



DEPARTMENT OF
PLANNING AND
DEVELOPMENT

"Building a Dynamic and Sustainable Seattle"



Final Report DPD QMS Project

DECEMBER 2015

**Demarche**
CONSULTING GROUP
"Making workplaces better places to be."



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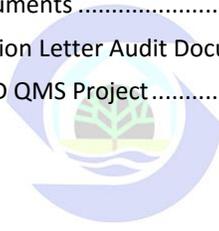
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1 BACKGROUND

The purpose of this project is to develop a framework for a quality management system (QMS) for DPD's Engineering Services Group that will achieve and measure quality plan review. The QMS will encompass the plan review work of all technical review groups in Engineering Services including the following: Ordinance, Structural, Geotechnical, Drainage, and Energy/Mechanical. The intention is to add zoning and land use at a later date to be inclusive and consistent.

The project focus is to develop a shared and clear definition of quality plan review with reviewers and management by:

- Documenting existing quality program efforts and standards (*see Appendix: Existing Quality Program Efforts and Standards: DPD QMS Project; Current Process Overview-SIPOC Maps: DPD QMS Project*); and, *Thematic Analysis Report of Interviews: DPD QMS Project*),
- Refining the definition of quality plan review (based on work done in the fall of 2014, *see Appendix: Analysis Report of Staff Survey: DPD QMS Project*), and
- Developing shared language and starting to build buy-in among management and staff via education and communications.
- Designing and testing measures of plan review quality (*see Appendix: DPD QMS Metric Design and DPD QMS Measures Audit Pilot Project Report*).

2 SUMMARY OF WORK AND FINDINGS

The existing quality program for Engineering Services plan review consists primarily of the following nine components that have developed over years. These include:

Direct supervision of plan reviewers,
 Formal Performance Evaluations (quarterly),
 Production reports on timeliness of initial plan reviews (at a group level),
 Quality Standards,
 Feedback within the Business Framework
 Code Interpretation meetings,
 Formal Training,
 Mentoring, and
 Focused Plan Review.

Each of these components of the DPD QMS provides a mix of quality assurance (QA) and quality control (QC). Both are essential to ensure a holistic QMS.

2.1 DEFINITION OF PLAN REVIEW QUALITY

The business of plan review, regardless of specialty, requires and exercises a range of judgment to determine how much review is appropriate and how much perfection in a design or set of plans (relative to the code) is necessary to issue an approved permit. This first step of the work focused on gaining clarity about the purpose of plan review, and defining what 'good plan review' looks like.

2.1.1 Purpose of Plan Review

The purpose of plan review is to ensure that customer's project plans reflect substantial compliance with relevant codes, with a focus on life safety (what is the risk?) for all codes, and legal requirements for grading, ECA, stormwater, and energy codes.

An important quality assurance activity is setting standards or requirements that are clear and specific enough they can be 'operationalized.' This means that the standards can be articulated clearly and translated into measurable terms that can be applied in uniform or appropriate ways throughout the plan review system. One important investment in achieving this definition of standards and requirements is embodied in the Plan Review Philosophy training that all staff receive.

The "Philosophy of Plan Review" training (see side bar) establishes the following expectations for reviews:

- Appropriate focus – "substantial compliance"
 - Review aids
 - Design Specifications
 - Plan Reviewer Judgment
 - Relative importance of issues
 - Type of project
- Understanding the concept of shared responsibilities (shared with designers, builder, owner), and "assumption of validity" of the designers' work
- Proactive problem solving
- Clear communication
- Timeliness
- Consistency
- Technically correct review comments/corrections
- Guidance about 'spot checking'
- Consult with supervisors and Construction Review and Inspection Quality Team (CRIQ) as appropriate, on difficult issues



Correction Letters:

- Understandable
- Code-based (reference the code section)
- Directive (states what must be done, using action words)
- Specific (and where located on plans)

2.1.2 Critical to Quality Indicators

Critical to quality (CTQ) indicators are the key measurable characteristics of a product or process whose performance standards or specification limits must be met in order to satisfy customers or requirements. For this project, defining and describing plan review quality was the starting point for capturing these CTQ indicators. A few basic quality indicators are documented in Philosophy of Plan Review training, and these were expanded on during the first tasks of this project. The result was 7 characteristics of 'good' plan review as listed in the chart below.

"[We] understand that there is a lot of judgment exercised in our work. An adequate plan review is somewhere on the continuum between just approving it without review, and requiring perfection before approving.

[We] need to use judgment in deciding what to focus on. Some code issues are more important than others. Life safety issues (e.g., location and number of exits or certain structural connection details) are more important than getting suspended ceiling details. ... also take into account the relative complexity of projects—a single family residence doesn't have the structural issues a 5-over-2 podium building has.

A new reviewer brings some of that judgment with them to DPD, based on previous experience. We expect a reviewer to exercise that previously acquired judgment, but to also acquire more the longer they are here. We have some tools to help, but a lot of this is learned by experience and with the help of CRIQ, Senior's, and CRIQ PL's. Questions are encouraged.

One place where we cannot insert our judgment is into areas that are not covered by the code, e.g., constructability or best practices."

--Jon Siu, DPD Principal Engineer

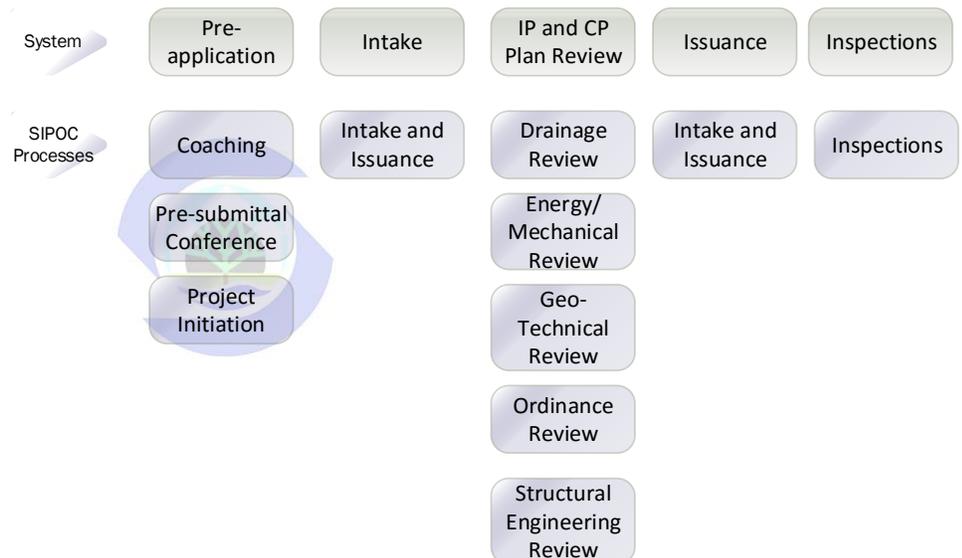
Engineering services supervisory and management staff participated in a survey (see **Appendix: Analysis Report of Staff Survey**). This report shows there is strong alignment across all groups around the use of the seven characteristics or indicators of quality plan review at DPD.

