

Engaging Communities in the Functional Planning and Geometric Design Process

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Paper prepared for presentation
at the Geometric Design – Lessons Learned: Linkages Between
Design Standards and Road Safety Session

of the 2015 Conference of the
Transportation Association of Canada
Charlottetown, PEI

ABSTRACT

The planning stage of a roadway project is the forerunner to the design and construction stages. In various jurisdictions the planning stage can be broken down into several components including General Location Planning, Preliminary Engineering Review, Detailed Functional Planning and Detailed Location Reporting. Each component is vital to establishing the parameters that will be used to design and eventually construct the project. As such, there has been a trend with jurisdictions to involve stakeholders earlier and earlier in the life of a project to manage impacts, risks and expectations. Many jurisdictions now require a comprehensive communications strategy to be implemented to guide the input of stakeholders that have an interest in the development and outcome of project requirements. The intent of early engagement is to minimize the amount of potential rework and inherent delays and budget overruns that can sometimes occur within the project lifecycle when the project objectives have not been properly communicated.

Many of the decisions related to a project occur during the planning stage of its life cycle. For example, the route alignment, design criteria, initial right-of-way requirements, avoidance or mitigation of environmentally sensitive lands, utility impact mitigation can be addressed at the onset of the project to raise awareness and make adjustments where possible.

Tetra Tech EBA Inc. (Tetra Tech), has been involved in the planning of several important key infrastructure projects for Western Canadian jurisdictions. The intent of these projects is to improve key routes to economic growth areas through enhanced mobility and access. With most infrastructure projects, the owning jurisdiction seeks to make improvements for the benefit of the majority; however, there is always an inherent disadvantage to some, mostly in the minority, when it comes to land loss and localized transportation impacts. Through collaborative engagement of local stakeholders, Tetra Tech and their project partners have developed and implemented effective communication strategies to involve key stakeholders from the onset of a project.

Traditional planning exercises usually imposed the decisions made by technical parties, without much consideration for the local stakeholder impacts. By taking advantage of the local stakeholder knowledge of project areas and surrounding constraints, Tetra Tech has been able to develop infrastructure options that seek to balance project impacts and objectives. This early engagement has led to municipalities working alongside one another to meet project objectives, rather than apart as had been the previous relationship. It has also led to municipal advocacy towards stakeholders sharing their feedback and being heard, when previous opinions suggested that all feedback would fall on deaf ears. The intent of this paper is to discuss project case studies that involved local stakeholders in the decision making process and the project advocacy that has been observed subsequently.

INTRODUCTION

During stakeholder engagement activities, a frequent response given from those that may be impacted from a transportation improvement proposal is to resign that a decision has already been made and that these activities are merely to inform rather than to include parties in the decision making process. Recently, Tetra Tech provided a presentation to various municipal stakeholders to advise them of route preferences for future road network improvements and to gain their support of these preferences. One of the municipal representatives present suggested that certain decisions had already been made prior to the project commencing and prior to the municipal partners becoming involved. In their opinion, the meetings that had taken place up to this point in the project had little significance and any input would not be considered for the solution.

Many property owners facing the threat of losing some of their land to a future construction project often express a similar opinion to one presented by the municipal partner during this meeting; that pre-conceived decisions have already been made. Shortly after this declaration was made, another municipal partner involved in the same project planning process sought to address this concern by stating their experience during a subsequent project that allowed this municipality to be a part of the decision making process.

Project A initially started off with the objective of identifying long-term access management improvements for a community experiencing substantial growth challenges. The decision was made by the local authorities to move the main trucking corridor within the community away from the downtown core for safety, operational and long-term maintenance benefits. Concerns were raised by the community regarding the possible economic impacts that this action could have on its sustainability. Through discussions with local municipalities, a course of action was decided upon. However, it became apparent that not all of the details regarding the full effect of taking such an action were fully understood until the design of the project had been completed and the construction announced.

When Tetra Tech was commissioned to complete the next stages of the planning for a component of Project A, resolutions had not been fully address with respect to previously stated concerns. Through the course of the project, these concerns were resolved to the satisfaction of the parties involved. At the time that decisions were required to be made as part of Tetra Tech's component of the project, all parties were keen to be involved in the decision making process. As such, a working group meeting with the local municipalities and infrastructure owner was held to involve the necessary parties in the decision making process and to gain support of the decisions made.

