Sturgeon County

Meeting Agenda - Final

Committee of the Whole

9613-100 Street
Morinville, Alberta
T8R 1L9

Tuesday, October 25, 2016 | **2:00 PM** | **Council Chambers**

A. CALL TO ORDER

B. APPOINTMENTS

B.1 2016 Local Road Reconstruction Strategy Review (60 minutes)

Attachments:
Briefing Note
2016 Local Road Reconstruction Strategy Review Report
2016 Local Road Reconstruction Strategy Review Presenta

Ian McKay, General Manager, Municipal Services

C. ADJOURNMENT

Legislation Text

File #: PRS-105-16, **Version:** 1

2016 Local Road Reconstruction Strategy Review (60 minutes)

Sturgeon County

Agenda Item: B.1

Briefing Note

Title	Local Road Reconstruction Strategy Review
Issue	SQRD Engineering was contracted to complete a review of the Local Road Reconstruction Program. The final report is provided for information, and is one input into determining the future direction of the Program. Administration will present their recommendations at the November 8, 2016 Council Meeting.
Previous Council Direction	03/08/2016 - Motion 089/16: That Council approves the transfer of $1,835,000 from 2016 Transportation Capital Budget to 2016 Transportation Operating Budget to support the Gravel Road Maintenance Program and Drainage Operations. 03/08/2016 - Motion 087/16: That Council approves the cancellation of the 2016 Capital Gravel Road Reconstruction of Township Road 562 from Range Road 44 to Range Road 251. 06/26/2012 - Motion 239/12: That County Council accepts the Local Road Reconstruction Strategy report dated June 2012 as information, and directs administration to bring forward an action plan for the future of the County's Local Road Program. 09/25/2012 - Motion 323/12: That County Council approves the Local Road Reconstruction 'Plan of Action' and directs administration to include recommendations for improvements from the DCL Siemens Report with budgetary implications as service enhancements in the 2013 budget, for Council consideration.
Report	<u>Background Information</u> • In 2012, the County undertook a review of the Local Road Reconstruction Program, and an action plan was subsequently approved that included the purchase of new equipment. • The economic climate and outlook has changed since the Strategy and Action Plan were endorsed. Challenges with the Program were identified when closing out the 2015 season: securing borrow, quality assurance, and costs.

	• In response, the Program was put 'on hold' for the 2016 season and resources and funds were reallocated to road priorities within Operations. External Communication • Once a Council recommendation is determined, a communication plan will be developed.
Implication	Strategic Alignment: The Program review aligns with Sturgeon County's Strategic Plan Focus Area: Operational Excellence. Administration wants to ensure the Local Road Reconstruction Program is run effectively, and that the cost structure allows us to remain competitive in the region. Administration also wants to ensure that the Program is set up for success, and that staff have the resources (skills, equipment, support) to excel. Organizational: The options presented in the SQRD consulting report will impact the organization (structure, processes, capacity). Administration is in the process of developing a transition and change management plan for both scenarios so that impacts will be understood and disruptions to operations will be minimized. Financial: Financial impacts will be evaluated when the final recommendation is completed in November.
Follow Up Action	1. Bring forward an administrative recommendation with alternatives in November.
Attachment (s)	1. 2016 Local Road Reconstruction Strategy Review Report 2. 2016 Local Road Reconstruction Strategy Review Presentation
Report Reviewed by:	 Ian McKay, P. Eng, GM Municipal Services  Peter Tarnawsky , County Commissioner – CAO

2016 LOCAL ROAD RECONSTRUCTION STRATEGY REVIEW

PREPARED FOR:

STURGEON COUNTY

PREPARED BY:

SQRD ENGINEERING

AUGUST 2016

EXECUTIVE SUMMARY

This report has been completed to aid in the decision making process for the future direction of the local road construction program. The current operational situation has the County providing internal local road construction forces as well as tendering local construction projects. The main goal of this report is to provide information so the method of conveyance for local road construction projects can be determined. There are two potential options which exist: 1) internal forces only, and 2) external or contracted forces only for the provision of local road construction.

An environmental scan has been completed to review current economic conditions, to understand how the economy has evolved since the 2012 report and to predict potential economic patterns which may influence the costs and market capacity. A brief review of the 2012 Local Road Reconstruction Strategy was undertaken to asses a number of issues that have an influence on the present situation. Variable industry factors such as capacity, employment trends, pricing, etc. were considered to understand how the construction situation has changed since the previous report.

Information regarding the local road construction environment was also gained from internal staff members, external technical specialists, equipment vendors, historical price information, and peer municipalities. The information has been compiled provide commentary about key factors which will guide the future direction of the local road construction group.

To be successful in road construction there are a number of key elements that are required to succeed. The key elements or challenges are:

- leadership and mentorship,
- attraction and retention of personnel,
- culture of the organization,
- dedicated group,
- heavy equipment to achieve productivity,
- sources of earth borrow,
- landowner negotiations,
- haul distances for earth materials,
- quality assurance,
- final project audits.

The core or central element is the ‘team’ which produces the end product. The team must operate from a coordinated plan with support from all levels and be fully committed to the success of the program. Leadership has to provide a positive environment that promotes the organizational values of collaboration, accountability, respect, excellence, and safety.

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1.0 Introduction

This report was commissioned by Sturgeon County in June 2016 to undertake a review of the 2012 Local Road Reconstruction Strategy(LRRS), complete an environmental scan of the market, economy and local road reconstruction group as well as perform interviews with peer municipalities, administration and technical specialists. In addition, current costs which relate to the local road reconstruction will be reviewed to determine how the costs vary between methods of conveyance.

The project has been developed in conjunction with an internal steering committee that included key staff members from various areas of Sturgeon County. The internal staff members were utilized to understand the current operating structure of the local roads construction program, undertake a review of the 2012 LRRS report, provide cost data, as well as provide ad hoc information as required. Internal staff liaison and input has been critical in the development of the overall report.

In order to execute local road construction projects efficiently there are tasks that need to be completed in advance of the actual construction operations. The tasks include: inspection, evaluation, planning, land negotiations, utility agreements, soils investigations, and engineering design. For the purposes of this report, it is assumed that in all options the same tasks must be completed well in advance to enable efficiencies during construction. Further, it is understood that this work is to be completed by internal staff, with the potential to supplement with contracted staff.

The main focus of the report is to present options related to the future operation of the local roads construction group. The two options that will be examined are completing local road construction projects internally or via externally contracted forces. Each option will be examined to outline the requirements and expenditures related to that alternative. Listed below are questions to contemplate while reading the report.

Reflective Statements:

1) Does the Transportation group have the capacity to undertake increased levels of activity related to local road construction?
2) Is it economically feasible for the County to provide local road construction services?
3) Can highly skilled employees be secured and retained by the County for road construction?
4) Is the method of contract conveyance purely a financially decision?
5) Is the investment in internal construction forces a core function of the Transportation group?
6) Can capital expenditures in heavy equipment and staff be re-allocated for better value?
7) Does the County have engineering capacity to provide support functions to the local road construction group?
8) Is there currently an annual strategic plan for the local road construction group?