The chart illustrates the 'weight' that all plan reviewers apply to these criteria in doing their work.

Always an essential description of quality plan review	plan reviewers	inspectors	suprv and mgmt	permit specialists	ALL
n=	36	17	15	12	80
Plan review should identify significant errors.	100%	94%	100%	100%	most important
Plan review needs to deliver clear and easily understood (by applicants) correction letters.	86%	88%	100%	100%	second
...should emphasize ...an approved set of plans w/sufficient detail inspectors need in the field.	81%	94%	80%	92%	third
Plan review should emphasize careful review of corrected plans.	69%	100%	60%	100%	fourth
Plan review must be consistent in approach and decision making from project to project.	72%	88%	53%	83%	fifth
Plan review must keep accurate/well documented permit records	64%	59%	53%	92%	sixth
predictable Initial Plan Review (IP) and Corrected Plan (CP) review cycles.	25%	35%	40%	50%	least important

2.2 DEFINE THE BUSINESS SYSTEM/Framework

The system within which plan review operates is illustrated to the right. Beginning in June a number of workshops were scheduled with SME teams to create individual SIPOC (supplier, inputs, process, outputs and customer) maps of the primary business processes. These comprise a comprehensive assessment of the system from pre-application to inspections, related to the quality of plan review.



2.2.1 Gap Analysis and Metrics

The following is a summary discussion of the strengths and weaknesses of the plan review system obtained from the eleven 90-minute SIPOC work sessions (see graphic) with every part of the plan review process.

Pre-application, Coaching, Pre-submittal Conference, and Intake Screening Processes

There are skilled SMEs available to customers through the various **pre-application, coaching, pre-submittal conference, and intake screening** processes. The outcome of making these SMEs available (a quality assurance investment) is: 1) having quality plans submitted that are ready to review, 2) an increasing number or ratio of Consistently Prepared Applicants (CPAs) for those returning applicants, and 3) coaching targeted toward better quality submittals. All three of these outcomes are measurable (quantifiable) metrics. Other benefits to plan review are that there are reductions in major code issues that need to be resolved during plan review (fewer big surprises, faster process, and fewer corrections and correction cycles).

The performance gap for these processes as they affect plan review was described by staff as the practice of deviating from plan screening standards as wait times for intake appointments grow, and pressure from customers and stakeholders to provide services increases (see side bar quote from SIPOC Report). Adequate staffing for review during peak production times may impact the screening standards and the availability of intake appointments. Intake appointments are used as a way of metering or limiting the volume of plan review work coming in.

Pre-application and intake appear to be functioning and predictable processes for the applicant.

Some gaps include:

- Issues with intake checklist sheets being out of date.
- Training of some intake staff related to what qualifies for STFI permits.
- In specific review areas, not communicating well enough with the applicants about what the important issues are to have on their plans; e.g., in geo, almost every correction notice has something about property line issues.

Potential control metrics that impact plan review may include 'quantity by type, by category' of errors or 'missings' as defined by those parameters intake staff are trained to screen plans for at intake. Since these tasks also include preparing the applicant project documents for intake review, conducting the intake screening review, assigning project type, estimating IP hours and routing, or coaching the applicant for resubmittal, any or all of these tasks may be included as potential sources of error or 'missings' for this process. Alternatively, selecting only those tasks most critical to plan review quality (screening, assigning project type and estimating IP hours) is also appropriate, particularly as measures of the Permit Leader role.

"The coaching process would benefit from an improved feedback loop (current process is informal) between coaching, intake, and review, to inform supervisory/management decisions on skill development and process changes. For example, if something is missed in screening, the screener doesn't hear about it."

-SIPOC Report, page 6

Initial (IP) and Corrected Plan (CP) Review Performance

IP and CP review as performed by Drainage, Energy/Mechanical and Geotech benefit from small, closely knit groups with timely access to supervisory feedback. These small groups provide SME coaching for customers, have a range of control over plan review quality and IP performance, and have access to field (inspections) and peer feedback. Aside from code

At intake: "It is nearly impossible to reject inadequate/ incomplete plans at intake appointments, knowing that the applicant will have to wait two months for another appointment, and then their review may happen two weeks later than our targets. The Department doesn't provide staffing levels that are adequate when the workload is high or increasing, which exacerbates the amount of time that applicants wait for intake appointments and reviews. The result is that intake staff must ignore the standards that plans are expected to meet at intake. Any pressure to enforce these standards (pressure from the technical side of the house) is totally overwhelmed by pressure from applicants and the production side of the house."

-SIPOC Report, Page 9-10

Gaps identified in these processes include (in addition to those mentioned above) include more formal feedback systems between plan review and intake, particularly in refining or adding IP estimates. Specifically noted was the need to improve and strengthen the feedback between 1) plan reviewer-to-Intake Permit Leader and 2) Intake Permit Leader-to-Permit Specialist 2 screener so that stronger learning occurs and errors are prevented.¹

¹ SIPOC Report, Page 10

update training (on a 3-year cycle), training in each of these groups is individualized, based on professional needs and parameters – professional associations, professional journals, conferences, etc.

There was a gap noted, however, in the working relationship between drainage reviewers and site inspectors (see page 12 of the SIPOC report for more detail). Inspector's noted that *"the reviewer's priorities don't match the inspector's priorities, e.g., the soil amendment calculations do not get checked by reviewers, but inspectors are relying on them."* Inspectors don't seem to know that they have not been checked.

A strong coordination is needed between energy/mechanical reviewers and mechanical inspectors to *"resolve field issues and coach the applicant for resubmittal when required."*²

Geotechnical review noted a need to better manage the work 'on the dashboard' versus that 'not on the dashboard.' This is particularly problematic when work 'not on the dashboard' is significant, critical to quality and production, and likely belongs in some tracking mechanism.³

IP and CP review as performed by Ordinance and Structural reviewers happens across small separately supervised Ordinance and Structural groups. In-house code and plan review training, code interpretation meetings and CRIQ technical support are provided to support consistency and quality. Representatives of building inspections attend code interpretation meetings.

Performance gaps and opportunities across these groups were identified in the following areas:

- Improving formal feedback to the pre-screening and intake⁴ process from review;
- Streamlining permit issuance and designing a quality control function at final review;⁵
- No clear role for Managers supporting supervisors of review groups;⁶
- Feedback from inspections to Ordinance and Structural (see Inspectability audit);
- Improving and formalizing the technical training program/curriculum;⁷
- Need for guidance to reviewers about what constitutes substantial compliance/exercising good judgment (clear definition and training);
- Incomplete or lack of FPR comments in various technical areas;
- Consistency between supervisors (with large group of Ordinance and Structural reviewers and breadth of their reviews—how do you develop and maintain consistency?);
- How best to communicate technical policy and decisions; and
- How best to replicate the roundtable discussions used by the specialty teams as a way to convey information, achieve consistency, and provide examples of what good looks like.

Metrics for **IP and CP review** currently are production-oriented and revolve around performance-to-target based on an established target for a project at intake – a target which is based on the size of the project (the estimated hours of review required). The targets are for reviews to be completed within 2, 4, or 8 weeks from the payment of intake fees, with faster turnaround for projects that qualify for "green/sustainability" incentives. Performance to these production targets is reported regularly to City Council and on the DPD public website.