Having gone through this process with Project A, the local municipalities that participated in Project A were able to validate the same process that had been completed for Project B when the declaration was announced regarding the pre-conceived notion that a decision had already been made. It is with this experience in mind that this paper has been developed which seeks to present the approach taken to engage communities in the functional planning and geometric design process. The focus of this paper is towards transportation infrastructure projects that may have applicability and relevance in other areas of interest.

A BRIEF ACCOUNT OF STAKEHOLDER ENGAGEMENT

Stakeholder engagement approaches, guidelines and policies started to emerge towards the latter half of the 1990's within many of the developed countries and have continued to evolve as methodologies are refined. The traditional method of leaving decisions to those responsible for implementing them still remains today, to a large degree; however, there is much more willingness towards involving communities, members of the public, and stakeholders in general in the initial decision making processes to manage expectations and outcomes. To some extent there has always been a period of notification to those impacted or those that have to manage the impact to others (i.e. communities) regarding infrastructure project requirements. The more common approach today is to advance that notification period so property owners, communities, members of the public, businesses, associations etc. have sufficient time to make the necessary adjustments required to support the proposed infrastructure.

In terms of the roadway transportation industry, infrastructure improvements such as the rerouting of a highway to flatten horizontal and vertical curves while lengthening sight lines and enhancing the safety of a corridor were identified, debated, and decided upon by practitioners that focused on meeting well established geometry design principles. While these principles, guidelines or standards were readily accepted by members of the industry through proven research and practice, they were not always understood by those that would be effected by them, specifically communities, property owners and members of the public. As such, there was often animosity towards the authority implementing these changes due to a lack of understanding and communication. Much of the resentment expressed towards these authorities appears to have been focused on voices not being heard and decisions being forced on others with little understanding as to why.

Throughout history there have been many movements that have sought to establish or maintain the rights of those viewed to be in a minority. The process of establishing or maintaining such rights has often been a long drawn out affair moving from one generation to another before the intended outcome is achieved. Although not as noticeable as the movements recorded in history, it can take some time for engineering practices to become adopted by both the private and public sectors. Such examples include the need for stakeholder engagement, the benefits of

undertaking road safety audits, and the safety and operational improvements offered by alternate intersection treatments such as roundabouts.

With the introduction of legislation such as The Freedom of Information and Protection of Privacy Act in Saskatchewan in 1990-1991 and in Alberta in 2000, provincial governments have practiced a level of transparency unknown previously. It seems that with this transparency came the desire to involve various forms of stakeholders at different stages of the planning and design processes that were not common practice beforehand.

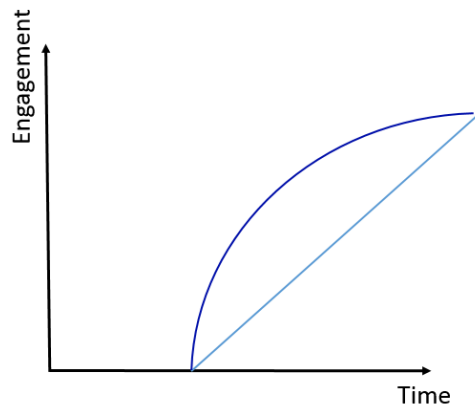


Figure 1 – Timelines Associated with Stakeholder Engagement

In the author's opinion, Figure 1 demonstrates a generalization towards the timelines associated with stakeholder engagement, both historically and now in individual projects. Historically, there was little to no involvement in the decision making processes since those appointed, elected or through birthright largely dictated the will of a few upon the majority. Today, as we embrace a society that wants to be heard and where opinions count for something, there is either a gradual rise or a sharp increase in the need to listen to those with an interest in the topic at hand.

In terms of individual projects, there is a lag time from project onset to stakeholder engagement and then support for infrastructure improvements. There is an initial consultation period to perhaps 'kick things off', but it takes time to understand just who might have an interest in the project outcomes and to establish a means of consulting meaningfully with them. Once engagement activities begin, there can be a gradual progression or a sharp increase in progression of the project and establishing priorities. At some point though, there needs to be a point of conclusion or the process may become over-saturated with opinion or ideas that stalls the desired project progression and decision making process.