2.0 Environmental Scan

2.1 Economic Conditions

The current economic conditions in 2016 have the average costs for contracted construction work generally trending lower from 2012. Reviewing the price volatility of two construction items, Figure 1, from Alberta Transportation's database illustrates the current trend.

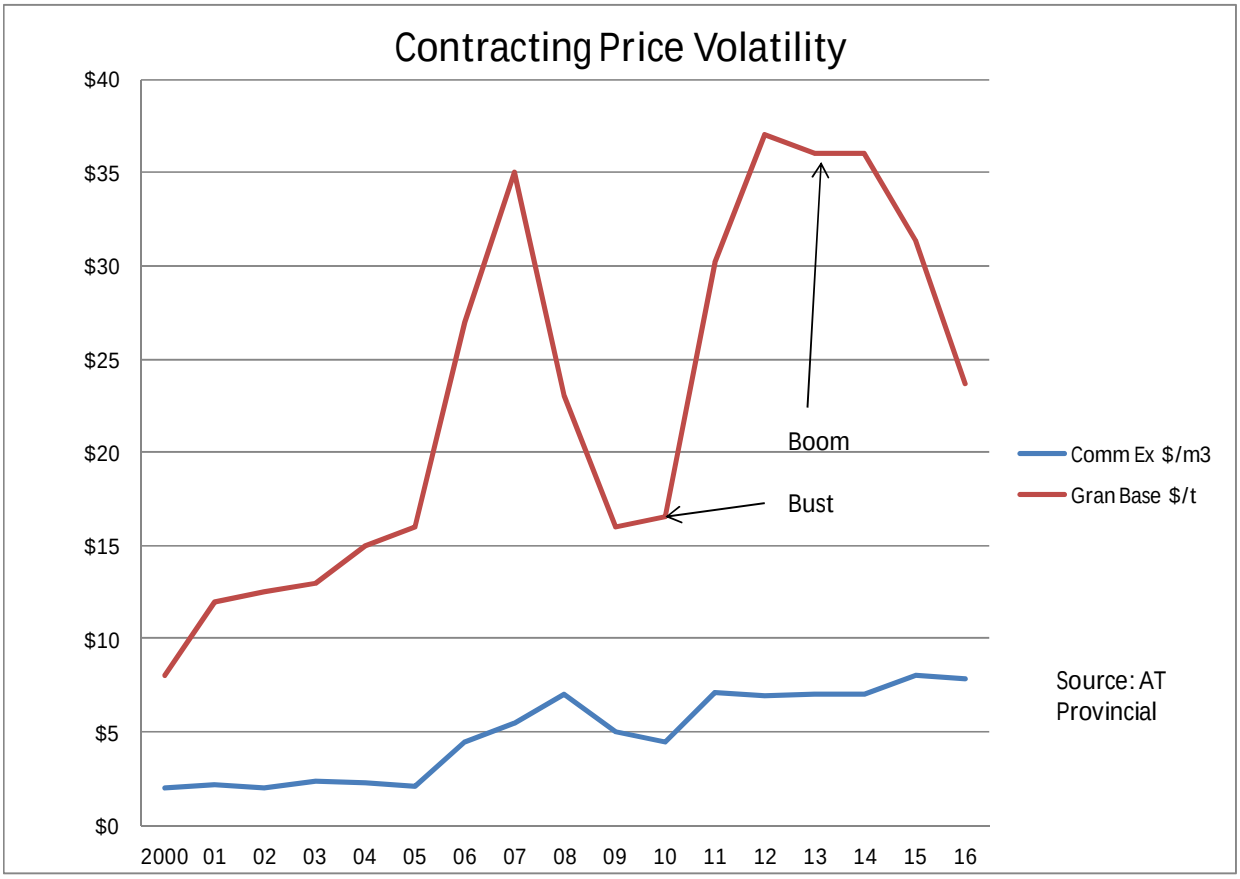

Figure 1 - Price Volatility

As the costs to tender local construction projects become more economical, another issue comes to the forefront: the ability to tender more projects. This scenario has positive and negative aspects which relate to costs, manpower and timing. Although the current economic conditions allow the County to receive better value for every dollar spent, the ability to tender additional projects becomes difficult with limited staff. Additionally, projects are not always 'shovel' ready and require a significant amount of resources to prepare.

Administration reports that recent tenders for construction projects and gravel crushing have been at historically low levels indicating an extremely competitive Alberta market for this type of

work. Contractors are offering competitive prices and contracting is an especially attractive option in this current market. The cyclical nature of the Alberta economy is directly related to the price of oil. It is not within the scope of this report to predict the future economic conditions but there is a historical pattern of boom and bust conditions, as illustrated in Figure 1, which significantly affect the costs related to local road construction.

Any future strategy employed by the County must focus on the ability to smooth out the economic peaks and valleys. This could be achieved by adopting an annual construction program that consistently completes a predictable value of work. There are options of tendering multi-year contracts or creating a list of qualified bidders which could submit pricing for local road projects for a multi-year period.

Although economic conditions influence employment options in various sectors in Alberta, the local road construction personnel remains difficult to recruit due to their mobile skill set. The construction group must attract staff by providing opportunities for full-time positions in which individuals can progressively develop their careers. Consistent and congruent leadership that is supportive and aligned with the culture of the organization is imperative.

2.2 2012 Local Road Reconstruction Strategy Review

2.2.1 2012 Report Assumptions

After a review of the 2012 local road reconstruction strategy report there were no major assumptions found to be invalid. The local road specifications outlined below still hold for each jurisdiction. Sturgeon County's General Municipal Servicing Standards (GMSS) for an 8.0m road top are generally consistent with peer municipalities.

