U.S. Geological Survey -- Alaska Resources Data Files and incomplete mineral deposit data in the Canadian Geological Survey -- Mine Files for the Yukon Territory and Northwestern British Columbia thereby increasing the number of mineral deposits in the Mineral Freight Forecast Model by 5000 occurrences or 25% and thus reducing the uncertainty in the current model results for the ACRL. Estimated cost of \$255,000 to be funded by the current Capital Budget Request. (Completed by December 2012).
- Task 3. Refining and updating the capital and operating cost estimates in the ACRL Phase I Feasibility Study. Estimated cost of \$230,000 to be funded by the current Capital Budget Request. (Completed by June 30, 2013).
- Task 4. Include the updated Mineral Freight Forecast Model in a new mineral freight revenue estimate for the Alaska Canada Rail Link. Estimated cost of \$65,000 to be funded by the current Capital Budget Request. (Completed by June 30, 2013).
- Task 5. Complete a Phase II Benefit/Cost Analysis of the Alaska Canada Rail Link based on the revised cost and revenue data. Estimated cost of \$430,000 to be funded by the current Capital Budget Request. (Completed by September 30, 2013).
- Task 6. Incorporate the new Benefit/Cost Analysis in the Phase II Final Report for the Alaska Canada Rail Link Project. Estimated cost of \$120,000 to be funded by the current Capital Budget Request. (Completed by December 31, 2013).

Completion of this work will further add to the business case that was initially made in 2007 for the construction of the Alaska Canada Rail Link Project. This work will also create strong business cases for those extensions within Alaska that are essential to connecting the mineral and energy resources of the State with either tidewater ports or markets along the railroad connection to the North American railroad grid.

Project Timeline:

FY2013

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

Alaska Railroad Corporation

Grant Recipient Contact Information:

Name:	Paul Metz
Title:	Principal Investigator
Address:	PO Box 755800 Fairbanks, Alaska 99775
Phone Number:	(907)474-6749
Email:	pametz@alaska.edu

Has this project been through a public review process at the local level and is it a community priority? ☐ Yes ☒ No

Alaska Canada Rail Link Project
Bibliography of Work Products Completed or In Progress That Were Conducted or
Commissioned by the University of Alaska Fairbanks

Note: The following list does not include approximately 70 additional Work Products commissioned by the Joint Working Group for the Phase I Feasibility Study. The Working Group consisted of representatives from the State of Alaska, the Yukon Territorial Government, and the University of Alaska Fairbanks in a technical advisory role. The University of Alaska has overseen the archiving of the these additional work products on a dedicated server originally operated by Gartner Lee Ltd., a Canadian geotechnical firm with offices in Whitehorse, Calgary and Toronto, Canada. The data is being migrated to a server in the United States that is being operated under a service contract from the University of Alaska Fairbanks to the Michigan Tech Research Institute in Ann Arbor, Michigan.

Completed Work Products with Annotations for 2011 Publications

1. Metz, P.A., 2011, Site characterization for a railroad extension in the sub-arctic of interior Alaska: Assoc. of Environmental and Engineering Geologists Annual Meeting, Anchorage, September 19-24, 2011.
 - The presentation included a discussion of the geological and geotechnical considerations for the route location of the proposed railroad extension from Dunbar siding to Livengood, Alaska. This extension would initially support the development of major mining projects in the Livengood area as well as the timber resources in this section of the Tanana Valley State Forest. The extension would support the major project goal of ultimately connecting the Alaska North Slope to the railroad grid thereby enhancing the development of the oil and natural gas fields in the region. The railroad extension would reduce the travel distance for re-supply of the North Slope from south-central Alaska by 100 miles. The route would also support the logistics for the construction of both a large diameter Trans-Continental Gas Pipeline and an In-State Natural Gas Pipeline.
2. Billings, Matt and Metz, P.A., 2011, Lime treatment of fine-grained, interior and south-central Alaska soils: Assoc. of Environmental and Engineering Geologists Annual Meeting, Anchorage, September 19-24, 2011.
 - The existing railroad system and the proposed extensions of the system to connect the North Slope oil and natural gas fields and major mineral resources of northern Alaska to the railroad grid in Alaska, transect either clay rich glacial morainal soils or wind blown silty soils. The project demonstrates that the bearing capacity of these soils may be increased ten fold with the addition of relatively small amounts of lime. The laboratory testing was done at low curing temperatures to model soil temperatures in south-central and interior Alaska. Continuing work shall test the effect on lime treatment on soil permeability and frost heave susceptibility. This

work is one of three M.S. theses in Geological Engineering that are expected to be completed by December 20, 2011.