A COMMUNITY'S AGENDA

With the impetus of available federal funds, a Western Canadian provincial government announced that plans for new infrastructure would be forthcoming to support a community's request to move truck traffic away from the downtown core. One of the province's key economic corridors to local, regional and international markets traversed the downtown core of a growing city. The high proportion of truck traffic using this corridor were required to mix with city traffic flows to access adjacent highways or local roads raising safety concerns. Perhaps of greater concern to the city was the ongoing (almost annual) maintenance required to patch, overlay and repair pavement that deteriorated at accelerated rates. This ongoing maintenance placed constraints on municipal budgets to address this key corridor's demands.

The announcement of new infrastructure plans to reroute truck traffic away from the downtown core was welcomed by members of the community. Shortly after the announcement, the province established options to address the desire to reroute truck traffic, and a subsequent alignment was established with public and stakeholder input. Geometric design elements for the route were determined that would meet provincial and national roadway infrastructure standards.

Subsequent reviews were completed by the province to confirm future twinning requirements, access control and spacing, right-of-way constraints, road safety enhancements and local industry's rail line expansion plans. With an apparent plan in place, the province began the acquisition of needed lands to support the project. At this stage of the work, Tetra Tech was retained to complete a study of the long-term access requirements at several locations along the future trucking roadway. This study will be referred to as Project A.

At the onset of Project A, it became apparent that many of the local municipalities' concerns had not been fully resolved during the previous planning and design work completed to date. During initial meetings held to advance the study, it was clear that progress could not be made until these underlying issues had been resolved to the satisfaction of all involved. As such, it was agreed that the study progress would be halted until such time as the necessary resolutions had been established and focus on delivering the study objectives could be maintained.

Upon recommencement of Project A, Tetra Tech recognized the need to engage these local municipalities at every opportunity so that decisions were made with inclusion of community leaders. These leaders could understand but more importantly support the decisions being made that could ultimately have positive and negative impacts on their economy. Regular updates and involvement of the municipalities was critical to meeting study objectives and developing infrastructure options that would meet local and regional transportation needs. Whereas initial

meetings were attended by various levels of government, each seemingly having their own agenda that led to a grandstanding of the meeting with one individual feeding off the momentum established by another, expectations were clearly placed with the municipalities to limit involvement in future meetings and in the decision making process to those with a holistic view of the study's intent.

As the study progressed, several key meetings were held with individuals from local government to develop, review, refine and make a recommendation regarding the future infrastructure requirements. This included establishing geometric design parameters that all could agree with, developing infrastructure options that met local and regional demands, selecting the preferred infrastructure option for each component of the study, and then disseminating the process and recommendations to impacted stakeholders and members of their communities. Opportunities to get in front of municipal councils were sought to inform the locally elected decision makers of the study outcomes and recommendations to be shared, and to advise of the process and involvement that municipal leaders had in the determination of such outcomes and recommendations.

A COMMUNITY'S ENDORSEMENT

Subsequent to the study described above, Tetra Tech was commissioned by the province to complete the initial planning of an adjacent infrastructure project that would require the same city and rural community's involvement as well as that from other local municipalities. The intent of this subsequent work was to identify future transportation infrastructure that would address growing safety related concerns and increased traffic through many urban and rural areas of the province along a key economic corridor. A similar process to that of Project A was also adopted on this latter study (Project B) to engage municipal stakeholders.

The focus of the future transportation infrastructure of interest in Project B was something that local stakeholders, property owners and members of public in general had been talking about for many years if not decades. As such, there was expectation as to how this infrastructure should be delivered and how it might impact adjacent properties and communities. Many property owners had taken initial steps to accommodate the future infrastructure requirements by implementing development setbacks and limiting their encroachment on the adjacent corridor. The areas of potential controversy were identified to exist around urban areas where such accommodation had not been made.

During one of the study meetings with municipal representatives, the preferred infrastructure options were presented to gain support from those elected to represent local interests. Several meetings had been held previously to establish and refine infrastructure options, and to present

feedback from a rigorous consultation process. Upon sharing the preferred option in one of the rural areas, one attendee questioned the relevance of these meetings when decisions had already been made prior to study commencing, an interesting point of view when this individual had been involved from the onset of the project and knew of the process followed to develop initial route option. An attempt was made to rebuff this accusation and confirm the process used to arrive at the decision being presented during the meeting. At this point, one of the elected officials who had been engaged during Project A spoke up to attest to the integrity of the process followed when establishing infrastructure preferences and to the role that the local communities' had played in determining Project A recommendations.

