

MORAGA TOWN COUNCIL – DECISION MAKING AND CANYON BRIDGE FAILURE

The most important competency for a town council (TC) is consistently making high-quality decisions. The TC is the highest level of decision makers in Moraga and represents the town citizens in acting on a wide range of subjects. Decision Quality (DQ) enables stronger decisions and statistically better results.

The objective of this paper is to stimulate appropriate action towards ensuring that the Moraga TC has, and appropriately utilizes, basic organizational competency in DQ for the range of decisions they handle. The completed temporary bridge project is referenced as an example of the current state for a complex project, for better or worse. Although the temporary bridge project is complete, there will be opportunities to advantageously apply DQ competency on current and future decisions (e.g. Storm Water System Projects, the Hacienda de las Flores, addressing growing pension fund obligations). Sample applicable DQ tools are also introduced.

Organization of this paper:

- **Summary introduction to DQ**
- **Applying the six elements of DQ to the Canyon Rd. Temporary Bridge Project**
- **Summary characterization of the TC's DQ in the Canyon Rd. Temporary Bridge Project**
- **Introductions to sample applicable DQ tools**

This summary paper is consistent with the basic DQ process, primarily as presented in Wikipedia (article specific to Decision Quality). Wikipedia is being used because the material is straight-forward and covers the necessary topics. The approach represented in Wikipedia is consistent with the developing field of DQ, and the approach being institutionalized by companies like Chevron Corporation (where I received my first exposure).

Disclaimer: This paper represents my perspective. It is based on the material available to me, which isn't comprehensive. I've endeavored to base this paper on my direct observations, pertinent documentation and the available live streaming video. I've attempted to base conclusions on reliable information. I believe the material and conclusions included here are valid based on the material available to me

SUMMARY INTRODUCTION TO DQ

The Strategic Decisions Group provides the following definition: *“DQ provides the defining framework for a good decision. It is an extension of Decision Analysis (DA)—a set of concepts and tools that produce clarity about the best choice in an uncertain and dynamic environment. DQ not only uses DA to get to the “right” answer, but also engages the most important parties in the decision process to achieve alignment and commitment to action.”*

Per the Wikipedia article on DQ, *“The confidence a decision maker has in its choice, and related to it the commitment a decision maker has to act upon that choice, depends on the quality of the decision at the time of making the decision. A high-quality decision is characterized by the following elements:*

- *A useful frame*
- *Feasible and diverse alternatives*
- *Meaningful and reliable information*
- *Clear values, preferences, and trade-offs*
- *Logically sound reasoning*
- *Commitment to action*

Quality in decision making requires quality in each of the elements listed above, and the overall quality of the decision is limited by the weakest element. DQ is achieved when for each element the cost to obtain additional information or insight to improve its quality exceeds the added value.

A variety of specific tools and processes exist to improve the quality of each element.”

What is needed to achieve appropriate quality in each of the six elements greatly depends on characteristics of the specific project. It's fit-for-purpose. A complex and risky project warrants more thought and substantiation than a simple low-risk project.

Note: while chair of the Moraga Planning Commission (PC), I introduced the commission to the six elements of DQ.

In the following section, each of the six elements named above will be further defined and TC decision making on the temporary bridge project will be assessed for each element.

APPLYING THE SIX ELEMENTS OF DQ TO THE CANYON RD. TEMPORARY BRIDGE PROJECT

A useful frame - Per Wikipedia: *“The first element to achieve DQ is framing. Having the appropriate frame ensures the right decision problem is addressed. Quality in framing is achieved when the decision makers have alignment on purpose, perspective, and scope of the decision problem to be solved. It means the right people will work the right problem the right way.”*

What was the purpose of the temporary bridge project? Consider the Moraga press release dated June 1, 2017 which stated in part, *“The Town wants everyone in all affected communities, but especially in the community of Canyon, to understand that the Town of Moraga, since the initial date of April 17, 2017, when the Town first became aware of potential damage to the Canyon Road Bridge, has hired and worked with state licensed and certified engineers and consultants to assess the condition of the bridge, to determine the need to close the bridge to protect the public, to determine what caused the damage to the bridge, and to plan the best course of action to re-open the bridge as quickly as possible. The Town is considering spending more than \$2 million to attempt to re-open the bridge in the short term only because the Town is concerned for and cares about the community of Canyon. If there were no residents in Canyon, the Town might let the bridge remain closed until the bridge replacement project could begin, which would be late in 2018 at the soonest.”*

Was the project frame simply to reestablish transit with Canyon via a temporary bridge? There were communications that addressed broader issues, but transit to and from Canyon was the dominant theme based on multiple references.