County of Barrhead

Road Top	- 8.0 m
Grade Slope	- 1.0 m vertical @ 3:1 sideslope
Ditch	- flat bottom @ 3 m width
Back sloping	- min 4:1 sideslope
Structure	- 500 t/km (des. 4, class 20)
Undercut	- min 600 mm
ROW	- 20.12 m
Plan Period	- 7 years
Plan Creator	- Administration

M.D. of Bonnyville

Road Top	- 7.4 m
Grade Slope	- 1.0 m vertical @ 3:1 sideslope
Ditch	- flat bottom @ 1 m min width
Back sloping	- min 3:1 sideslope
Structure	- 685t/km (des. 4, class 20)
Undercut	- min 700 mm
ROW	- 20 m min - 30 m max
Plan Period	- 1 year
Plan Creator	- Council

Lacombe County

Road Top	- 8.0 m
Grade Slope	- 1.0 m vertical @ 4:1 sideslope
Ditch	- flat bottom @ 3.5 m min width
Back sloping	- min 4:1 sideslope
Structure	- 1,000 t/km (des. 4, class 20)
Undercut	- min 600 – 1,000 mm max
ROW	- 20.12 m
Plan Period	- 5 years
Plan Creator	- Administration

Leduc County

Road Top	- 8.0 m
Grade Slope	- 1.0 m vertical @ 4:1 sideslope
Ditch	- flat bottom @ 3.0 m width
Back sloping	- min 3:1 sideslope
Structure	- 600 t/km (des. 4, class 20)
Undercut	- min 600 mm
ROW	- 30 m
Plan Period	- 4 years
Plan Creator	- Administration

Sturgeon County

Road Top	- 8.0 m
Grade Slope	- 1.0 m vertical @ 4:1 sideslope
Ditch	- flat bottom @ 3.0 m min width
Back sloping	- min 3:1 sideslope
Structure	- 1,000 t/km (des. 4, class 20)
Undercut	- 1 000 mm max
ROW	- 30 m
Plan Period	- 4 years
Plan Creator	- Administration

The strategic planning period and method of generating the program of roads to be reconstructed is similar to the 2012 report. The planning information is listed above with the road specifications. It should be noted that Administration reports that in most cases a 30m wide right of way is required to fit the County maintained infrastructure, or alternatively back slope agreements are required.

2.2.2 New or Unanticipated Factors

One factor that was unanticipated is County's ability to attract and retain skilled staff members to the local road reconstruction group. Due to the level of turnover there have been issues related to the depth of experience in the staff. In particular, Administration reports that in the Edmonton region it is difficult to attract experienced scraper operators, foreman, and superintendents. Further, the local road reconstruction program has been temporarily shut down to examine the overall program. The continued success of this program is not only related to the financial cost but also the culture, leadership and core group of staff.

Another factor which is apparent is the need for the group to act as a single 'core' entity within the transportation group. Generally speaking, the depth and breadth of the project scope requires dedicated engineering, planning, survey, project management and quality control staff and should not be off the corner of their desks. In certain situations, staff can become overloaded with tasks that creep into time commitments that cannot be handled individually.

Another factor that has become evident is the recruitment and retention of road construction staff needs to be viewed with the understanding that the private industry model and the municipal model are fundamentally different. In municipalities where road construction is successful, they have communicated that strong transition plans need to be in place for when key members leave. Key members tend to be long standing employees. In many cases the peer municipalities express that once these staff leave, they will have to re-examine whether this work can be done in-house and admit that they may not be able to accomplish their current levels.

The County is encountering difficulty in acquiring earth borrow from adjacent land owners in close proximity of the projects. This factor has been creating longer haul distances from available sources of borrow. To mitigate this issue, dedicated resources must be tasked with the responsibility of securing economi8cally feasible sources.

2.2.3 Equipment and Staff Adjustments

During the interview process with the steering committee there was no mention of any adverse affects of the equipment and personnel adjustments that occurred as a result of the original report. It is assumed that staff adjustments were initiated due to the alteration of the heavy equipment fleet and primarily relate to equipment operators. Consideration should be given to the human resource issues related to salaries, overtime provisions and other features which could enhance the positions.

2.3 Post 2012 Local Road Reconstruction Strategy Information

2.3.1 Market Capacity

The external construction market has a finite capacity to uptake local road reconstruction projects, and historically external tendering has not been the primary method of delivery for this program. External tendering has been typically used more for reconstructing and paving of collector roads utilizing grant funding. Traditionally, internal local road building resources have been focused on the local road projects. The external construction market recognizes that the County has only been tendering a limited amount of work and therefore has limited interest for bidding during stable economic conditions where market capacity and demand are at a relative equilibrium. Historical tender patterns illustrate that during times where demand outstrips capacity, the County has encountered opportunistic bidding practices thus diminishing the real value for money which is attained. During times when demand severely outstrips capacity, the County has closed tenders without receiving a bid. Currently, the County is receiving numerous bids with lower prices due to the market capacity. There should be an immediate initiative to engage contractors to enter into multi-year contracts while the economic conditions are in the County's favour.

2.3.2 Property Negotiations

The standard width used to construct local roads requires additional property from adjacent landowners. Even though market rate compensation is being paid to land owners for property, supplementary negotiations and agreements for advance geotechnical investigations may have to be completed with some allowance for additional compensation. The compensation should also account for unique locations and circumstances of the investigation, i.e. time of year. Further, the soils investigation of potential borrow sources must be completed to verify the quality of the material.

Changing rural demographics and farming practices have increased the need to alter negotiation methods used to secure land from adjacent landowners. In all situations, a transparent process must be used to acquire right-of-way, landscape agreements and earth borrow. Advance negotiations, i.e. two years prior to construction, must be undertaken by dedicated resources to ensure economically feasible sources of borrow are available. The current policy for fencing is included where required, i.e. borrow sites, property boundaries. Property releases must also be signed by the owner prior to any payments being issued.

Property negotiations could be undertaken by a member of the group to maintain a single point of contact and provide consistent message to the property owners. It is preferable that this point of contact be a County employee, trained in land negotiations who has a long term vested interest in Sturgeon County and its residents. This position does not currently exist. It is recommended to add this resource to the program.

In the contracting option, borrow compensation rates are typically “contractor’s choice” in the contract, which enables the contractors bidding on the work to negotiate agreements with land owners. This arrangement allows contractors a great deal of flexibility as they do not have to be concerned with precedent setting rates of compensation.

2.3.3 Productivity

One of the most important factors for the local road construction group is the level of productivity that is achieved. The highest level of productivity will normally result in the lowest cost per kilometer to construct roads. The unit cost method is very simple in principal but extremely time consuming in financial accounting to breakdown all the tasks over a number of projects for comparison. For the purposes of this report, productivity must be a relative benchmark related to the number of kilometers that are constructed during the year. The productivity is also dependent upon the design cross section that is being constructed as well as the size of the heavy equipment fleet. It should be noted that an optimum fleet size exists for the number of kilometers that are being constructed.

2.3.4 Employment

Current employment conditions in the Edmonton market would appear to indicate the availability to procure suitable staff for the construction group would be easy. The difficult task is identifying and retaining skilled staff that performs critical functions within the group. The local road construction group has many challenges related to competing segments, i.e. oil industry, wage level, proximity to Capital Region, and competing private companies.