It was an unexpected but welcomed testimonial relayed between one elected official to another, from different communities, concerning the principles and processes followed during an engineering exercise that would ultimately effect local stakeholders. Another elected official that was similarly involved in the processes established within Project A also attested to the success of including community leaders in the decision making process for transportation infrastructure initiatives. An 'urban legend' (regarding the notation of pre-conceived decisions) had been dismissed by those that may have once have upheld such a legend.

ANOTHER COMMUNITY'S PERSPECTIVE

The mandate to establish a high-speed, free flow facility was established during the initial stages of a corridor improvement project. The roadway geometric design criteria were identified that would meet this mandate. The vision for this corridor improvement and the benefits of completing such were shared with municipal partners to ensure that they had the same vision and end goals in mind, which they did. For one such community, this mandate could mean that the main transportation corridor within their jurisdiction may no longer provide the same exposure and potential draw of business to bolster a faltering economy. This former service centre had since become a satellite town to a neighbouring community that was benefiting from recent economic resource growth and activity.

The proposal to bypass this former service centre was initially met with mixed emotions from elected officials and surrounding property owners. Opportunities to utilize the road network within the community were explored; however, there was not sufficient land available to achieve the project objectives without significant community impact and property loss. Several meetings were held with the local municipalities to review the mandate, discuss possible route options and understand potential impacts. Following such meetings, the decision was made to bypass the community for the purpose of improving the safety and operational conditions of the road through the community (since it would eventually be turned over to local municipalities to manage), and minimizing impact to development adjacent to the existing corridor.

With the benefit of bypassing far outweighing those options that stayed within the community, there was acknowledgement from the elected officials as well as residents that this decision would be supported. Once this consensus had been reached, at the request of municipal stakeholders, the route was revised to take into consideration items that elected officials and property owners had raised that could improve the overall performance of the corridor as well as minimize land impacts beyond the initial considerations. During one of the public meetings held to present the study findings, a property owner noted, 'in our case, we appreciate the concerns of ours that have already been addressed' in regards to moving the route away from property to a location of lesser impact.

ENGAGING A MUNICIPAL AGENCY

Another initiative undertaken by Tetra Tech was to complete a similar review of a subsequent community, which it too, was the focus of infrastructure improvements that sought to look at options that might result in a major transportation network being rerouted outside a larger municipality and growing economic centre of activity. In initiating this work, similar processes to those described in the previous examples were deployed. Additional stakeholders including the local chamber of commerce was consulted due to the possible ramifications that this project might have on the communities' ability to maintain and attract business within the area.

Key messages were established in coordination with the infrastructure owner, such that consistent messaging was disseminated to various stakeholders in the area. Following the same engineering processes used to engage municipal partners in determining appropriate infrastructure recommendations for the community, a public agency consultation program was rolled out to advise elected officials of the decisions developed at this stage in the project. In addition, opportunity to reach out to the local chamber was made to confirm where priorities stood amongst those that had not had the same opportunity for involvement as the municipal partners had. The initial response received from the chamber included:

'The chamber of commerce feels strongly that the route should remain in its current configuration; through the city, rather than one of the options that would essentially create a bypass around the city. With the current infrastructure design, the city...and many of our member businesses have constructed their business operations around a highway commercial location. We strongly believe that it would have a significant negative impact on the operations of those businesses. In our opinion, based on the current design of the city, a change (to the roadway) configuration would have too great an impact on the overall operations to make it a viable option...we believe that solutions can be found that will benefit all stakeholders while respecting the efforts of those who have endeavored to create a successful economic structure in the current circumstances'.