The function of providing access for fire fighting was discussed at the June 14 TC meeting at which the project was authorized. Access solely for Indian Valley, as well as the broader area was discussed. For more material on fire safety, see the below section entitled Logically Sound Reasoning.

Although not formally documented, based on multiple references in project documentation, it appears that installing a temporary bridge to reestablish transit with Canyon was the intended project frame. It is the prerogative of the decision makers to determine the project frame.

Informal spot polling of Moraga residents over the last nine months indicates general uncertainty about the purpose of the project, including if and why it was done to reestablish transit with Canyon. No one has yet given a compelling reason why Moraga exposed \$3 million of its limited assets for the project.

Feasible and diverse alternatives – Per Wikipedia: *“A decision cannot be better than the best available option (alternative). A wide variety of approaches, tools, and methods exist to generate high quality alternatives, ranging from systematic search approaches to identify alternatives to approaches that aim to creatively synthesize alternatives. Quality in alternatives is achieved by applying a suitable alternatives generation process, where the process itself leads to a variety of feasible and diverse alternatives, which are hybrid solutions of originally considered alternatives that combine their best features, and where for each alternative an understanding of its implementation exists.”*

At the June 14, 2017 TC meeting, potential alternatives were presented, as follows:

- Build Permanent Bridge Now
- Repair Bridge with Landslide Retaining Wall
- Install Temporary Bridge with Landslide Retaining Wall

- Do Nothing Until Permanent Bridge is Completed
- Repair Existing Bridge with Earthwork Repair
- Install Short One-Lane Temporary Bridge (125') with Earthwork Repair
- Install Two-Lane Temporary Bridge (125') with Earthwork Repair
- Install Two-Lane Temporary Bridge (150') with Southern Abutment Protection
- Install One-Lane Temporary Bridge (150') with Southern Abutment Protection

This is not consistent with considering a wide variety of alternatives, but is consistent with a narrow frame of installing a temporary bridge for reestablishing transit.

Meaningful and Reliable Information – Per Wikipedia: *“The quality of a decision depends on the quality of the information to inform the decision. Quality in information is achieved when the information is meaningful and reliable, is based on appropriate data and judgment, reflects properly all uncertainties, biases, intangibles, and interdependencies, and the limits to the information are known. A wide variety of tools exist to improve the quality of the information used in the decision problem.”*

For a frame focused narrowly on bridge replacement, the staff report for the June 14 TC meeting appears to be mostly appropriate although it was likely condensed (e.g., identified alternatives, addressed a variety of issues, characterized construction). One assumes the TC could have requested additional details if needed, and one TC member noted having met with the Public Works Director.

One area of significant deficiency was risk assessment. Each of the alternatives was assigned a risk of “high”, “medium” or “low” without any explanation. Based on correlating to each alternative, I deduce that the risk rating correlates to the duration of the bridge link being disabled.

It would have been meaningful to have risk assessment results which addressed technical risks (e.g., geological) and project risks (including commercial). I would have expected a qualitative risk assessment. The results for each identified significant risk should include a description, an assessment of impact, a likelihood of occurrence, potential mitigations and an action/ resolution. It should be self-evident that it is critically important for decision makers to understand and consider risks, including their potential impact, prior to project commitment.

Regarding risk assessment, were the risks of not doing the temporary bridge project seriously considered? There were risks. As a data point, the bridge was out for seven months and the world didn't end. Another data point is the bridge on Redwood Rd. near Castro Valley and was disabled at around the same time (March 2017) and did not open again until March 30, 2018. Note: with both bridges out, Canyon still had two routes of ingress/ egress.

Clear values, Preferences, and Trade-Offs – Per Wikipedia: *“Quality in this element requires the identification of the right decision criteria and the definition of trade-off rules among them. This necessitates at first the identification of all key stakeholders, and what each of them values. Quality in*

this element of decision quality is characterized by transparent value metrics, a clear line of sight of the primary metric, and explicit trade-off rules between key metrics.”