It is imperative to secure skilled individuals with compensation packages that provide opportunities for future career development. In addition, staff must be given choices how to receive compensation, time-off and off-season assignments. For example, the members of the construction group normally work more hours seasonally than a normal employee due to the nature of the work. As a result there should be variable options, i.e. full-time status, flexible overtime banking, payouts, incentives, etc. The placement of staff in valuable off-season positions, which directly relate to the local road planning and design, would be particularly beneficial to the integrated nature of the group. Table 1 shows the staffing levels that peer municipalities are currently employing to undertake their construction programs. (Note this does not include the staff required for the planning, design, survey and quality control of the program)

County	Staff		
	Permanent	Seasonal	Total
Barrhead	2	5	7
Bonnyville	8	1	9
Lacombe	11	9	20
Leduc	Externally Tendering All Local Road Construction		
Sturgeon	6	7*	13

*** includes 2 flag persons**

Table 1 - Construction Staff Compliments (Supervisory Staff Excluded)

Barrhead, Lacombe and Sturgeon counties all currently re-assign staff to unrelated positions of the road construction group, i.e. brush cutting, snow plowing, etc. Bonnyville employs all full-time staff with alternate time banking provision (3 month extension to 6 months) to allow staff flexibility with their off-season time.

2.3.5 Construction Equipment

The County currently utilizes Cat 627H scrapers as the core component of the heavy construction fleet. All other peer municipalities undertaking internal road construction also utilize the scraper as their primary earthmover. The 2012 LRRS report recommended using scrapers as the main earthmover and the County has utilized this methodology in the past. Table 2 illustrates the current composition of the heavy equipment fleet. The peer municipality reviews confirmed that all the groups involved in local road construction operate a similar complement of equipment to the County.

County	Cat 627 Scraper	Cat 621 Scraper	Cat D8	Cat D7	Cat D6	Cat D5	Cat D4	Cat 815 Packer	Cat Motor Grader	Total #
Barrhead	3				1		1	1	1	7
Bonnyville	3			1	1		1	1	2	9
Lacombe	3	2	2		1			1	2	11
Leduc	Externally Tendering All Local Road Construction									0
Sturgeon	3			1	1			2	1	8*

*** excluded equipment (water truck and excavator)**

Table 2 - Heavy Equipment Fleet

The key performance indicator with road construction is the cost per kilometer of road. A major component of the overall road construction cost is the price per cubic meter to move material. There are currently three methods that can be utilized to bulk earth move in varying circumstances. A bulldozer, excavator or scraper can be employed to move earth but they all have positive and negative aspects with respect to their performance which directly relate to productivity and cost.

The bulldozer is the cheapest bulk mover of earth but only feasible to distances around thirty meters and has no ability to compact the structures it builds. A bulldozer rapidly loses its cost advantage as the push distance increases and at approximately ninety meters it costs the same

as a scraper. The scraper can also triple its minimum cycle distance for almost no difference per cubic meter of load. The bulldozer will not be considered as a viable method of bulk earth moving as the distance from the source is beyond it feasible distance.

Excavators are extremely robust machines able to bench their way into areas a scraper could not access. An excavator is slow to move large quantities and rely upon additional machines like trucks to extend their reach which is generally less than twenty meters. When dependent upon trucks for haulage, the idle time for the excavator is a prohibitive cost. Final placement of the material will also require a bulldozer or grader.

Twin engine open bowl scrapers are typically used on very large projects. The scraper is fast, highly maneuverable, can handle steep climbs in rough terrain, and has the power to load itself. There is a time penalty to complete loading compared to a bulldozer, but once loaded can deliver materials faster and cheaper than anything else to about five kilometers. Due to its high wheel loads the scraper is capable of high compaction rates during final placement. Conversely, the scraper does not operate well in wet boggy conditions and they can cause significant damage to soil structure when land leveling in fields in damp conditions.

Basically, the choice of equipment to be utilized is more dependent on the project size, type of soils and haul distances. These factors can be mitigated by the project design and geotechnical investigation to ensure the conditions meet the criteria of the equipment complement. Administration reports that due to borrow acquisition challenges, internally completed projects have recently experienced significantly longer material hauls as well as additional landscape borrow costs.

The decision to alter the heavy equipment fleet is more dependent upon how the local roads are designed, i.e. distance to fill, size of cuts, etc. as well as the overall construction methodology of the local roads. For example, material standards could be established by preliminary soils investigation to guide when projects are completed internally or externally to achieve the best value for money.

2.3.6 Construction Costs

The economic conditions in 2016 are trending to lower tendered prices for local road construction. Due to the contraction of the Alberta economy there is excess capacity that exists in the construction industry. In turn, the underutilized capacity is focusing on a finite pool of municipal construction work thus reducing the costs. Statistics Canada lists the CPI index increase for Alberta from 2011 to 2015 to be approximately 6.4%[1] and an increase of 9.3%[2] during the period from 2006 to 2010. The comparison of the two CPI values for Alberta clearly illustrates there has been a reduction of costs during the latter period in the provincial economy.

The 2012 LRRS report outlined the total cost (including all equipment, personnel, gravel and material, land, engineering) per kilometer of internal local roads with an 8.0m subgrade width to be $297,000. Current cost data received from the County for internally constructed roads of

[1] http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/econ150a-eng.htm
[2] http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/econ150b-eng.htm

similar width is $331,209, an increase of approximately 12%. The current cost per kilometer of tendered projects with the same width is $409,538. Using the current cost data there is a 21% difference between internal and external construction methods.

Cost Comparison Between County and Contracted Forces					
		Length (km)	Subgrade Width (m)	$/km	% Change
County Forces	2012 Report	7.2	8.0	$296,956	
	2016 Report	8.0	8.0	$331,209	12%
Contracted Forces	2016 Report	6.4	8.0	$409,538	

Cost Difference between County Forces & Contracted Forces = $78,329 / km
% Cost Difference between County Forces & Contracted Forces = 21%

Table 3 - Cost per Kilometer Comparison

A decision matrix has been formulated using the costs from Table 3 to evaluate the yearly cost implications of internal forces versus contracted forces to complete local road construction. To fully capture the costs it is important to include ancillary items directly related to the overall yearly budgets to examine each option equally. The cost per kilometer is the primary expenditure but additional items relate to construction and support staff, equipment alterations and additional materials. Further, the cost data for this report was generated from a small data set for each project type, i.e. two projects. Overall, the limited amount of data makes it rather difficult to base long-term funding and budget decision upon only four sets of data generated from recent projects.

2.3.7 Local Road Construction Staffing

Staffing for the local road construction group is a primary component to success. Not only does it require the appropriate number of individuals but a wide array of knowledge, skills and abilities, which has been a challenge for Sturgeon County to attract and retain. The various positions include equipment operators, lead hands, supervisory foreman, superintendent, and a project manager. In addition, there are internal or external components which add to the group for planning, design and operational support for both engineering and equipment maintenance. As noted in section 2.2.4, there can be issues with securing and retaining suitable individuals due to the unique skills required for the various positions. The specific challenges for construction staff retention need to be thoroughly examined by the human resources department. The goal would be to outline a list of options, i.e. salary, OT provisions, benefits, employment status, etc. to enhance the overall retention and build the group to a sustainable level of permanent staff. Direct engagement with existing staff could aid in the development of the overall employment program.