² SIPOC Report, Page 12

³ SIPOC Report, Page 15

⁴ SIPOC Report, Page 17, see Intake paragraph

⁵ SIPOC Report, Page 10, Pain Points

⁶ SIPOC Report, Page 11, 18, 25 Competency Expectations

⁷ SIPOC Report, Page 17, potential opportunities; Page 6, 7, 10, 11 and 18, Competency Expectations

Several problems were noted with this process that have not, to date, been adequately addressed and are discussed in the Conclusions Section.

Issues continue however, with reliable ability to collect and use IP estimate versus actual data. These data are useful for the individual supervisor/manager as a production and quality management tool, though because of unique LCS coding by specialty review groups, is not easily collected or reliable across a given project. A systems fix, either by designing a custom report, or coinciding with Accela implementation is warranted.

A more immediate recommendation, using Hansen, is to create an IP estimate versus IP actual measure for Ordinance and Structural reviews that represents an average per reviewer or average per review group (all of Ordinance for example) instead of by project. Such a method could be piloted before Accela implementation.

Issuance Process

The ***issuance process*** currently consists primarily of a complicated series of quality control steps that assure that the permit can be issued. This consists of a range of mostly manual and some automated checks that both validate and generate completeness of the final product and payment from the customer.

Pain points or gaps include:

- Land use conditions are a common hold up at issuance; where role responsibilities between zoning and LU reviewers are not resolved;
- Final reviewers aren't clearing 'red' alerts in Hansen consistently;
- Cover sheet and approved plans are issued as separate electronic files so that the cover sheet is often missing at the job site;
- Approval stamping issues (and software challenges) have not been resolved; and
- It's difficult to know what 'good' looks like for all the facets of issuance.

Metrics could include the cost of checking and validation (in resources and in performance) versus the potential cost of error. Additionally, there is useful potential in reflecting performance of the entire permit process from intake to issuance, with total days, and percent of total that are DPD days, versus percent that are customer days. This would require both the operational definition of time in DPD court, as well as tools and training to support such data.

Inspections Process

The ***inspections process*** provided good feedback on the level of plan review quality, noting few significant 'missings' or errors in the structural and ordinance area. Some complaints in the field in site development areas (adjacent property, landscaping, drainage, trees, etc.) may require either new levels of plan review or alternative means to address field concerns. Other feedback from inspections targeted the need to adhere to established guidelines for STFI permits so as to assure quality performance in the field (see comments above).

Additionally, since starting this quality project, field inspections has been proactively providing feedback about a range of issues and potential gaps between plan review and inspections. One specific area of concern is aligning expectations and practices for special inspections requirements. Twenty projects were recently identified and analyzed by the CRIQ project team for issues identified by inspectors, typically involving the inspector adding (and sometimes waiving) a special inspections requirement not included by the plan reviewer. This analysis has been reviewed by supervisors with recommendations for some additional policy guidance where needed. The spreadsheet of this analysis is available as an appendix to this report (***see Appendix: Special Inspection Spreadsheet***).

2.2.2 Quality Assurance/Quality Control

In the business system there are natural places in the process, intersections with customers and stakeholders, and designed points of data collection that represent the Quality Assurance (QA) and Quality Control (QC) opportunities for plan review. Quality assurance is defined as a set of proactive activities for ensuring quality in the plan review work and processes. For example, QA activities include training, setting standards for review and intake, mentoring, uniform supervision and coaching to established plan review performance criteria.

Quality control is a set of activities for ensuring quality of the (completed) reviewed plans. Quality control typically focuses on identifying defects in the plan review and its related services; e.g., correction letters, customer interaction, coordination with inspections, data entry, collaboration with permit specialists related to permit intake, tracking and issuance, etc. (reactive process).

Audits of projects can serve both a QA and QC function depending on how the audit is designed and used. For example, a single issue audit that is done 6 months following a significant training on a code issue could serve the purpose of assessing how effective training on that issue is being applied – a quality control function for training. The findings from that same audit can also be used to confirm or assess the extent to which plan reviewers are addressing this significant code issue – a quality assurance issue.

In the current business framework, the following tools and structures provide a framework of QA/QC for plan review:

Quality Assurance	Quality Control	Comments
<p>All Intake processes (pre application, pre submittal, coaching, intake screening, etc.) Rate of repeat customers that are CPAs</p>		<p>Intake processes are all designed to assure a 'quality' submittal is taken in for review. Assuring integrity in these processes is important to plan review effectiveness and efficiency, and to customer satisfaction.</p>
<p>All TIP sheets, customer facing checklists, online help tools, and phone coaching etc.</p>		<p>The extent to which these tools are outdated, inconsistent, or unavailable, customers then rely on coaching from the intake processes.</p>
	<p>Intake screening at submittal CPA compliance/rejection Intake rejection rates/integrity</p>	<p>The Quality Control function is correction or rejection at intake. If that does not occur, plan review effectiveness and efficiency suffers.</p>
<p>Plan Review QA standards Correction Letter Standards FPR update progress against plan</p>	<p>Plan Review Audit Performance Correction Letter Audit Performance Use of FPR</p>	<p>Existing QA standards are in place for some 'core competencies' such as quality correction letters, use of FPR, some content in FPR, IP and CP standards/estimates, and others. More can and should be developed.</p>
<p>Plan Review Performance IP actual versus Estimate</p>	<p>There are 4 auditable criteria that are being tested as performance metrics: 1) IP/CP time reviewer spent on the plan; 2) technical accuracy; 3) communication quality 4) inspectability of issued plan</p>	

2.2.3 Ad Hoc or Incidental Audits

In the current process, these are described as 'non-blind', individual plan audits that are prompted by some event or issue. They are typically conducted by a supervisor. The range of issues or events may include a question from a staff person on a complex code issue, a third correction cycle, or a complaint about a plan review that results in an "inquiry" into the issue

that concerns a supervisor. Since much of this activity currently is part of routine feedback and coaching provided by a supervisor to the plan reviewer, these audits are not likely to be documented by the supervisor.

Other audits that might be included in this category would be those conducted by Supervisors as part of their own growth and development, expanding their supervisory skill sets and coaching abilities. These are undertaken with the support of the CRIQ team that provides training and coaching in audit practices.