What are the values of stakeholders (e.g., Moraga residents) as related to the temporary bridge project. Were value trade-offs considered (e.g. maintaining financial health of Moraga vs. appeasing stakeholders who reside outside of Moraga)? How much of the town’s assets was the TC willing to risk in favor of the temporary bridge? All the way to bankruptcy? How much of the town’s financial health was the TC willing to sacrifice to accommodate Contra Costa County (CCC)? Were the wants of the range of stakeholders considered?

Unfortunately, the stakeholder values addressed in Chapter 2 of the Moraga General Plan do not appear to be applicable in this case, and the Municipal Code appears to be completely lacking in identifying or characterizing values.

Does dialog from the TC meetings give insight into the TC member values for Moraga? At the October 12 TC meeting, the values of health and safety were expressed and generally agreed upon. Dave Trotter also expressed the value of following through on promises made to Moraga citizens who drive their children to the Canyon school, and to commuters who use that route. But there was no indication that these values were balanced relative to Moraga’s financial health.

Logically Sound Reasoning – Per Wikipedia: *“This element is the domain of decision analysis, which aims to produce insight. Decision analysis provides the logic and analytic tools to find the best choice in a complex situation, and should serve as a guide to facilitate the conversation about the decision. A wide variety of tools, ranging from decisions trees, over hierarchies to complex network models is available to match the decision problem. Quality in this element is achieved when the value and uncertainty of each alternative is understood, and the best choice is clear.”*

For the temporary bridge project, the TC’s reasoning for approving the Canyon bride project were primarily qualitative, especially related to reestablishing transit with Canyon. However, the impact to Canyon of not having the bridge could have been quantified. Were the residents catastrophically impacted, slightly inconvenienced, or somewhere in-between? It would have been easy to benchmark Canyon against a representative small population of other remote hamlets in California (e.g., travel time for services, schools, emergency response). Benchmarking results would have given data on relative severity of impact to Canyon and provided valuable substance for decision making purposes. Such benchmarking is logical and there was time in the project schedule. In preparation for the June, 2017 TC meeting during which the project was approved, I submitted communication which warned about the lack of compelling reason for the project, but no action was taken. Benchmarking against other small hamlets in California might have helped identify additional alternative ideas.

Fire and safety was justifiably a supporting argument given for approving the project. However, the larger affected area and especially resident population from the disruption were in CCC. Moraga’s share

consists of one home and essentially Indian Valley. Just for argument purposes, if the temporary bridge had not been installed, then CCC would have appropriately acted on providing fire and safety protection for the county areas, including Canyon. Was there consideration that CCC fire and safety protection could then have included the Moraga home and Indian Valley also? And, regarding fire protection for Indian Valley, how does it differ from the many other valleys in the Contra Costa area which are both remote and near population centers? Do all have easy road access? Would a different approach be taken for fire-fighting from the air? Why is there a history of cars (SUVs?) accessing Indian Ridge from the Moraga Country Club fire road terminus, but it isn't acceptable to MOFD? Were these logical issues pursued?

From a CCC and Moraga combined perspective, there are significant intuitive advantages to the temporary bridge project to provide transit capability while the permanent bridge replacement is being designed and constructed. But, where's the logic of Moraga taking total responsibility. Consider the following:

- The most common argument in favor of the temporary bridge project relates to the CCC hamlet of Canyon. Fire fighting for the broader area is also important. Arguments in favor of the temporary bridge for Moraga alone are weak, especially considering the cost and risks.
- Moraga receives the lowest percent return in the county from real estate taxes
- Moraga is financially stressed, in part due to the sink hole at Rheem Blvd.

If the above had been communicated to CCC with a proposal to partner on the temporary bridge project, two potential responses would have been:

- Yes – let's partner on this important project.
- No – this is a Moraga problem (after all, as the TC was told internally, "Moraga owns the bridge").

There are several obvious reasons it would be advantageous for CCC to agree to a partnership, one of which related to avoiding additional costs if the temporary bridge project wasn't done. Does Moraga Rd. (or Moraga Way) to Canyon Rd. border on being a route of regional significance?

If the answer from CCC had been yes, then great. Moraga pursuing the project and managing risk would be on much firmer ground. If the answer had been no, then Moraga logically should have evaluated the project based solely on the impact to Moraga, with likely a different result.