During a subsequent meeting with many members of this chamber's board as well as with the local Member of the Legislative Assembly in attendance, an open discussion regarding the project recommendations, the impacts associated with the various route options developed, the consultation and evaluation processes completed, and the over-arching project objectives in context, there was recognition that the right decisions had been made, with the right people included to make those decisions. A key metric in the success of this meeting was to establish common areas of importance to the community, the agency, the owner and the travelling public. These areas of importance included minimizing direct development impact, establishing a long-term viable corridor that could meet future demands, and ensuring good access into the community was maintained. By engaging in open and transparent dialogue, it was possible within the space of approximately two months, to demonstrate the added value that a route option once viewed negatively, could have to assist the community positively.

AN ENGAGEMENT TOOL

There are several decision making tools available to assist engineers, stakeholders, municipalities and agencies when faced with evaluating options. A common approach is to consider the overall cost associated with the delivery of the desired project outcomes and then to choose the option that costs the least. This is how many of us approach decision making on a regular basis when faced with personal choices. When it comes to addressing infrastructure needs, quite often the cheapest option is not always the best option to proceed forward with.

The lowest construction cost estimates sometimes require the larger number of scope changes or have the greatest potential for scope creep as items can be missed during the procurement stage or intentionally omitted. In certain instances, the lowest cost materials may be the ones that require the greatest amount of maintenance; despite the initial low cost estimates, over time, this may prove to be more expensive than other options presented.

Tetra Tech utilizes a value based analysis when faced with projects that may have more than one viable solution to address the stated objectives. This analysis can be used to gain stakeholder support of the process and the decisions made during a project. Figure 2 illustrates a value based matrix used as a relative ranking tool to define option preferences. It can be manipulated as needed for the purposes of individual projects, but in general, it considers a list of evaluation criteria from which a distinction between options can be established. The agreed upon criteria receive a relative weighting in terms of their expected importance to the project from which each option is ranked, one against the other, in terms of how well this criteria applies to the project needs.

Route Options	Ranking OPTION 1	Ranking OPTION 2	Ranking OPTION 3
Criteria 1 <i>(description of criteria 1)</i>			
Criteria 2 <i>(description of criteria 2)</i>			
Criteria 3 <i>(description of criteria 3)</i>			
Criteria 4 <i>(description of criteria 4)</i>			
Criteria 5 <i>(description of criteria 5)</i>			
Criteria 6 <i>(description of criteria 6)</i>			
Criteria 7 <i>(description of criteria 7)</i>			
Criteria 8 <i>(description of criteria 8)</i>			
Expected Construction Cost			
Route Preference			v

Ranking System

Viewed favourably: fewest impacts/challenges expected

Viewed to be somewhat favourable: some impacts/challenges expected; or little to no difference between options under review

Viewed least favourably: many impacts/challenges expected

Figure 2 – Tool to Enhance Stakeholder Engagement

The benefit that this tool brings to the decision making process is its flexibility to be tailored to project and stakeholder needs. In past projects, Tetra Tech has prepared a list of possible criteria that could be used in the process to determine a route preference and then debated this list with stakeholders to come to an agreement as to the applicable criteria that should be used. When consensus is received, the relative weighting of the criteria is then debated and subsequently agreed to. It is to this process and level of stakeholder engagement that one elected official and community leader had experienced as part of Project A, which made them feel inclined to speak up and provide their testimonial to another during Project B. The challenge that each project may face is to understand how this approach can be tailored to individual needs as they arise, and whether this might be an effective tool to gain the desired buy in from stakeholders as has been demonstrated here.

THE ROAD SAFETY AUDIT PROCESS – AN EXAMPLE OF ENGAGEMENT

A Road Safety Audit (RSA) is a formal and independent safety performance review of a road transportation project by an experienced team of safety specialists, addressing the safety of all road users. It is a proactive road safety tool that can be applied at the planning and design stages of a transportation project that aims to lower the risk of collisions either before the facility is operational or prior to safety performance issues being realized.

The RSA process provides an opportunity to focus solely on the issue of safety, since road designers are required to consider many other competing design constraints that may influence their design decisions. Road operations and maintenance efforts may be focused elsewhere depending on their priorities. The process effectively presents the opportunity to modify designs prior to implementation rather than requiring changes or retrofits once construction is complete to correct an identified safety issue. Also, design guides sometimes do not account for human factors (e.g. workload, expectancy) or the combinations of design criteria (e.g. horizontal and vertical curves combined), which can be addressed through this process.