3. Bohart, Charlie, 2011, Engineering economic analysis for a railroad extension from Dunbar siding to Livengood, Alaska: Assoc. of Environmental and Engineering Geologists Annual Meeting, Anchorage, September 19-24, 2011.
 - As noted above, the proposed railroad extension from Dunbar siding to Livengood shall enhance the economic feasibility of several major mineral occurrences that are under various stages of exploration and development in the Livengood area. The Livengood Gold Project is the most advance exploration project in the region with nearly 20 million ounces of measured, indicated, and inferred resources. Adjacent to the gold project is a potentially large Cu-Mo-Au Porphyry mineral occurrence that would require a bulk transportation system to make the project economic. Also in the area is a large resource of high purity limestone for the production of lime and Portland cement. These resources could provide the large volumes of mineral freight necessary to make the railroad extension economic. In addition to these resources, there are over 400 known critical and strategic mineral resources including Rare Earth Elements in a 50 mile wide corridor from Dunbar siding to the Yukon River. This is one of three M.S Theses in Geological Engineering that will be completed by December 20, 2011.
4. Bolz, Patti, and Metz, P.A., 2011, Geological and geotechnical site investigation for a carbon dioxide rich flue gas direct injection and storage facility: Assoc. of Environmental and Engineering Geologists Annual Meeting, Anchorage, September 19-24, 2011.
 - The large coal resources of interior and northern Alaska have been examined for the production of synthetic fuels, primarily Jet-A and diesel fuel. These fuels are in high demand in Alaska. The U.S. Air Force is examining the potential for the location of Coal-to-Liquids (CTL) plant in interior Alaska. A plant producing 50,000 barrels of fuel per day would require an annual coal production of 3.5 million tons. This coal would be transported to such a plant by rail along existing tracks or along several of the proposed railroad extensions included in the Alaska Canada Rail Link Project. A major constraint for the operation of a CTL plant is the capturing and sequestration of the very large volumes of carbon dioxide produced from such facilities. Rock units favorable for such sequestration have been located along the proposed railroad extensions to Delta Junction and the Canadian Border as well as to Livengood and the Yukon River.
5. Brooks, Collin, Billmire, M., Keefauver, E., Kourous-Harrigan, H., and Metz, P.A., 2011, Mineral occurrence revenue estimation and visualization (MOREV) tool for Alaska-Canada rail and mineral resource evaluation: Assoc. of

Environmental and Engineering Geologists Annual Meeting, Anchorage, September 19-24, 2011.

- The MOREV tool provides a systematic method for estimating mineral freight from known but undeveloped mineral resources. This is an Arc-GIS based system that can be utilized for any transportation system. It has been developed to assess the 7,000 known metallic mineral occurrences in Alaska including Critical and Strategic and Rare Earth Element minerals and the 3000 known similar occurrences in the Yukon Territory and 13,000 occurrences in northwestern British Columbia along the proposed routes of the Alaska Canada Rail Link.
6. Brooks, Colin, Helen Kourous-Harrigan, Mike Billmire, Paul Metz, D. Eric Keefauver, Robert Shuchman, Rick Dobson, K. Arthur Endsley, and Mark Taylor, 2011, Expanding Alaska-Canada Rail: Jointly Visualizing Revenue Freight, Development Cost, Mineral Commodity Value, and CO₂ Impacts. Journal of the Transportation Research Record, 10 p.
- This work extends the MOREV tool to include the impacts of carbon dioxide emissions from the extraction and well as the transport of mineral and energy commodities. This greatly increases to functionality of the tool particularly in the event that carbon emissions are taxed in the future.
7. Bundtzen, T.K., Metz, P.A., Laird, G., Laird, C., Bolz, P., Obermiller, K., and Billings, M., 2011, Material Site investigations , Dunbar Siding to Livengood Railroad Extension Route, interior Alaska: Contract Report to Alaska Department of Transportation and Public Facilities and the Alaska Railroad Corporation, June 2011, 154 p., Map, 1 Sheet, scale 1: 120,000.
- This work includes an engineering geologic map for the proposed railroad extension for Dunbar siding to Livengood as well as an assessment of potential material sites along the route. Excellent quality material for railroad ballast has been sampled at several localities. Test results have been received from a certified laboratory. Based on the outcrop distribution only, there is a high probability of large amount of excellent construction material in the northern portion of the railroad extension near Livengood.
8. Ferrel, S. M., and Lautala, P. T., 2011, Rail embankment stabilization techniques for permafrost: Assoc. of Environmental and Engineering Geologists Annual Meeting, Anchorage, September 19-24, 2011.
- This is an extract of material included in a sub-award contract to the Railroad Engineering Program at Michigan Technological University entitled, “Best Practices for Railroad Construction and Operation in Areas of Permafrost and Deep Seasonal Frost”. This paper specifically addresses various