During internal and external consultations for this report there has been a significant amount of discussion related to how critical the personnel in the group are to the overall productivity of the construction operations. This report assumes that the preliminary work such as soils

investigation, engineering design, land negotiations, utility relocations and Alberta Environment assessments have been completed prior to the start of construction. Ensuring these advance tasks are completed for the construction group will benefit the overall productivity.

It is imperative that the "team" responsible for road construction as well as support functions of planning, land negotiations, utility agreements, Alberta Environment approvals, engineering design, quality control, and survey work in an integrated and collaborative manner to ensure successful outcomes. Ultimately, the personnel are the motive force behind the local road construction group. Personnel must be considered to be professional, motivated, hard working, dedicated, and trustworthy with the best interests of the County in mind. It is critical that appropriate resources are allocated to the group to perform all the various functions.

Members of the construction group could be involved with advance land and borrow negotiations as well as topographical survey to best utilize the internal resources and ensure they remain on related load road tasks. Crossover will exist between internal members and external support functions so it is very important to have local road staff involved in as many segments of the process so organic growth of the personnel can begin. Areas to concentrate upon may be engineering design, land acquisition, borrow investigation, utility relocations, crossing agreements, Alberta Environment assessments to list a few. The concept of shovel ready projects must be examined as the timeline of road construction projects is being extended due to increased levels of oversight from non-traditional groups such as Alberta Environment.

It was noted in the 2012 report that the County should establish a core group of permanent staff that are critical to the productivity of the operation. Based upon the unique skill sets of individuals in the local roads group, additional thought should be placed upon developing a team or core group of personnel that focus on local road work during the entire year. Although this is a higher initial investment in full-time personnel it will present retention and continuity benefits to the operations of the group. This higher level of investment has been included in the analysis of options in Section 3. It is recommended that the staff investments be made to enable the group to perform productively. The concept of a core group must be examined to ensure the continual progress of ongoing work as well as giving personnel the time to execute all the various tasks related to the lifecycle of a project. The core concept aligns with the explicit organizational culture of employee empowerment, internal career development and progressively growing to future challenges.

2.3.8 Stakeholder Communications

Communications with residents is very important not only during the construction operations but well in advance during road evaluation, capital programming and engineering design. Due to the interactive process of road designs it is very important that residents are consulted regarding property and borrow requirements at minimum a year in advance of the construction. The process of working with landowners and residents must be increased to mitigate issues that may arise during the process. Peer municipalities have indicated that their approach to landowners has frequently been asking for assistance to ensure the project is successful rather than mandating requirements that may precipitate an adversarial relationship.

It is recommended that Sturgeon County consider open houses or public consultation as another channel to help the County ensure local resident concerns are addressed in advance of a project. This approach increases the level of effort required but it would provide essential insight into any potential issues that may arise during the project planning and design phases. In addition, the increased level of communication would necessitate a consistent and formalized stream of information to the public. Open and transparent communications related to local road construction projects would not only enhance the visibility of the projects but it would also explicitly display the ongoing commitment to the transportation infrastructure.

2.4 Council Questionnaires

A questionnaire was developed to identify and determine key issues related to the local road reconstruction program. The questionnaire is contained in Appendix A. The main tenet of the interview process was to interpret the stakeholders' opinions of County reconstruction forces as well as determine the Councillors' opinions related to the various facets of the local road reconstruction framework. The interview process had a few basic guidelines which relate to the reconstruction of local roads by either internal or external forces. The standards by which the local roads are reconstructed, either internally or externally, must be independent of the conveyance.

The general consensus of the constituents is that there is good value for County construction forces. Overall it was noted that there are sufficient advantages in maintaining internal forces to perform local reconstruction projects. In addition, the construction forces allow flexibility in operations with the capability to re-direct operations on emergent situations when required.

Factors related to local road reconstruction projects all ranked very highly with respect to planning, prioritization, timing, production, quality, and cost. These factors are all related in the general sense of the transportation department but they can be rather specific to segments of the larger process. For example, planning, prioritization and timing generally relate to the upfront processes prior to construction. In this situation, the construction team has less involvement in the project. The core construction group will be central to the construction costs, production and quality of the local road. It is important that the segments directly related to the construction must be internally supported to achieve success.

The majority of interviewees indicated that local road construction should be part of the transportation department's core business. Although the majority indicated that the core business concept was important there were caveats with this concept. The main reservation would appear to be the availability of highly skilled staff enabling the utilization of personnel and equipment assigned to the group.

Delivery of the local roads program was split upon the idea of internal resources versus external tendering. The present economic conditions have introduced reducing bid pricing for tendered contracts based upon the current industry capacity. In addition to rising investment requirements to purchase heavy equipment and the current cessation of activity of the heavy construction fleet there are a number of options that may be considered for program delivery.

The need to provide a financially sustainable method of delivering the program was noted a few times during the interview process.

The level of investment in local road construction should be increased. This question resulted in the most decisive answer of the interview process. Well maintained local roads represent economic vitality, committed leadership and prudent financial stewardship.

The idea of local road backlog was discussed and this question had many varying responses. The timeframe ranged from ten to fifty years to eliminate or renew the County's local road infrastructure. The information was significantly varied due to the many circumstances that would influence the timeframe of investment that is allocated to the local roads program. Local roads are predominantly low priority; often provide service to fewer stakeholders and normal operational conditions make justification of precious capital resources very difficult in the planning process. Collectors and arterials are often higher priority projects due to their location and increased levels of usage therefore demand significant investments. As the County expands its development base, many additional levels of service requirements are being introduced that further exert pressure on the capital budget.

2.5 Peer Municipality Interviews

During 2012 interviews were completed in the jurisdictions of Barrhead, Lacombe, Leduc, and Bonnyville. As a follow-up for this report all the peer municipalities were briefly interviewed over the phone. In 2012, all the peer municipalities employed internal construction forces with similar equipment as Sturgeon County. Currently Barrhead, Lacombe and Bonnyville have remained consistent with their internal provision of services but Leduc has altered the local road reconstruction program to an externally tendered structure. All the peer municipalities mentioned negative impacts to their programs if key leaders were to leave. Further they also discussed the potential of having to alter their construction programs in that event. During the peer interviews, almost all the original information collected in 2012 was consistent with 2016. The local road template and design features have remained the same. There were some minor variations related to equipment, personnel and property compensation in the three remaining jurisdictions but the overall operational theme has remained constant.

Leduc is currently undertaking the local road reconstruction program via a fully external tendered process. The main reasons given for the altered approach were related to end product quality and staff turnover. The entire program is managed by three engineering/project management staff members who steward the entire lifecycle of the projects. Specific equipment that could not be re-tasked was disbursed at auction. There were initial reservations to the program delivery but that no longer exists as the pricing and response from the local contracting market has been very encouraging. As an aside, the question was asked what would be the strategy if local road reconstruction prices rise significantly and the response was to re-direct capital to areas that provided better value.