Types of Ad Hoc audits being used in Engineering Services (recognizing different supervisors approach this differently), currently include:

- A. A supervisor “walks through” a plan set with the reviewer when/if they come to him/her with 2 or more questions about a project (for example, two exiting questions). After this discussion (15-30 minutes), they spend 15 minutes documenting the discussion – especially information clarifying how the code applies. A copy is given to the employee and is put in the employee’s file. The supervisor can then refer to it, and check back later to see if this “training” was effective (did the reviewer apply this new knowledge on their next similar project?) (*see Appendix: Plan Review and Correction Letter Audits, Audit Tool Kit Section.*)
- B. For a reviewer’s annual evaluation, the supervisor looks through a variety of recent correction letters and chooses one that is for a relatively complex project (relative to the reviewer’s experience level). The corrections are then evaluated for communication and technical quality, and then referring to the plans, the supervisor checks to make sure that nothing big was missed and that the corrections are technically correct and applicable. This audit process takes about 1.5 hours (depending on the project type), not including any time they may spend documenting the audit or meeting with the reviewer. The results are used in the annual evaluation.
- C. Finally, an Ad Hoc Audit process can include the supervisor selecting several recent correction letters written by a staff person, and quickly assessing their communication quality. Developing scoring and documentation that aligns with the correction letter audit would be a helpful process so that this information can be effectively used both in giving good feedback to the individual (comparative to the organization) and be used in their performance evaluation.

2.3 IDENTIFY MEASURES AND CONDUCT PILOT PROJECTS

Three types of audits were conducted as pilot projects. From these, potential metrics for plan review quality were developed. The Correction Letter (CL) audit tests a method of measuring the quality of reviewer’s plan review correction letters (not including their technical appropriateness). The Inspectability audit is designed to measure whether a reviewed set of plans included the information needed for quality inspections. The Plan Review audit tests auditing as a means to measure the technical quality of plan reviews, including an assessment of the plan reviewers IP/CP hours, quality of communication through the correction letters process, and overall plan review quality. For each of these, to some degree, the audits were also used as a means to assess the consistency within groups of auditors – primarily supervisors.

2.3.1 Correction Letter Audits

The critical-to-quality criteria for correction letters developed by the CRIQ team was used as a framework for this audit. For each of these an 'operational definition' has been developed and supported by a training program for new reviewers. These dimensions include:

- The correction is clear and understandable

correction letter description	meets expectation points			
	Clear	Code-based	Sheet/detail	Directive
NEW SFR 1 Common - O&S	80%	91%	100%	93%
NEW SFR #1 Common - O&S	73%	80%	73%	100%
NEW SFR #1 Common - O&S	83%	100%	100%	100%
NEW SFR #1 Common - O&S	87%	87%	86%	100%
NEW SFR #1 Common - O&S	73%	67%	100%	93%
range of SFR common correction letter review	73% to 87%	67% to 100%	73% to 100%	93% to 100%

- The correction is based in the code, and cites the code section
- The correction notice points to the appropriate sheet/detail in the plan
- The correction is directive and identifies the action needed

Each letter was reviewed by the supervisor and evaluated using the same scoring form for the four criteria above.⁸ For each letter, the supervisor noted whether each correction item either 'meets expectations', 'needs improvement' or was 'not applicable' and provided some commentary note, as appropriate.

Project types for the audit were identified by supervisors, and managers selected the actual project correction letters, which were then altered to remove the project number, address and reviewer's name. This allowed the audits to be "blind," which was important to insure objectivity.

Supervisors were asked to track the amount of time required to conduct the correction letter reviews which occurred during the time period of Oct 5 through the 14th. A total of 58 CL audits were completed, at an average of about 40 minutes each.

Ordinance and Structural Group

Overall results from these audits were positive. Ordinance and Structural supervisors reported an average 82.5 percent 'meets expectations' for all their audits.

In a test of supervisor consistency, each Ordinance and Structural supervisor audited the same correction letter for a New SFR (see table of results, previous page), as well as a podium building and a tenant improvement project. In these tests, some variations in how supervisors evaluated each of the four categories was revealed. This allowed this group of supervisors to use this experience to discuss differences in perception, meaning and application and gain a shared approach.

Geotechnical Group

For Geotechnical, the supervisor identified an assortment of five project types to reflect complexity and performed an audit of each, using the same check sheet as the Ordinance and Structural supervisors. Overall, the correction letter performance reflects 93 percent positive or meets expectations (see side bar and Conclusions, Section 3.2).

Energy and Mechanical Group

The Energy and Mechanical supervisor also identified three project types to reflect complexity and performed five audits using the same check sheet as the Ordinance and Structural supervisors. For this group, the overall correction letter performance reflects 84 percent 'meets expectations.'

Drainage Group

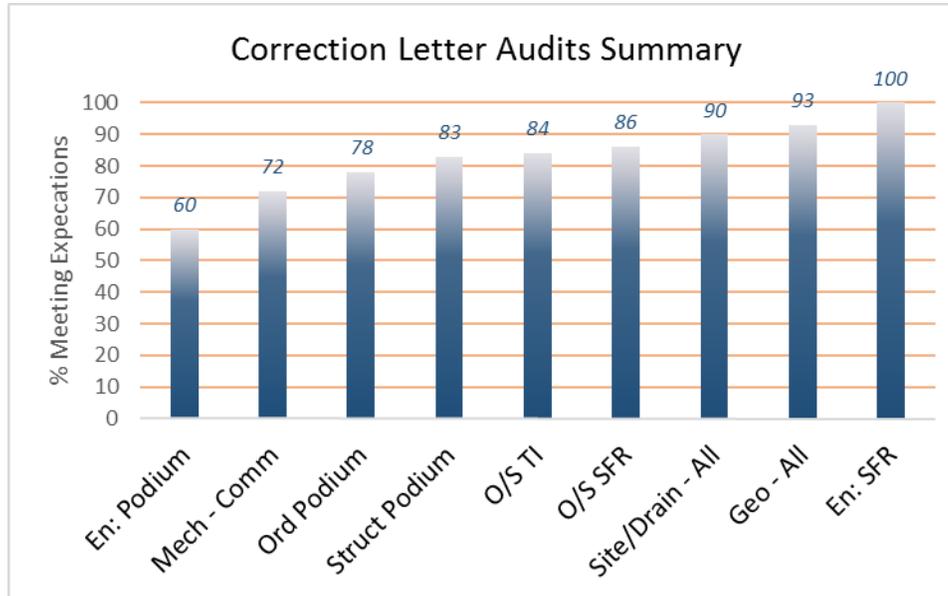
The Drainage supervisor identified three project types and did six correction letter audits, using the same scoring sheet as the Ordinance and Structural supervisors. For this group, the overall correction letter performance reflects 88 percent 'meets expectations.'

This graph (next page) shows the average scoring for all the correction letter audits.

"I shared the correction letter and audit results with my group yesterday. I gave them the correction letters first and we went through them as a group going through each correction item. After each one, I asked for their opinion of the correction. After each item and their opinion, I shared what I had written in my audit. It was a good exercise—I think what came out of it was that the group felt they were on the same page in terms of consistency—they were seeing correction items on topics that they would have written about. On the items that I thought were too long or confusing, the majority of the group also thought the same thing. It gave us a chance to discuss those long/confusing correction items—what could be done differently to make it clearer—it made it pretty clear to the person who wrote two of those letters that he should change his style, and we were able to make those suggestions in a friendly environment without the person feeling attacked."

-Geotechnical Supervisor

⁸ See Appendix for full report: **DPD QMS Measures: Audit Pilot Project Report, November 2015**. Page 5



2.3.2 Inspectability Audits

Building operational definitions of quality (the QA process) will enable inspections to capture plan review ‘missings’ against these definitions. Otherwise, such gaps become matters of opinion, and issues of customer and site-specific impact. Two strategies were proposed to help formalize this objective. One was the piloting of the inspectability assessments for types of projects, and second is reinforcing the relationship-building and routine meetings between inspections and plan review that are working well between some plan review and inspections groups but not others.