techniques for stabilizing embankments for railroads constructed in permafrost terrains. This work is based on site visits to China, Russia, Sweden, Norway, Finland, Canada, and Alaska.

9. Zhenhua, Rui, Metz, P.A., Reynolds, D.B., Chen, Gang, and Zhou, Xiyu, 2011, An analysis of pipeline construction cost overruns: *International Journal of Oil, Gas, and Coal Technology*, 5(1). Accepted for publication in January 2012.
 - A major original goal of the Alaska Canada Rail Link Project was to examine the impacts of the rail link on the economics of the construction of a large diameter Trans-Continental Natural Gas Pipeline. Pipeline cost escalation and over-supply of natural gas in the contiguous states have had a major negative impact on the economics of North Slope natural gas production. The following three papers address some of the issues with respect to the cost overruns for pipelines.
10. Zhenhua, Rui, Metz, P.A., Reynolds, D.B., Chen, Gang, and Zhou, Xiyu, 2011, Historical pipeline construction cost analysis: *International Journal of Oil, Gas, and Coal Technology*, 4(3), p 244-263.
 - See comments above.
11. Zhenhua, Rui, Metz, P.A., Reynolds, D.B., Chen, Gang, and Zhou, Xiyu, 2011, Regression models to estimate pipeline construction costs: *Oil & Gas Journal*, 109(14) p. 120-127.
 - See comments above.
12. Metz, P.A., 2011, Natural Resource Development and Port MacKenzie Rail Extension: Presentation to the Senate Finance Committee, Alaska State Legislature, February 23, 2011, 6 p.
 - Presentation on the significance of the Port MacKenzie Rail Extension to mineral and energy development along the transportation corridor from the Port to interior Alaska.
13. Brooks, C., Metz, P.A., and Shuchman, R., 2011, Mineral Occurrence Revenue Estimation and Visualization Tool: Michigan Tech Research Institute and University of Alaska Fairbanks Pamphlet, February 2, 2011, 2 p.
 - Pamphlet to be distributed to potential users of on-line version of the tool.
14. Shuchman, R., Brooks, C., Billmire, M., Kourous-Harrigan, H., Keefauver, E., Metz, P.A., and Taylor, M.L., 2011, Transportation Carbon Accounting Module: Michigan Tech Research Institute and University of Alaska Fairbanks Pamphlet, February 2, 2011, 2 p.
 - Pamphlet to be distributed to potential users of on-line version of the module.