3.0 2016 Local Road Reconstruction Analysis

This report has examined the market, economy and local road construction information as well as performing interviews with peer municipalities, administration and technical specialists. Current costs for local road construction projects were examined both internally and externally delivered.

The main focus of the remainder of the report is to present analysis and alternatives related to the operation of the local roads construction program. The two options that will be examined are completing local road construction projects internally or via externally contracted forces. Each option will be examined to outline the requirements and conditions related to that alternative.

Critical elements of the local road reconstruction group relate to planning, prioritization, timing, production, quality, and cost. All these issues must be addressed to allow the program to be successful. During the interview process it was apparent that high productivity combined with quality of the end product is the desired outcome. The overall cost is dependent on the production and quality of the work. Administration reports that productivity for internal projects has been hampered due to lack of available borrow with short hauls. Administration reports that quality on internal projects has been very high with few reported defects or failures on gravel roads after constructed. As mentioned previously in the report planning, timing and prioritization are elements that are precursor to the actual construction project and must be examined to provide full support to the construction program.

Depending upon the amount of work the local road reconstruction program could consider yearly programs that employ both internal and external resources, if required. A type of blended program would be a reliable option as the volume of work completed on a yearly basis normally exceeds the internal capacity. This situation also provides an opportunity for County forces to undertake projects with conditions that suit the current equipment compliment and tender other projects that have circumstances that do not suit the equipment fleet. The current economic conditions may also allow the County to tender additional work and reduce the current backlog more quickly. In essence the County must strategically select the appropriate projects for their forces to complete. This project selection decisions would be borne out 1-2 years in advance of construction to allow planning and engineering investigation.

3.1 Option 1: Internal Construction Forces

Information gathered from all the interviews was very consistent with the fact that it is very difficult to be successful in road construction due to the continually changing industry conditions. Success is not achievable if the personnel are not highly skilled, motivated, team players that are dedicated to their work. This success is also directly related to both the leadership of the group as well as external support that is provided.

Option 1A is the County Forces Scraper Option. The equipment compliment has been reviewed in Table 2 and may require an additional D8 bulldozer to aid in operations if borrow sources are unfavorable. This equipment alteration would require an additional capital investment.

Key points related to strategy:

- Location of earth borrow is a significant contributor to productivity.
- Determination of maximum haul distance is required.
- Scrapers require a dedicated fleet mechanic, with higher risk of downtime.
- Attracting and retaining skilled scraper operators requires full-time positions.
- Recruitment of leadership and key staff is required.
- Internal engineering support is required.
- Addition of D8 bulldozer.

Option 1B is the County Forces Truck Option. This option would alter the type of equipment utilized, i.e. excavator and truck instead of scrapers. Administration reports that the excavator and truck option should be considered in the future as the County has had difficulty attracting and maintaining trained scraper operators. The utilization of trucks should also be considered as an alternative due to the longer hauls on local road projects. This equipment alteration would require an additional capital investment.

Key points related to strategy:

- Location of earth borrow is a significant contributor to productivity.
- Determination of maximum haul distance is required.
- Trucks may potentially be more cost effective for longer hauls.
- Trucks do not require highly skilled operators.(seasonal employees)
- Trucks require less maintenance.
- Recruitment of leadership and key staff is required.
- Internal engineering support is required.
- Sell scrapers.
- Addition of an excavator and 4 articulated dump trucks.

It is assumed that end product quality will be the same with either option. Production is extremely critical to the project but it is not immediately achieved by changing equipment. Alternatively, the group could consider tendering projects that do not specifically suit the equipment compliment.

Qualified staff with suitable knowledge, skills and abilities must be resident within the group. Section 2.3.7 discusses the potential staff levels but this is related to the equipment. Key supervisory positions need to be filled as well as additional support personnel related to project management, land acquisition, engineering design, and survey. The following support staff positions are required for the internal County forces option: design engineer, surveyor, project manager, land agent and fleet mechanic. The truck option will also require two additional operators.

The group must have opportunities for staff to be full time employees in a positive environment that are rewarded for dedicated service. There should be flexible provisions for overtime banking that can be utilized during the off-season. Personnel involved in this group make sacrifices by working longer hours during the construction season. As a result staff sacrifice

both personal and professional opportunities during this period to maintain the group's productivity. If the explicit message of the County is to empower employees then this must be extended to this group. Employees are the key to success!

The ability to attract and retain highly skilled staff is not only difficult but it is costly. If there are any issues with the growth and management of more staff in the local road reconstruction group then this topic must be considered within the overall decision matrix. During periods of higher economic activity and less road building capacity as seen during boom times, staff is highly mobile and can readily change employers without repercussion. Further, the County is placed in competition with many other market sectors for a finite pool of available resources.

During the peer municipal interviews it was mentioned frequently that if one key staff member left their group it could alter their entire program. Staff turnover will always be part of the situation but it must not be due to instability in the group. Ultimately, the group must be formed from the project manager down to the operators.

End product quality standards must be established by ensuring the correct processes are in place to ensure transparent standards are attained. The construction methods, quality assurance standards and final specifications must be consistent independent of the method of conveyance. It is recommended that internal projects should have a dedicated project manager, quality assurance testing and as-built drawings to confirm the original design parameters were achieved.

Management and engineering services support is critical to prepare projects in advance for the construction group. The concept of shovel ready projects must be examined to allow flexibility in the delivery of projects. Road rating, programming and prioritizing is the responsibility of the transportation department but the rating could be done by a construction group member to be involved in the advance design activities.

3.2 Option 2: Externally Tendered Projects Only

Based on current economic trends there is sufficient market capacity in the road reconstruction industry to seriously review this option. In addition, the recent bid pricing has been very favorable to tender work externally. This option must be explored further to understand all the components and short-term cost reductions that could attained by the delivery method; however; some preliminary cost and staff implications are listed below.

The external tendering alternative would give the transportation department options with in-house staff that could be re-assigned to fill other responsibilities. Administration reports that this type of re-assignment took place in 2016 with the operational transfer to shoulder pulling and drainage. Additionally, the need for skilled equipment operators would be removed. Administration reports that four full time operators previously on construction have replaced operators in maintenance positions and the remainder of the permanent local road construction positions are vacant.

The impact on the heavy equipment fleet would be to re-task equipment to other responsibilities and sell the remainder of the fleet. The potential market value of $2.9M could be re-allocated if

the heavy equipment fleet is dispersed. The impact on the budget for replacement of the heavy construction fleet would be reduced by $7.6M dollars over the next eight years. The capital equipment table is located in Appendix B. The capital re-allocation potential to the budget by altering both the method of conveyance and reduction of equipment replacement funds would total approximately $10.5M over the next eight years.