It is well understood that the difference between what a plan reviewer looks at --occupancies and their separation, exiting design, etc. -- and what an inspector sees in a building -- consistency of rise and run of stairs, built-up stud nailing, etc. -- are two kinds of worlds. However, ensuring that creating a code compliant building, particularly in those areas where there are the greatest challenges in the field -- boarding houses, micro-housing, podium buildings, etc. is the focus of this first quality audit project.

The purpose of this pilot was to design and define a checklist of issues from the inspections perspective that are critical items plan reviewers must have clearly resolved/corrected on plans so that a code compliant building can be constructed and inspected. Using a recently issued or approved podium building project, this project engaged three selected SME inspectors to audit a total of four projects. An anticipated outcome is increased clarity on what issues must be addressed by plan reviewers vs. what issues can be addressed by inspectors, at least for the chosen project type - podium buildings.

Four podium projects were audited (described below), with each two of them reviewed by two inspectors (to check for consistency between auditors).

Podium Project A:

- Issued Permit
- Construction of a mixed use building with below grade parking
- Reviewed by Blevins and Wallace

Podium Project B:

- Issued Permit
- Construct a mixed used building (hotel) with parking garage (includes excavation and shoring)
- Reviewed by Steele and Wallace

Podium Project C:

- Permit not yet issued – project in corrected plan review

- Construct multifamily structure (5 story over basement) – a boarding house
- Reviewed by Blevins

Podium Project D:

- Permit not yet issued – project in corrected plan review
- Construct multifamily building (7 story with basement) – efficiency dwelling units with no parking; includes shoring
- Reviewed by Steele

The inspectability check sheet indicated those issue areas inspectors wanted the auditor to specifically look for and evaluate. In this case, the auditor noted that the completed plan either *'meets expectations'*, *'did not meet expectations'* or that the issue area was *'not applicable'* to this plan set (no score). Secondly, the auditor may have seen or noted other items on the plan set that required comment and scoring. In such cases those were added. Overall, for all six projects, 73 percent of issues identified met expectations.⁹

Regarding consistency between reviewers, the following observations can be made:

- For the “B” plan, a mixed used building (hotel) with parking garage, which includes excavation and shoring, reviewed by Steele and Wallace, both reviewers noted an identical number of total issues (23) and were fairly consistent in evaluation.
- For the “A” Plan, a mixed use building with below grade parking, reviewed by Blevins and Wallace, there are few similarities in audit findings. They agreed on the categories of energy, excavation and life safety. One auditor noted “this is not a great set of plans.” Otherwise, ratings, comments and overall scores were distinctly different between these auditors. Follow up discussions to understand these differences occurred late in November and are documented in **Appendix: Inspectability Audit Documents**.

Issues needing resolution that arose from the inspectability audits included some details that inspectors would like to have added to plans for podium and similar projects, special inspections they think should be required, adding notes to the plans regarding any agreements/easements between adjacent property owners regarding excavation, and other information that is not getting to the field (e.g., approved cover sheets and fire dept. review letter). These issues were documented, discussed in a large meeting between CRIQ and inspections, and were handed off to management (Jon and Dave) for resolution. A couple of issues were sent to the Accela staff representatives for consideration in the new software implementation. The spreadsheet of these issues is found in **Appendix: Inspectability Audit Documents**.

2.3.3 Plan Review Audits

The objective of this first plan review audit was to 1) orient the supervisors to the task of auditing a reviewed plan, 2) identifying major areas where supervisors may be inconsistent, 3) identify any performance issues with plan review (technical and communication), and 4) develop an audit approach and scope that is useful and sustainable.

These audits were done using a scoring construct where auditors were asked to evaluate the technical aspects of the reviewers work and ask whether the reviewer caught the important issues in each major review category, indicating either *'meets expectations'*, *'needs improvement'* or *'not applicable.'* Next they evaluated the correction letters developed by the reviewer associated with the project and provided an assessment of the communication clarity and appropriateness. Again, a simple scoring of *'meets expectations'*, *'needs improvement'* or *'not applicable'* was used.

To achieve the plan review audit objectives, project identifiers (project number and plan reviewer) were removed from the documents, allowing the audit to be “blind.” Auditors were expected to identify any significant issues or missing correction requests, and provide comments.

⁹ See Appendix Report, **DPD QMS Measures: Audit Pilot Project Report, November 2015**, page 11

Single Family Residence Audit

Ordinance and Structural supervisors did a single-plan Single Family Residence audit, and auditors averaged 2.2 hours of audit time. For this SFR, scores were 56 percent ‘meets expectations’ on technical, and for communication, 66 percent ‘meets expectations.’ There is some inconsistency in how supervisors work as auditors; e.g., level of audit review, selection and perception of issues.¹⁰ For the most part though, it was determined in the follow-up discussions that the inconsistencies were primarily a matter of degree (i.e. where the line between “meets expectations” and “needs improvement” is drawn).

Podium Building Audit – Structural and Ordinance

Podium Building A was audited by structural and ordinance supervisors using separate score sheets for each discipline. Structural Auditors differed in their perspective about the quality of the review for Podium Building A, with strong alignment between two of the three auditors at 45 percent and 33 percent, ‘meets expectations’ and the third at 82 percent ‘meets expectations.’ The same auditors differed in their evaluation of the quality of correction letter for this project, with 67 percent ‘needs improvement’ by two auditors, and 100 percent ‘meets expectations’ by one auditor. At least one technical error – an incorrect correction -- was noted by all auditors. The overall score then is 57 percent ‘meets expectations’ for technical and 55 percent ‘meets expectations’ for communication.¹¹

Two ordinance auditors also scored Podium Building A for technical and communication quality review performance. They were well aligned in their audit, noting an identical number of technical issues and a similar number of communication issues (overall 67 percent ‘meets expectations’ on technical, and 41 percent ‘meets expectations’ on communication). Technical issues noted were missing exit signage, emergency lighting and some poorly written and unclear corrections.

Energy and Mechanical Audit

For the Energy and Mechanical audit, the supervisor audited energy plans for a podium building (A), mechanical plans for a new commercial building (L), and energy plans for a SFR w/ DADU (E). Audit time averaged 2.3 hours. Issues noted were primarily missing correction items, missing code references, asking for corrections already shown on the drawings, duplicate correction items, and asking for corrections that could be left to the inspector. Overall scores for these three audits were 92 percent ‘meets expectations’ on technical and 65 percent ‘meets expectations’ on communication.¹²

Drainage Audit

The drainage supervisor audited two civil engineered plans for new mixed use buildings (P and Q). Average time spent auditing these plans was 1.8 hours per project. Positive audit results for both plan sets were reported with minor issues noted on one plan set identifying the storm water discharge point and failure to include a PE evaluation note on the plan set. Overall results for these two audits were 94 percent ‘meets expectations’ on technical and 79 percent ‘meets expectations’ on communication.¹³

Geotechnical Audit

“We need someone dedicated to leading the Structural Engineer’s (determine needed training, setting up training, be a champion of structural review, help with Roundtables). Some tasks could be delegated, but it requires a ringleader (who is also the buffer). We miss having a “technical” supervisor. We miss the Tech Core Team that was responsible for structural training.”