Regarding comparison of alternatives per the staff report for the June 14 TC meeting, the evaluation criteria appears to be:

- Reestablishing transit capability ASAP, and
- Being eligible for emergency funding

Ultimately the temporary rented Bailey bridge was selected. This part of the reasoning appears basically sound. However, as identified above, assessing and contrasting risks between the alternatives was significantly flawed. The risks represented by the "high, medium, low" ratings weren't defined and do

not appear to include project risk. In the end, commercial risk on the temporary bridge project resulted in a 50% project overrun, representing a major bust.

Commitment to Action – Per Wikipedia: *“The quality of a decision also depends on the commitment to act upon the choice that is made. Quality in this element is achieved by involving all key decision makers and stakeholders in an effective and efficient decision making process. At the end of the process, quality is characterized by buy-in across all stakeholders and an organization that is ready to take action and commit resources.”*

For the temporary bridge project, the key decision makers were the Moraga TC. However, there was unusual influence on decision making from outside of the TC, which resulted in the TC limiting the options considered. Also, the TC members did not consistently make their thinking visible in making decisions. In the end, the TC did address and take action on the options presented to them.

SUMMARY CHARACTERIZATION OF THE TC’S DECISION QUALITY ON THE CANYON RD. TEMPORARY BRIDGE PROJECT

The Canyon Rd. Temporary Bridge Project was unusually challenging for Moraga. Failure of the bridge had an immediate negative impact to area residents, especially the residents of the CCC hamlet of Canyon. To address the failure, recovery actions began quickly, hearings were held, planning was done and ultimately the Moraga TC approved the temporary bridge project as a solely Moraga endeavor.

The temporary bridge project required a major investment of town funds relative to available assets, was complex and involved significant risks, and was a major distraction for Moraga staff. Such projects require a more robust planning and decision-making approach compared to projects normally experienced by small towns like Moraga.

Specifically related to the TC’s DQ on the project, there are several pertinent observations which I include to assist future TC decision making.

- **Little effort was made to frame the project.** Who were the stakeholders and how might their desires vary? What was the purpose of the project? Was it simply to replace the bridge in some manner, or something broader that included bridge replacement as an option. Having a well-defined and agreed frame greatly determines how project planning should progress.
- **The TC authorized a “Common Good” project.** The biggest beneficiary was CCC, in particular the hamlet of Canyon. The benefit to Moraga was relatively small. There’s a strong argument for Moraga to have approached CCC to partner in a project to reestablish transit to Canyon and the broader area, but that option wasn’t pursued. During meetings, TC members did ask about

potential funding from CCC, but were advised (strongly?) against pursuing such. Is there a law/regulation which sets requirements for reestablishing a failed bridge?

Without having proposed a partnership to CCC, we will not know what their response would have been. And a negative response could logically have resulted in adjusting the frame, and ultimately changing the decision made.

The TC is the highest decision-making body in Moraga. Accordingly, the TC needs to apply DQ and set the expectations to achieve high-quality decisions. This includes being accountable for the decisions, which also means that staff are not the scapegoats for poor quality decisions made by the TC. If staff inappropriately interjects in the decision-making process, it's the TC's responsibility to ensure that roles and responsibilities are maintained. Ultimately, the TC is responsible for the quality of its decisions and needs to be held accountable.

- **The TC did not require an assessment of the severity of impact to Canyon in its decision making.** How distressed was Canyon? Minor irritation? Catastrophic? Somewhere in-between? Canyon could have easily been benchmarked against similar remote communities in California. Almost all Moraga communications on the temporary bridge project referenced reestablishing transit to Canyon as the primary purpose of the temporary bridge project.

Evaluating a project which triggered Moraga to declare a fiscal emergency warrants more than qualitative input from emotional individuals. This is one example of the bridge decision being made without meaningful and reliable information.

- **The TC did not require a credible risk assessment for decision making.** It's self-evident that risks need to be considered on all decisions (e.g., who buys a car without at least checking the safety rating of different makes/models). Depending on the decision, risk assessment can be as simple as a minor thought, or as complex as statistical quantitative modeling (e.g., industry major projects). A qualitative project risk assessment would have been appropriate for the temporary bridge project. And it is critically important to have a good idea of project costs prior to authorization (in contrast to the statement from the Oct. TC meeting which essentially said "Moraga needs to pay what its going to cost". Would the TC have authorized \$3 million back in June? How about \$100 million?). Addressing risk via an appropriate risk assessment is part of meaningful and reliable information.