The RSA is effectively a six step process that requires the collaboration and cooperation of various engineering and agency bodies:

- Step 1 – Audit start up meeting with the design team that may also include the owner to confirm the project scope and objectives, and to exchange project information.
- Step 2 – Site visit by RSA team to observe and record terrain, land use, road network, road users, lighting, traffic control, etc.
- Step 3 – Audit analysis by the RSA team in a workshop setting. Detailed review of the design considering all road users and identification of safety issues. In order to maintain autonomy no members of the design team are present during this analysis other than when required to answer specific design related questions from the RSA team.
- Step 4 – Preparation of the audit report to highlight the safety issues, present the audit findings and to identify suggestions to improve road safety for all users.
- Step 5 – Presentation of findings at a meeting with the design team and the owner. This creates an opportunity for the design team to ask questions of the auditors for clarification purposes.
- Step 6 – Preparation of response report by the design team and owner outlining actions or justification for not implementing suggestions.

This is a proactive process that requires parties to engage with each other for the purpose of improving a planning, design or construction project. Similar to the stakeholder engagement required during other projects, it seeks to bring decision makers together to enhance the performance of the infrastructure, improve the road safety for all users, and minimize project costs. It is not an opportunity to critique one another, but rather a process to help improve the end product for road users within the limitations of the work being undertaken. The success of this process is in its ability to identify risks to the project that can be managed at a time in the project's life cycle when small changes do not require extensive rework or have significant financial implications. Mechanisms that enhance engagement on projects whether in the RSA process or other study processes, ultimately seek to improve the overall deliverable for the end client, the road users and those that could be impacted, whether directly or indirectly.

CONCLUDING COMMENTS

Although the examples shared previously focus largely on work completed during the planning stage of roadway infrastructure projects, the applications can be employed during the geometric design stage and other disciplines, particularly when decisions are being made that directly affect local stakeholders. Design exception policies are in place for many road agencies which allow for the relaxation of guidelines/standards when exceptional circumstances arise. During the planning and design of roadway improvements to address access to resource development sites, a design exception was requested by the infrastructure owner for the weaving distance between the end of an interchange ramp and the subsequent access point along a local road, since the spacing was viewed to be inadequate. Such opportunities allow various parties to work together to determine an acceptable course of action for all involved. In the case of the weaving example, the road owner relaxed the requirements during the planning stage such that the design and construction of improvements to the local road would not require additional rework to find an alternate connection to access the interchange by another owner.

It is recognized that many decisions have been and continue to be made based on sound engineering judgment and applicable standards. Without procedures and policies in place, many of the decisions being made by transportation practitioners would likely follow the traditional approach of limiting involvement from others beyond the engineering and infrastructure owner's influence to shape the outcome. By engaging communities and other stakeholders in either the decision making process or ability to shape the outcomes of a project, there is generally a greater acceptance and understanding of the decisions. Municipal endorsement appears to be more readily available and synergies develop between agencies where strained relationships were observed before.

Of interest during the consultation processes adopted on different projects, Tetra Tech pursued many avenues to engage stakeholders, property owners and elected officials for the purpose of

providing opportunities to shape the project outcomes and informing others of the outcomes where appropriate. During many of the meetings held for the projects listed above, many stakeholders brought multiple hats to the table, i.e. represented more than one interest group. Many property owners also represented ratepayers or constituents, business interests also accompanied agency board responsibilities. As such, stakeholders were able to see different points of view with respect to how a project may benefit the region or province as a whole while understanding the implications for individual property owners faced with the possibility of losing a portion of their livelihood. In another instance, a successful business owner expressed full support of the project objectives and need for it to proceed, but at the same time did not like the possibility of losing a portion of their yard site to support the project delivery. By working with such individuals and groups, it is possible to come to an understanding and an agreement as to how a project might progress knowing that someone is always going to be inconvenienced in a manner that does not necessarily exist today.

REFERENCES

Steel, Paul H.A., Mesher, D., Adamson, J. 2014. "Development of a Road Safety Audit Network Screening Tool." In *24th Canadian Multidisciplinary Road Safety*. Vancouver, BC: Canadian Association of Road Safety Professionals.

The Transportation Association of Canada. 2001. *The Canadian Road Safety Audit Guide*.

Alberta Transportation. 2004. *Road Safety Audit Guidelines*.