Appendix: SIPOC Report, pg. 63

¹⁰ IBID, page 17

¹¹ See Appendix Report, **DPD QMS Measures: Audit Pilot Project Report, November 2015**, page 18

¹² IBID. page 19

¹³ IBID, Page 19

The whole geotechnical group (supervisor and review staff) audited two plans: Project M was Shoring and Excavation for a phased project and Project N was a new Multi Family with a site mapped as ECA Slide. Average time spent auditing each of these plans by the group was 2 hours.

Each person in the geotechnical group audited the projects individually, and then met as a group for 90 min. initially and then again for 90 min. to compare results. Overall technical performance of plan reviewers on these two audited projects was 87 percent ‘meets expectations’ and communication was 77 percent ‘meets expectations.’¹⁴ Outcomes of those meetings are included in the **Appendix: Plan Review Documents**.

Summarizing the overall scores from the plan review audits in the table below, it is notable that the scores for communication do not exceed or equal the technical scores for any audit. This may suggest that refresher training in well-written corrections, use of FPR and near-term use of correction letter audits may be helpful.

Plan review quality audits produced several potential metrics:

- technical performance on audits
- technical performance on ‘single issue’ audits following focused training/coaching
- communication clarity (plan review audit)
- IP/CP performance (audit)

Audit group	Technical percent ‘meets expectations’	Communication percent ‘meets expectations’
SFR	56	66
Structural Podium	57	55
Ordinance Podium	67	41
Energy/Mechanical	92	65
Drainage	94	79
Geotechnical	87	77
Overall average	75.5	63.8

2.3.4 Customer Feedback Interviews

Six invitations were sent to customers to conduct interviews about their plan review experience (see **Appendix: Customer Survey**). Three responded and provided feedback about their experience. Their responses are provided below, which are primarily positive.

Best practices indicate that this kind of client feedback is best analyzed through both an incidental/transactional and a thematic lens, so as to avoid overreaction to the incidents and applying an appropriate focus to process and system issues where themes indicate something repetitive or thematic is occurring. This takes a bit of data, someone to pay attention to it, and knowledge of the system and processes (and perhaps the people) that provide and get services. This customer survey effort was a pilot of the methodology, with the idea that the interviews might validate the audits done of these same projects. The sample size here is too small for useful analysis, but was helpful in testing methodology.

The three projects for whom interviews were done were:

Response 1: Shoring and Excavation permit for a phased project. Geotechnical plan review audit was done in November

Response 2: Mechanical/HVAC permit for a new commercial building. Mechanical plan review audit was done in November.

Response 3: Building permit for a new podium, mixed use building. Ordinance and Structural plan review audits were done in November.

The responses were analyzed in two ways. First, a qualitative evaluation of respondents’ assessment of DPD performance in each of the four categories we asked them to comment about is summarized in the

Question	Response 1	Response 2	Response 3
Presubmittal	NA	NA	Clear and NA
Correction Letter	Positive	Good	Good
Quality of Review	Positive, value-added	Positive	Good, some issues
Customer Service	Positive	positive	Good, some issues

¹⁴ See Appendix Report, **DPD QMS Measures: Audit Pilot Project Report, November 2015**, page 20

first table. Secondly, this evaluation is compared with the internal audit findings of these projects (see project described above) to contrast with the internal assessment of performance on these projects.

The contrast is shown in the second table.

Project Audits			Interviews of Project Design Professionals			
Project	Plan Review Audit Score	Correction Letter Audit Score	Response #	Correction Letter	Quality of Review	Customer Service
A: Podium	Struct: 58% meets tech expectations; 56% met communication expectations Ord: 67% meets tech expectations; 41% met communication expectations	Struct: 76% meets expectations Ord: 62% meets expectations	3	Good	Good, some issues	Good, some issues
L: Mech for new Commercial	89% met tech expectations; 65% met communication expectations	Mech: NA	2	Good	Positive	Positive
M: Shoring/Ex	90% met tech expectations; 69% met communication expectations	Geo: 89% meets expectations	1	Positive	Positive, value-added	Positive

Note that these customers appeared to be satisfied with the quality of product and service, while internal auditors saw some opportunities for improvement.

In the Recommendations Section, responsibility for ongoing attention to customer feedback would fall to Strategic Advisors and Managers in joint attention designed in Audit program efforts, similar to this effort.

3 CONCLUSIONS FROM 2015 WORK

Conclusions from the investigative and pilot studies work done in 2015 are summarized in this section under the following headings:

- Shared Vision of Plan Review Quality
- Audit Conclusions
- Feedback Loops
- IT Tools and Reports
- Staff Development and Training
- Roles and Responsibilities
- Measures and Metrics

3.1 SHARED VISION OF PLAN REVIEW QUALITY

The work done in 2015 by this project confirmed and provided additional detail regarding the definition of what we mean by a good quality plan review, but as that definition is and will always be a subjective construct, continuous work is required to maintain, update and communicate it. In addition, developing and communicating standard practices for applying the codes to various and continually changing project types requires an on-going effort which in some ways has just started. For example, this project has produced lists of important code issues for a handful of project types, but there are many more that should be addressed.

The same ongoing effort will need to be applied to achieve and maintain consistency amongst auditors. This applies currently to Ordinance and Structural supervisors but will need to be expanded to include a wider group, if senior BPEs and SPEs and Strategic Advisors (SAs) become auditors in the future. Also, the judgment of all auditors needs to be calibrated for consistency and reliability in scoring.

3.2 AUDIT CONCLUSIONS

The following general conclusions can be made about the audit pilot project conducted in 2015:

- Based on the results of the three pilot audits for correction letters, full plan review, and inspectability, it is possible to develop a sustainable audit program and corresponding measures of plan review quality.
- The usefulness of correction letter audits was debatable, depending on review group.
- The scope of the full plan review audit was too labor-intensive to be sustainable for Ordinance and Structural, but more manageable for specialty teams.
- Not all review groups need to do audits the same way, so the QMS could develop a Toolkit of Audit types that supervisors and management could choose from to suit the needs of each review group.
- The Specialty Review team supervisors were able to do a much more detailed, thorough audit than the Ordinance and Structural Supervisors due to the more limited breadth of their code/regulations. Their audits may have a different purpose and result, accordingly.
- The debriefing and consistency discussions of the technical issues that follow the audits have great value in clarifying how to interpret and apply the code, as well as how to perform good quality plan review.
- Audits need to be “blind” to be most objective and effective. Because making the project documents “blind” proved to be quite time-consuming, ideas are being considered for simplifying the task of removing the reviewers name from the documents while ensuring that each staff member of the team is audited.
- Auditors seemed to find doing the audits to be interesting and valuable work.
- The audit results yielded feedback on the reviews that would be of high value in improving the performance of individual reviewers. It would be good to develop a means to give this feedback to the reviewers, even though the primary purpose of the audits is to measure the performance of the group or system.
- The Correction Letter audit and the subsequent debriefings with staff served to reinforce the four principles of ‘good written communication’ that serve as an ‘operational definition’ for correction letter quality.