Potential staff requirements for the management of external tendering could be completed by two staff members with some consulting assistance. The processes would include road rating, programming, engineering design, land negotiations, contract preparation, tendering, and construction management. A key programming component, Road Matrix Selection sheet, could be utilized by the transportation department to build the inventory of roads.

One of the issues with contracting out the entire local road reconstruction program is the economic volatility of the Alberta economy. This risk can be mitigated through longer term contracts which can provide price stability for capital planning. During periods of economic boom the pricing for road reconstruction work may not provide value for money so another option may be to re-allocate the reconstruction monies to other projects where there is better value for money.

3.3 Cost Evaluation of Options

The two options for the program delivery have been analyzed using the cost data for internal contracting and external tendering. The cost information is listed below for comparison:

Option 1A cost / km = $331,209
Option 1B cost / km = $364,330
Option 2 cost / km = $409,538

Option 1B carries a ten (10) percent premium over Option 1A based upon productivity estimates.

To analyze the overall costs for each of these options a cost sheet was formulated to examine all the input costs related to the options. The additional costs, where applicable, relate to re-graveling, additional construction staff, additional support staff, yearly equipment replacement costs, and immediate equipment alterations. The capital re-investment implications of Option 2 were not considered in this matrix due to unknown re-investment options.

The target number of kilometers to complete per year has been set at 12.8km (8 miles). The overall cost information is based upon the 12.8km/year.

Yearly costs for Option 1A = $ 4.9M
Yearly costs for Option 1B = $ 5.5M
Yearly costs for Option 2 = $ 5.6M

Using Option 1A as the base value:

Option 1A is 11% lower than Option 1B and 13% lower than Option 2. Option 1B is 2% lower than Option 2.

Although Table 3 outlines a 21% difference between historical costs of internally completed project costs versus contracted project costs, the current difference predicted by the matrix is between 11% – 13% depending upon the option. The narrowing of the cost difference is related to the additional internal expenditures required to produce a similar end product. There is also a reduction in the gap between the 2016 and 2012 report costs (internal vs. external) mainly due to the reduction of contractor's profit levels.

3.4 Reflective Statement Analysis

In the introductory section, a number of statements were listed for the reader. The statements generally relate to the underlying drivers of the current issues that are faced by the road construction group. The goal of the report is to provide a context for these questions to be answered as well as a future strategy for the construction of local roads within the County. In any event, the statements should evoke a discussion based upon the current costs, economic trends and future composition of the local roads group.

Does the Transportation group have the capacity to undertake increased levels of activity related to local road construction?

It is evident from the interviews that more resources would be necessary for the County to undertake increased levels of activity. Two to five additional support positions would be recommended along with the required equipment operators.

Is it economically feasible for the County to provide local road construction services?

Due to the limited number of data sets that are available for this design width of construction, it is difficult to evaluate long term conclusions from this small data set. The historical data indicates that the internal scraper option is the lowest cost option. However, the scraper option has many risks and implications based upon the haul distances, material requirements, skilled staff requirements, and high maintenance requirements. The current compliment of three scrapers is inherently risky as when one machine goes down, productivity could potentially decrease by as much as thirty-three (33) percent.

Can highly skilled employees be secured and retained by the County for road construction?

The interviews indicate that this is the critical question for the success of the program. The County has had many challenges recently in attracting and maintaining trained scraper operators, foreman and superintendents.

Is the method of contract conveyance purely a financially decision?

Yes, with a caveat. Although the County does not strive to generate financial returns for internal road construction projects there still has to be a consideration for overall costs. The County has a fiduciary duty to the ratepayers to complete work in the most financially responsible manner. This method will ensure the highest rate of return for the money expended. The provision of safe and reliable local roads is a priority that the County is committed to provide.

Is the investment in internal construction forces a core function of the Transportation group?

This is a fundamental decision for Council based upon information from administration. There are many factors that must be considered based upon the size and scope of the desired program in relation to the ongoing regular maintenance program which is a core function.

Can capital expenditures in heavy equipment and staff be re-allocated for better value?

The economic goal of equipment expenditures must be to maximize value by providing the appropriate level of service and results that substantiates the investment.

Does the County have engineering capacity to provide support functions to the local road construction group?

With the current complement of staff, engineering services cannot support the local road construction group. At this time, engineering services has service enhancements in place to allow for the 2017 budget that is requesting three (3) new positions in the operations support branch. One of these positions, if approved will be involved in the design of the local road program.

For the 2018 budget engineering services is asking for one (1) additional position in the operations support branch. This local road program officer would project manage the local road program and the drainage program.

If the program moves forward, 2017 would see the design and land acquisition, with the construction for the local road in 2018. (The timing of the hiring of the program manager would match this timeline.)

Is there currently an annual strategic plan for the local road construction group?

To formalize the process, Council could reiterate the strategic importance of this program with a 10 year program commitment. This strategic importance would be reflective of the priority of the program in relation to other priorities including rehabilitation of roads, drainage legacies, bridge replacements and paving new roads.

4.0 Conclusion

This report summarizes the findings of work undertaken to determine if Sturgeon County's Local Road Reconstruction Program should be completed in-house or with contracted services. The scope of work included a review of the 2012 LRRS report, completion of an environmental scan of the market, economy and local road construction group. As part of the assignment, interviews were performed with council members, administration, technical specialists, and peer municipalities that were consulted during the 2012 report.

Recent Sturgeon County road construction costs were reviewed to provide a snapshot of the industry related to the 2012 cost information. Information gained since the 2012 report was reviewed as it relates to the current operating situation. The fundamental assumptions regarding the local road construction templates were confirmed to ensure they were still valid. At the time of the 2012 report all the peer municipalities were conducting internal road construction. Presently the County of Leduc no longer undertakes local road construction with internal forces.

The intent of this report was focused on the program delivery to obtain the most productive operation at the lowest cost per kilometer. Productivity was examined as a function of the method of construction. The end product quality is a significant factor of the conveyance decision but it will be assumed to be equal in either situation. The 2016 report analyzed the costs in the same method as the 2012 report to ensure congruity with the cost/km.

Local road reconstruction program delivery options considered were 1) internal local road reconstruction and 2) external local road reconstruction. The recent cost data for internal construction forces and external tendering are $331,209/km and $409,538/km, respectively. It should be noted there were only four data sets to compare the overall historical costs. There are a number of staff and equipment changes which must be considered for the future delivery of the program. The risks of each option must carefully be considered and evaluated in conjunction with expected costs.

Throughout the report there has been commentary related to the current operating situation of the local road construction group. The introduction introduced some reflective statements that were answered in the previous section of the report. The current situation of the local road construction group is fundamentally related to costs, staff and support functions. Independent of the option that is selected for the conveyance of the local road construction projects, the program must be completed in a decisive and efficient manner to provide the highest value for the ratepayers.