15. Metz, P.A., 2010, Coal-to-Liquid Fuels Production: Key to U.S. Economic Prosperity and Energy Security: Arctic International Mining Symposium, Alaska Miners Association, Fairbanks, Alaska March 9-13, 2010.
16. Bohart, C., Thorum, E., and Metz, P.A., 2010, Dunbar-Livengood Rail Extension Pre-feasibility Study: Arctic International Mining Symposium, Alaska Miners Association, Fairbanks, Alaska March 9-13, 2010.
17. Brooks, C., Shuchman, R., Kourous-Harrigan, H., Keefauver, E., Billmire, M., Dobson, R., Jessee, N., Wienert, M., Taylor, M., and Metz, P.A., 2010, Mineral Occurrence Revenue Estimation and Visualization Tool – *A System for Evaluating Potential Revenue and Greenhouse Gas Emissions from Mineral Resources for Existing and Expanded Rail Networks in the Alaska –Northwest Canada Region*: Arctic International Mining Symposium, Alaska Miners Association, Fairbanks, Alaska March 9-13, 2010.
18. Brooks, C., P. Metz, M. Billmire, D.E. Keefauver, H. Kourous-Harrigan, R. Shuchman, R. Dobson., 2010, Expanding Alaska-Canada Rail: Visualizing Mining Revenue and CO2 Impacts. Proceedings of the 2010 ESRI International User Conference, San Diego, CA.14p.(ESRI put a version of the paper online here:
http://proceedings.esri.com/library/userconf/proc10/UC/papers/pap_1399.pdf).
19. Li, Hui, 2009, Experimental and numerical study of sonic wave propagation in freezing sand and silt: unpublished University of Alaska Fairbanks, Ph.D. dissertation, 171 p.
20. Metz, P.A., Miller, S., and Thorum, E., 2009, Annotated Bibliography of the Alaska Railroad: unpublished University of Alaska Fairbanks report, 19 p.
21. Kumar, Pradeep, 2008, Planning and design of material handling system for sand and gravel: A case study, Port MacKenzie area, Matanuska-Susitna Borough, Alaska: unpublished University of Alaska Fairbanks, M.S. Project Report, 42 p.
22. Jing, Liping, M.S., 2008, Modeling the dynamic active layer in permafrost with GIS-based terrain and climatic data analysis: unpublished University of Alaska Fairbanks, M.S. thesis, 66 p.
23. Penjore, Tshering, 2008, Aggregate resources and aggregate processing plant in Port MacKenzie area, Matanuska-Susitna Borough, Alaska: unpublished University of Alaska Fairbanks, M.S. Project Report, 35 p., Appendices A-C.
24. Rai, Pravat, 2008, Lime stabilization on the Railroad Extension to Port MacKenzie, Matanuska-Susitna Borough, Alaska: unpublished University of Alaska Fairbanks, M.S., Project Report, 42 p, Appendices 1-7.

25. Metz, P.A., 2008, Landslide risk assessment near Denali National Park and Preserve, Alaska: Program and Abstracts, Assoc. of Engineering Geologists Annual Meeting, New Orleans, September 15-21, 2008.
26. Metz, P.A., and Li, Hui, 2008, Mineral freight forecasts and expected gross metal values for mineral occurrences in the Alaska Canada Rail Link Corridor: Arctic International Mining Symposium, Fairbanks, Alaska, March 18-22, 2008.
27. Metz, P.A., Dhungana, J.R., D'Chuna, N., Thorum, E., and Miller, S, 2008, Route locations and summary of benefits to Alaska from the Alaska Canada Rail Link: Arctic International Mining Symposium, Fairbanks, Alaska, March 18-22, 2008, Map 1 sheet, scale 1:1,000,000.
28. Wiltse, Nathan, 2007, Feasibility simulation and risk analysis of a rock quarry operation site at Flag Hill, Interior, Alaska: unpublished University of Alaska Fairbanks M.S. Project Report, 66 p., Appendices 1-3.
29. Metz, P.A., 2007, Expanding resources and economic development frontiers through the Alaska gas pipeline and Alaska Canada rail link: 3rd Annual Alaska Oil & Gas Symposium, Anchorage, Alaska, September 17-18, 2007.
30. Boland, K., Metz, P.A., and others, 2007, Alaska Canada rail link feasibility study, Phase I Final Report: Contract Report to Alaska Department of Transportation & Public Facilities and U.S. Department of Transportation, May 2007, 71 p.
31. Metz, P.A., 2007, Alaska Railroad extension – Port MacKenzie to the Canadian Border: Advantage Northern: Resource Development and Northern Transportation Conference: Whitehorse, YT, May 28-30, 2007.
32. Metz, P.A., 2007, Mineral occurrences along the Alaska Railroad extension – Port MacKenzie to the Canadian Border: Alaska Miners Association, Fairbanks, Alaska, April, 2007.
33. Metz, P.A., 2007, Mineral occurrences along the Alaska Railroad extension in Alaska and Northwestern Canada: Regional Meeting, Society of American Military Engineers, Anchorage, Alaska, March, 2007.
34. Staff, Alaska Canada Rail Link Working Group, 2006, The Alaska Canada Rail Link Project Pre-Feasibility Study: unpublished Working Group Report, November 2006, 173 p.
35. Blaszak, Michael, 2006, Alaska Canada Rail Link Feasibility Study – Project Finance Regulatory Review: Van Horne Institute, University of Calgary Final Report to the University of Alaska Fairbanks, October, 2006, 36 p.