3.2.1 Supervisory Consistency

Reviewing data from the audits as well as feedback from the SIPOC, staff survey and initial interviews, supervisors identified a need for improved coordination and communication among the Ordinance and Structural supervisors, supported by the managers and CRIQ. Where plan review quality is concerned, inconsistency among supervision is detrimental when there is not a shared understanding or emphasis of critical quality management practices. This project has focused on identifying these critical practices and indicators, testing levels of understanding and consistency and developing recommendations going forward.

Among the focal points for supervisory consistency are the skills of understanding, teaching, coaching and evaluating (auditing) communication quality using the CRIQ standards of a ‘well written correction letter.’¹⁵ It is an essential ‘best practice’ that all supervisors in ES operate with a consistent level of understanding, demonstrate

“The Ordinance and Structural audits revealed a number of technically incorrect or inappropriate corrections, though the sample was too small to quantify deficiencies.”
See Appendix: Plan Review and Correction Letter Audit Documents

¹⁵ See Appendix Report, DPD QMS Measures: Audit Pilot Project Report, November 2015, appendix

an ability to audit communication in a consistent way, teach and coach effectively, and show performance results through low CP cycles. The follow-up discussions that the Ordinance and Structural supervisors have held after the audits, have been very beneficial in improving consistency and “calibrating” their scoring standards.

3.2.2 Plan Review Audit

Discussions with the Supervisor/auditors suggest expanding our scoring to include three criteria and an overall score for each audit – a) technical (did they miss any big code issues), b) value-added by corrections/correction letter, c) time spent (actual IP clock hours and calendar days) and overall plan review evaluation.

A scoring mechanism like the one shown below can facilitate aligning auditor’s perspectives of ‘good’ so that ratings are more similar from auditor to auditor. This mechanism would be intended as the auditor’s overall assessment of the plan review quality.

Proposed/Potential Scoring Schemata					
-3	-2	-1	1	2	3
Very Poor Unacceptable Clearly missed the mark	Poor Quality work Needs significant Improvement	Doesn’t meet expectations Needs Improvement	Marginal work Meets minimal expectations No major error	Satisfactory work Meets basic expectations No major error	Very Good work Meets all expectations No errors

To develop a quality metric, a ‘programmatic approach’ to conducting the audits would need to be developed so that the results are a) regular (bi-annual?) b) represent a reasonable sample of the plan reviewer’s work or the work of the group (whichever the metric is applied to) and, c) are conducted by objective auditors.

Types of plan review audits yielding performance data could include:

‘Single issue’ audit to assess quality of review and correction letter performance on one important/critical code issue (e.g., exiting) across a large sample of plans. The metric would be quality of performance on the technical and correction letter issue (if a correction was written on exiting). Percentage of overall performance (number errors/total audited plans) could be the metric. This audit could be of one project type, or a family of project types.

Building Type audits to assess **consistency of review by type**; e.g., single family residence or podium buildings would involve selecting a small sample set inclusive of all review groups and doing a total audit using the four proposed criteria. The metric would be the final scoring of all plan sets.

Audits by review discipline; e.g., energy/mechanical, drainage, geotechnical, ordinance, structural, and SFR zoning plan review would entail selecting a small sample set and doing a total audit using the four criteria. The metric would be the final scoring of all plan sets.

Final metrics then would be performance by group on the four criteria by period.

After the plan review audit, Ordinance and Structural Supervisors/auditors debriefed with CRIQ representatives Steve and Rick. The outcome of this discussion included the following issues and recommendations:

- We need a “global score” from an auditor. This can be generated relatively quickly. An experienced auditor can do this with a “page turn” review. But it would need to be supplemented by some detail (e.g., a list of issues/problems with the review or a detailed scoring sheet) in order to use audits to identify needs for training or coaching, for example.
- It is important to clarify the purpose of the audit and the score, prior to the audit.
- The complexity of the project and the known history of/experience with the designer affects how closely the reviewer (and auditor!) need to review the plans.

- To determine performance of Ordinance and Structural reviews of podium projects, an audit of a sample of 10 projects could be done for just the “podium” issues.
- The scoring sheet we used for the pilot plan review audit exaggerates inconsistencies between Ordinance and Structural supervisors (due to “pass” or “fail” type scoring) and the range of perspectives used by supervisors.
- It’s important to look at the IP hours spent when evaluating a plan review.

Issues that arose from the SFR and podium plan review audits included questions as to the importance of specific code requirements (how hard should reviewer’s push to get information showing compliance added to the plans?) and a general question about the organization of corrections in a correction letter. Those issues which supervisors did not completely resolve in their follow up discussions were taken to CRIQ meetings and resolved there. See **Appendix: Plan Review and Correction Letter Audit Documents** for documentation of the issues and their resolution.

3.2.3 Correction Letter Audit

Correction letter quality – or *communication clarity through correction letters* was the purpose of this focused audit. Since communication consistency is so critical to plan review success, low CP cycles, and overall production performance, this type of audit provides the supervisor a fairly ‘quick’ window into the performance of a reviewer. Since they knew the project type for each of these audits, supervisors were able to intuit whether a correction was likely to be technically correct and appropriate or not. It was frustrating then, to not be able to do the next step and look at the plans to verify this. As a result, some supervisors found this audit less compelling than others, and recommended changes in 2016.

To develop a correction letter or communication metric a ‘programmatic approach’ to conducting the audits is needed so that the results are a) regular (quarterly or monthly?), b) represent a reasonable sample of the plan reviewer’s work or the work of the group and, c) are conducted by an objective auditor (may suggest supervisors audit other groups’ Correction Letters). The metric then would be performance by group on the four clarity criteria by period.

The results of the Ordinance and Structural Correction letter audits showed some inconsistency between the supervisor-auditors, which may have been in part due to the “pass-fail” nature of the scoring. In follow-up discussions by these supervisors, it seemed that the differences were more a matter of degree than actually substantive disagreements. The discussions were very useful in helping supervisors who might be “outliers” in their scoring, better calibrate their judgment relative to the “norm.” Only one significant issue about the organization of the corrections in the correction letter was elevated for discussion at a CRIQ meeting. See **Appendix: Plan Review and Correction Letter Audit Documents** for more details.

3.2.4 Inspectability Audit

Inspectability quality was the purpose of this audit, as defined by the (structural) building inspector SMEs – was the information needed by inspectors included in the approved plans? Several metrics may emerge from this work:

- Inspectability audit findings and issue resolution
- Special inspection issue tracking and rate of ‘missings’ by plan reviewer, and degree of alignment with senior/structural inspectors
- STFI correctness (mostly an intake improvement issue)
- Other inspections issues tracked by review group

For all of these, audit findings resulted in fruitful discussions of the issues and subsequent policy decisions, and some need for training or process improvement. Therefore, the frequency of the above might be done no more than quarterly, or less frequently based on the number and kind of issues found. Issues would need to be tracked as they occur, such as STFI correctness (projects approved for a STFI that should not have been), and special inspections changes in the field. These issues would provide a metric (ratio of STFI errors to correct STFI, for example) and frame the content of future audits (special inspections issues, for example).