APPENDIX A

Questionnaire

1. Do the constituents express there is good value for County construction forces?

   Poor Value Fair Value Good Value Very Good Value

2. Are there advantages to having internal County forces undertake local road construction projects?

   No Advantage
   Limited Advantages
   Sufficient Advantages
   Numerous Advantages

3. Most important factors related to local road construction projects?
   (1 not important, 5 very important)

a.	Timing	1	2	3	4	5
b.	Quality	1	2	3	4	5
c.	Planning	1	2	3	4	5
d.	Production	1	2	3	4	5
e.	Cost	1	2	3	4	5
f.	Prioritization	1	2	3	4	5

4. Should local road construction be part of Transportation's core business?

   Yes or No

5. How should the local roads construction program be delivered?

   Internally or Externally

6. How should future levels of investment be for local road construction?

   Decreased Unchanged Increased

7. What timeframe is reasonable to eliminate the current backlog of local road projects?

   10 years 25 years 50 years 100 years

APPENDIX B

Utilization & Value

Unit#	Model	Year	Total Hrs	Idle Hrs	Replacement Year	New Price	Salvage Value	Replacement Value
051-119	D6T	2013	3166	1244	2023	$600,000.00	$240,000.00	$360,000.00
055-156	336E	2015	715	291	2025	$500,000.00	$355,000.00	$145,000.00
050-145	14M	2013	3734	1661	2018	$475,000.00	$310,000.00	$165,000.00
053-141	815F	2015	215	56	2025	$600,000.00	$437,500.00	$162,500.00
053-138	815F	2008	4641	1740	2018	$600,000.00	$265,000.00	$335,000.00
051-118	D7	2007	7371	2799	2018	$650,000.00	$190,000.00	$460,000.00
052-128	627H	2012	2514	977	2018	$900,000.00	$600,000.00	$300,000.00
052-129	627H	2012	2460	909	2018	$900,000.00	$600,000.00	$300,000.00
052-130	627H	2013	1717	599	2019	$900,000.00	$600,000.00	$300,000.00
		Totals	26533	10276		$6,125,000.00	$3,597,500.00	$2,527,500.00

Average idle time = 38.73%

Red indicates Road Construction specific equipment. Black is multiuse and could be repurposed

County Forces			Subgrade	Material						
Road	Year	Length (km)	Width	Factor	Construction	Engineering	Land	Other	Total $	$/km
Rge Rd 222 fr Twp 560 to 554	2012-2013	3.2	8.0		$ 943,784	$ 98,901	$ 29,411	$ 93,422	$1,165,518	$ 364,224
Twp Rd 580 - Rge Rd 251 to Rge Rd 244	2014-2015	4.8	8.0		$ 1,017,560	$ 80,866	$ 170,765	$ 214,960	$1,484,151	$ 309,198
Total		8.0							$2,649,669	$ 331,209

Contracted			Subgrade	Material						
Road	Year	Length (km)	Width	Factor	Construction	Engineering	Land	Other	Total $	$/km
Rge Rd 223 fr Hwy28 to twp 572	2014	3.2	8.0		$ 1,074,497	$ 242,960	$ 13,800	$ -	$1,331,257	$ 416,018
Twp Rd 570 & RRR233	2016	3.2	9.0	17%	$ 904,286	$ 310,000	$ 65,500	$ 10,000	$1,289,786	$ 403,058
Total		6.4							$2,621,043	$ 409,538

Heavy Equipment Fleet Capital Reduction

Impact on 10 year Capital Plan	
2017	$0
2018	-$3,525,000
2019	-$900,000
2020	$0
2021	$0
2022	$0
2023	-$2,275,000
2024	-$900,000
2025	$0
2026	$0
2027	$0
	-$7,600,000

2016 Local Road Reconstruction Strategy Review

Prepared by:
SQRD Engineering
September 2016

Main Goal

Examine 2 methods of operation based upon costs:

1. Internal Construction Forces
2. External Tendering Only

Understand the specific challenges related to each option.

Main Drivers of the Review

1) Can the Transportation group undertake more local road construction?
2) Is it economically feasible for the County to provide local road construction services?
3) Is the method of contract conveyance purely a financially decision?
4) Is the investment in internal forces a core function of the Transportation group?
5) Can employees be secured and retained for road construction?
6) Does capital expenditures in equipment and staff provide the best value?
7) Is there engineering capacity to actively support the construction group?

Primary Information

Information was gathered through the following sources:

- Cross-divisional Project Team
- Steering Committee
- Review of 2012 DCL Siemens Study
- Peer Municipal Interviews
- Industry Technical Expert Interviews
- Internal Financial Costs

Current Economic Conditions

- Over capacity in construction industry,
- Competitive bidding creating downward pressure on unit costs,
- Short-term economic predictions flat,
- Higher unemployment rate in AB ~ 8.6% from ~6.1%(July 2015),
- Price of oil during 2016 (~ $18.00 – $36.00)
  (http://finance.alberta.ca/aboutalberta/osi/aos/data/Heavy-Crude-Oil-Reference-Prices.pdf)

New & Unanticipated Factors

- Technical leadership of construction group,
- Construction staff retention,
- Attraction of skilled equipment operators,
- Difficulty in acquiring economically feasible earth borrow sources,
- Culture of municipal employer,
- Current economic conditions.

Peer Municipal Interviews

Barrhead, Bonnyville, Lacombe, & Leduc

- Road design criteria consistent since 2012
- Barrhead, Bonnyville & Lacombe – internal forces
- Leduc – external tendering only
- Staff retention highly impacts program
- Similar equipment compliment
- Stable ‘core’ group of staff imperative

Financial Data

Cost Comparison Between County and Contracted Forces					
		Length (km)	Subgrade Width (m)	$/km	% Change
County Forces	2012 Report	7.2	8.0	$296,956	
	2016 Report	8.0	8.0	$331,209	12%
Contracted Forces	2016 Report	6.4	8.0	$409,538	

Cost Difference Between County Forces & Contracted Forces = $ 78,329 / km
% Cost Difference Between County Forces & Contracted Forces = 21%

(Note: financial information was derived from 4 subsets of financial data)

Cost Evaluation of Options

Option 1A

- 12.8 km/yr
- Annual Constr. Cost = $4.24M
- Additional Costs = $0.68M
- Total Yearly Cost = $4.92M

Option 1B

- 12.8km/yr
- Annual Constr. Cost = $4.66M
- Additional Costs = $0.83M
- Total Yearly Cost = $5.49M

Option 2

- 12.8km/yr
- Annual Constr. Cost = $5.24M
- Additional Costs = $0.34M
- Total Yearly Cost = $5.49M

(+$2.93M in equipment sales)

Conclusion

Local Road Re-construction Program decisions will have to be made based upon the following 3 criteria:

Financial Costs,

Staff recruitment and retention, and

Strategic direction of the Transportation group.