Rushing decision making to align to a weather window is highly discouraged as it increases the probability of poor project outcomes. A tight schedule increases the importance of good framing to enable effective project planning. When necessary, it can be decided to start select activities early (e.g., engineering or procurement) with the recognition that specific associated costs will likely be unrecoverable.

INTRODUCTIONS TO SAMPLE APPLICABLE DQ TOOLS

There is a large population of available tools associated with DQ, which should be applied on a fit-for-purpose basis. Tools are applied for major through small projects. For all projects, especially small projects it important to select tools that will have positive impact, and that for small projects the tools are appropriately scaled.

Application of the tools will also depend on the types of decisions being considered. Annual operating budget decisions may not need any tools. For very small projects, few tools will be used and they'll be streamlined. Larger (i.e., more risky and complex) projects like the permanent Canyon Bridge Project, Storm Water System Projects and Canyon Temporary Bridge Project (past tense), and Hacienda de las Flores warrant additional consideration.

Following are summary introductions into some of the tools which may have value in Moraga. All of these tools are broadly used in industry, including major companies like Chevron.

Clearly Defined Roles and Responsibilities – This may be considered more organizational, but it also affects DQ. There is very limited material in the Moraga Municipal Code on roles and responsibilities. Commissions and Boards are incompletely addressed in Title 2, but there's nothing of substance on the TC. Especially important is establishing clear role and responsibility relationships between the TC and staff. The reasons are multiple and should be self-evident. Are the roles and responsibilities for the TC documented but not publicly accessible?

Note: because the roles and responsibilities for the PC were incomplete while I was Chair, Planning Director Ellen Clark and I developed simple roles and responsibilities which included the relationships with the TC, staff and DRB. Roles and responsibilities for the PC are logically much simpler than for the TC.

Project Frame – Implicitly or explicitly, almost all projects should have a frame. As a minimum, the initial frame should include project purpose, high-level project scope and stakeholder identification. Simple frames can be done very quickly, in less than an hour by an individual. For major complex projects, it can be an extended team effort. Development of the project frame leads to other components such as identification of critical near-term decisions.

Peer Reviews – At the project level, this involves one or more external experts reviewing the project design (often after preliminary engineering but before start of detailed engineering) utilizing their expertise and experience, separate from the project team, to confirm design validity and identify potential project improvements. "Potential" is an important word here because the project team/

decision makers have the ultimate say on implementation of any changes. Note: Moraga often requires a geotechnical peer review as part of the development planning process.

For a couple of reasons, inclusion of a peer review for the current scope of the storm water system projects should be included in planning now. As part of exploring this conceptually for the storm water system projects, I've had discussions with two local sanitation sewer engineer experts (retired). They both indicated their expertise is applicable, and tentatively indicated willingness to do the peer review at no charge to Moraga. At this point I would guess that the external experts would need on the order of 16 – 24 hours (provided the more comprehensive project materials (i.e., beyond the summary reports on the web site) are readily available) and the time commitment for interfacing of staff would be 4 – 6 hours, excluding participation in presentation of results.

Alternatives Generation - Alternatives generation is introduced above in the DQ element “Feasible and diverse alternatives”. Alternatives generation is critical to maximizing the value of the project. It's important to start with a very wide population of potential alternatives, including extremes and the “do-nothing” case which should always be included. Some of the alternatives are quickly rejected, but then there's a record that they have at least been considered. Hybrids of multiple ideas often become the winner. There's a large population of tools to both help generate alternatives and to help consolidate into a reasonable subset.

Note: While I was president of the Hacienda de las Flores BOD, I used a common alternatives generation tool to develop a strategic plan which was presented to the TC.

Risk Assessment – Another DQ tool is risk assessment (which was introduced above under the Meaningful and Reliable Information element). It should be self-evident that it's critically important for decision makers to understand and consider risks, including their potential impact, prior to project commitment.

Risk assessments can range from the very simple to sophisticated quantitative statistical modeling. Appropriate for most projects is a qualitative risk assessment which is developed, documented and managed using a spreadsheet risk register of risk description, assessment of impact, likelihood of occurrence, potential mitigations and action/ resolution. One or more risk assessment registers are normally developed early in a project and are periodically updated as the project progresses.

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