36. Staff, HDR, Inc., 2006, Cost-benefit Analysis for the Alaska Canada Rail Link: HDR/HLB Decision Economics, Inc. Final Report to University of Alaska Fairbanks, October 27, 2006, 57 p.
37. Staff, Lockheed Martin Space Operations (LMSO), 2006, Alaska Canada Rail Link Feasibility Study Phase I – Analysis of Rail Link Impact on North Slope Development, Current Transportation Risks, and Shared Corridor Synergies: LMSO Final Report to University of Alaska Fairbanks, June, 2006, 96 p.
38. Staff, Lockheed Martin Space Operations (LMSO), 2006, Alaska Canada Rail Link Feasibility Study, Market Analysis of Current and Future North Slope Oil and Gas Activity: LMSO Final Report to University of Alaska Fairbanks, May, 2006, 70 p.
39. Metz, P.A., 2006, Site selection for a major petrochemical complex in Alaska: Assoc. of Engineering Geologists Annual Meeting, Boston, Nov 1-3, 2006.
40. Metz, P.A., 2006, Mineral freight forecast for the Alaska Canada rail link project: International Workshop on the Alaska Canada Rail Link, Vancouver B.C., April 5-6, 2006.
41. Metz, P.A., Bundtzen, T.K., and Donnellan, B, 2006, Current and intermediate term supply and demand for limestone in Alaska: Arctic International Mining Symposium, Fairbanks, Alaska, March 13-17, 2006.
42. Metz, P.A., 2006, Mineral occurrences and potential sources of freight for the Alaska railroad extension – Fairbanks to the Canadian border: Arctic International Mining Symposium, Fairbanks, Alaska, March 13-17, 2006.
43. Metz, P.A., 2005, Pipeline Development in Arctic and Sub-Arctic Regions: Northern Transportation Conference: Yellowknife, NWT, Canada, November 9-11, 2005.
44. Metz, P.A., 2005, Opportunity and Risk Analysis of the Alaska/Canada Rail Link: Project Workshop on the Alaska/Canada Rail Link, Whitehorse, YT, Canada, November 2-3, 2005.
45. Jing, Liping, Zhou, Wei, Li, Hui, and Metz, P.A., 2005, Modeling the dynamic active layer in permafrost with GIS-based terrain and climatic data analysis: Assoc. of Engineering Geologists Annual Meeting, Las Vegas, Sept 19-24, 2005.
46. Metz, P.A., 2005, Preliminary design and engineering economic analysis of alternate modes of access to the Tanana Flats Training Area, Fort Wainwright, Alaska: Final Contract Report to U.S. Army Alaska, June 2005, 414 p.

47. Metz, P.A., 2005, Mineral and energy resources along the Alaska rail corridor: Alaska Canada Rail Link Corridor Conference, Prince George, B.C., Canada, April 7-8, 2005.
48. Metz, P.A., 2004, Assessment of the geologic hazards along the proposed routes of the Alaska Natural Gas Pipeline: Association of Engineering Geologists 47th Annual Meeting, Dearborn, Michigan, September 2004.
49. Metz, P.A., 2004, Energy, minerals, and infrastructure requirements in support of a petrochemical industry in interior Alaska: Alaska Miners Association, 19th Biennial Conference on Alaska Mining, Fairbanks, Alaska March 15-19, 2004
50. Metz, P.A., 2003, Extension of the Alaska Railroad from Fairbanks to Big Delta: Report Fairbanks North Star Borough Railroad Task Force, 15 p., Maps, 10 sheets, scale 1:63,360.
51. Metz, P.A., 2002, Geologic hazards along the proposed routes of the Alaska natural gas pipeline: Association of Engineering Geologists 45th Annual Meeting, Reno, Nevada, September, 2002.
52. Metz, P.A., 2001, Alaska/Canada rail link – A component of a North American energy transport system: Proceedings of Conference on Alaska/Canada Rail Link, October 10, 2001, Fairbanks, Alaska, 15 p.
53. Metz, P.A., 2001, Testimony before the Alaska State Legislature Joint Committee on Natural Gas Pipelines, August 15, 2001, Fairbanks, Alaska, 2 p., Map, 1 sheet, scale 1:1,000,000.
54. Metz, P.A., 2001, Alaska mineral resources and the Alaska/Canada rail link: Alaska/Canada Rail Link Roundtable Meeting, Calgary Chamber of Commerce, August 8, 2001, Calgary, Alberta, Canada, 2 p.
55. Metz, P.A., 2001, Testimony before the Alaska Legislature Joint House Committee on the status of the Alaska-Canada rail link, February 20, 2001, Juneau, Alaska, 2 p., Maps, 3 sheets, scale 1:1,000,000.
56. Metz, P.A., 2000, Mineral resources along the proposed extension of the Alaska Railroad from Fairbanks to the Canadian Border: Conference on the Alaska-Canada Rail Link, Vancouver, B.C., January 20, 2000.

Work In Progress

Lautala, P.T., 2011, Best Practices for Railroad Construction and Operation in Areas of Permafrost and Deep Seasonal Frost: Railroad Engineering Program, Michigan Technological University Final Contract Report to the University of Alaska Fairbanks, expected completion of final editing, November 30, 2011.

- Includes site visits to operating railroad systems in Alaska, Canada, Russia, China, Finland, Sweden, and Norway. This is the most current and complete compilation and analysis of railroad engineering practices in cold regions.

Billings, Matthew, 2011, Lime treatment of fine-grained, interior and south-central Alaska soils – A potential method of embankment stabilization for transportation systems: M.S. student in Geological Engineering, expected graduation December 2011.

- See comments in previous section for the same author

Bohart, Charles, 2011, Engineering economic analysis for a railroad extension from Dunbar siding to Livengood, Alaska, unpublished University of Alaska Fairbanks M.S. thesis, defense completed, final editing expected completion November 15, 2011.

- See comments in previous section for the same author

Metz, P.A., Taylor, M.L., and Van Wyhe, Leon, 2013, Alaska Canada Rail Link Feasibility Study, Market Analysis of Current and Future North Slope Oil and Gas Activity: Update of LMSO Final Report to University of Alaska Fairbanks, May, 2006, 70 p.

- A major focus of the Phase I Feasibility Study was the assessment of the impact that a railroad link to the North American railroad grid would have on the construction of a Trans-Continental Natural Gas Pipeline from the North Slope of Alaska to the Calgary Hub or on to the Chicago area. Since the Lockheed Martin Space Operations Report in 2006, there have been significant changes in the plans for a Trans-Continental natural gas pipeline to commercialize North Slope natural gas. This work product will assess the impact that the various proposed railroad extensions will have on the various alternatives for commercialization of North Slope natural gas. It is proposed that this product be completed at the end of the not cost time extension to include all of the natural gas commercialization alternatives that exist at that time (December, 2013).

Taylor, P., 2011, Livengood Railroad Corridor Report: Pacific Contract Company: editing of draft report, expected completion November 30, 2011.

- Assessment of alternate routes for proposed railroad extensions from the Dunbar siding to the Yukon River. Report includes estimated capital costs and a preliminary engineering economic analysis.

Thorun, Elliot, 2011, Economic Analysis of Trolley Assisted Ore Truck Haulage in Potential Large Open Pit Mines in the Alaska: M.S. student in Geological Engineering, expected graduation December 2011.

- Trolley assisted ore truck haulage system could reduce the demand for low sulfur diesel fuel at a particular mine site and thus would reduce in-bound rail freight requirements. In-bound freight requirements generally range between 5% and 10% of the out-bound freight from base metal, iron ore, coal, and industrial mineral mines. Reducing the cost of energy for these deposit types has the potential to significantly increase the economics of mines in a transportation corridor if that corridor includes a power distribution system as well as a railroad. The results of the research demonstrate that even medium scale mines can benefit from trolley assisted haulage systems in the transportation corridor from Dunbar siding to the Yukon River.

Zhenhua, Rui, 2011, Regression models to estimate pipeline construction costs and analysis of pipeline cost overruns, Interdisciplinary Ph.D. Program, dissertation; defense schedule for November 16, 2011; expected graduation, December 2011.

- See comments in previous section for papers by same author

Proposals Submitted to ADOT & PF for Work Related to Previous ACRL Investigations

1. Alaska Railroad Master Plan: Alaska Department of Transportation and Public Facilities, \$1,100,000.
 - The Alaska Railroad Master Plan would benefit from the large volume of data and reports generated by the Alaska Canada Rail Link Project. The plan must include provisions for the route locations necessary to connect the major mineral and energy resources of Alaska with a bulk transportation system provided by the Alaska Railroad Corporation. Incorporating this data in the short time period necessary to comply with the federal mandate to have such a plan in place by the end of 2012 shall be a challenge. To date there has been no reply to the proposal
2. Western Alaska Transportation Corridor Assessment and Mineral Freight Forecast: Alaska Department of Transportation and Public Facilities, \$404,130.
 - The Alaska Department of Transportation and Public Facilities has proposed the construction of roads to Nome and to the Brooks Range Copper Belt to provide road access to the mineral resources in the regions. This proposal provides for the application of the mineral freight forecast tools developed for the Alaska Canada Rail Link Project to assess of all the mineral resources along the various road corridors to western and northern Alaska. This tool can be utilized to estimate the expected tonnages of mineral and energy materials that may occur in the regions and thus determine the most appropriate method or methods for

developing transportation systems within a transportation corridor. To date there has been no reply to the proposal.

Paul Metz, Ph.D., Principal Investigator
College of Engineering and Mines
University of Alaska Fairbanks
P.O. Box 755800
Fairbanks, Alaska 99775-5800
Off Phone (907) 474-6749
Fax (907) 474-6635
Cell (907) 322-6928

Mark Taylor, P.E., Co-Principal Investigator
College of Engineering and Mines
University of Alaska Fairbanks
P.O. Box 755800
Fairbanks, Alaska 99775-5800
Phone (907) 301-3905



Fairbanks North Star Borough

Office of the Mayor

809 Pioneer Road

P.O. Box 71267

Fairbanks, Alaska 99707-1267

907/459-1300

Fax: 907/459-1102

Email: mayor@co.fairbanks.ak.us

February 23, 2012

Senator Joe Thomas
Alaska State Capitol, Room 514
Juneau, AK 99801

Dear Senator Thomas:

I am strongly in support of a request for the Alaska Canada Rail Link Phase II Final Feasibility Investigation; a request made by the Commerce, Community, and Economic Development Department working in agreement with the University of Alaska.

The University of Alaska has a long and distinguished performance record in support of mineral economic development and railroad engineering within Alaska and in northern Canada. This capital budget request will allow completion of the remaining Alaska Canada Rail Link Projects tasks. This work effort is unparalleled in Alaska and there is no other initiative underway, planned or proposed that investigates this subject in such a comprehensive and thorough process.

Previous studies have shown the positive role the Alaska Canada Rail Link could have on the development of North Slope natural gas, interior mineral and energy resources, and Alaska's economy at large. This capital budget request will, in part, supplement incomplete mineral resource data, update rail corridor capital and operating costs and produce a cost-benefit analysis. Additionally, I have had discussions with various Canadian groups involved in their early analysis of a rail link to our Interior for natural resource movement. This is important work that should be done.

Completion of this work will further add to the economic case for railroad development to Canada and will provide Alaska and private developers a thorough and exhaustive strategic planning tool. I encourage you to support this capital budget request. It is a next step.

Sincerely,



Luke Hopkins, Mayor