It is recommended that additional Inspectability audits be performed to look at energy/mechanical and drainage plans so as to understand and strengthen the connection between those review groups and field inspection. Findings from those audits again should expect to result in issues and policy decisions, and potentially process changes.

See **Appendix: Inspectability Audit Documents** for records of the (Ordinance and Structural) Inspectability issues raised and discussed in follow-up meetings. The issues have now been “handed off” to management for resolution. Follow-up coordination/communication with Ordinance and Structural Supervisors will be required to “close the loop.”

3.3 FEEDBACK LOOPS

Three primary areas for conclusions about needed feedback loops are provided in this section. First the feedback process after an audit is discussed as part of the learning from the audit pilots. Next, taken from the SIPOC work and Inspectability Audit, staff noted process needs to build and improve feedback loops between plan review and intake and between plan review and inspections.

3.3.1 After Audit Feedback

Doing the audit is just the beginning of the work, and may be the easy part. Follow-up work includes:

- Analyzing the results and formatting them in such a way they can be easily communicated and tracked consistently.
- Discussing inconsistencies among auditors and reaching consensus or elevating the issue to CRIQ for a “policy decision,” and then documenting the outcome of the discussions.
- Developing ‘lessons learned’ from the audits and communicating them to the appropriate parties (e.g., policy or auditor decisions may need to be communicated to review staff).
- Acting on these lessons – by providing training and process improvements as appropriate (and individual coaching, if the audits are used to assess individual performance).

It is important to note that all these tasks need to be completed in a timely fashion after the audit is conducted, so that value of the feedback is not lost. Timely analysis allows the audit team to identify desired follow up actions immediately after the audit process with staff. Delays promote fear and uncertainty and undermine trust in the integrity of the work.

3.3.2 Intake and Plan Review Feedback Process

As the quality of plans that are taken in is compromised – typically by the pressures of large customer waiting queues and limited staff resources to respond – the impacts to plan review quality and production throughput are compounded from intake, to plan review, to issuance and then to inspection and close out (see **Appendix: SIPOC Report**, Page 9, 10, 14, 17, 36, and 47).

The conclusions from staff and supervision is that there is a need to either formalize the ad hoc feedback loops or create formal feedback loops where none appear to exist. The links between Intake and Plan Review (Permit Leader/Permit Specialist as well as Permit Leader/Plan Reviewer) consist primarily of the IP estimate tool and routing protocols. When these tools don’t work well or are not updated – with joint effort – communication breakdown occurs. Project ‘rescues’ then happen on an individual

“Input Requirements: Criteria intended for resolving issues on code questions and grey areas. We spend about 10 minutes of each meeting addressing process issues – this needs to be resolved in another forum. (Anomaly is that an applicant may believe that a Pre-submittal will provide coaching on code issues and process questions. For mechanical we are doing coaching on line or at the counter that prompts us to tell them they need a Pre-submittal. We are using this meeting for project feasibility purposes. We need to make the expectations of the meeting clearer to the applicant before they schedule – the meeting is non-process focused --and that it may take some time to address what they are asking for. We need training to message these things and facilitate to these ends. We can have handouts and messaging at the counter. Is this on the application? Look at TIP 318: Application form is somewhat confusing?”

Appendix: SIPOC Report, Page 55, amended

basis, rather than process fixes, costing unnecessary time waste when the issue occurs again. Several examples of these problems were cited in the SIPOC work related to skills and training of Permit Specialists approving projects for STFI permits (mechanical), failure to get projects properly routed to Geotechnical, and missing or incorrect IP estimates for some types of review.

Some have suggested a need for a shortened intake line for rejected projects allowing for customers to make corrections for resubmittal.

There is a clear need for management (Managers or Strategic Advisors) to be responsible for creating, tracking, developing solutions and analyzing trends from these feedback loops, particularly where the impact on the quality of plan review occurs.

3.3.3 Inspections and Plan Review

The feedback loops evaluated through the pilot work involved relationships and processes between Inspectors and Plan Review including: Building inspectors and Ordinance and Structural reviewers; Building inspectors and Permit Specialists; Site inspectors and drainage reviewers; Site inspectors and geotechnical reviewers; Mechanical inspectors and Energy Mechanical reviewers; and Mechanical inspectors and Energy Mechanical counter staff.

“Frequently permit applications for mechanical alterations or additions don’t have a clear scope of work described, and plans apparently are not screened for clarity. This results in IP estimates that are wrong, which is a problem for the team – it makes it hard to assign projects appropriately and get them reviewed by their target date.”

Energy/Mechanical, SIPOC Report, Page 13, Pain Points

“ The biggest inspections’ concern is how mechanical projects get routed – most counter staff have little tech knowledge and don’t know technology or terminology - so if the applicant asks for a Subject-To-Field-Inspection (STFI) permit, they might get one – when plan review is actually required.”

- SIPOC Report see Page 46, Additional Input

The relationship between energy/mechanical inspections and review, and geotechnical review and site inspections are examples of plan reviewers benefiting from good working relationships with inspections. This led to explorations of other plan review and inspections groups working relationships and the following conclusions and recommendations.

Site/drainage inspections have been keeping records of problem issues they encounter in the field that represent gaps they believe need to be addressed by drainage review.¹⁶ Some of these issues have been identified as issues reviewers are not checking for, thus representing an expectations and communication gap that needs resolution. A stronger, working partnership between these two groups would serve the interests of improved production, quality, staff morale and customer service.¹⁷

Process and training problems exist between energy mechanical reviewers/inspectors and the permit specialist counter staff regarding decisions about STFI permits (see **Appendix: SIPOC Report, page 13**).

Special Inspections Feedback. In the third quarter of 2015, inspections provided twenty permits where inspectors observed in the field that either a special inspection should have been called for by the plan reviewer and was not, or a special inspection was required by the plan reviewer that was determined to be unnecessary by the inspector. This list of 20 projects was a sample out of the pool of 106 special inspection revisions for 2015 to date. They were reviewed by the appropriate Ordinance and Structural supervisor and the original reviewer, to see if there was agreement with the changes made by the inspector (see **Appendix: Special Inspections Spreadsheet**).

In about 25 percent of the projects, the reviewers agreed they had missed the special inspections requirement or some detail that would lead to the requirement. A couple of projects’ reviewers thought the special inspection requirements

¹⁶ See Appendix report, Current Process Overview: SIPOC Maps DPD QMS Project. Page 12, 31, 43

¹⁷ IBID. Page 12, 31, 43

required judgment calls and that the added special inspections may or may not be needed. The remaining projects involved field changes by the customer that were not on the originally reviewed plan sets.

Continued spot auditing of these types of field decisions will continue to improve feedback between ordinance and structural plan reviewers and building/site inspections. Formalizing a process for data collection and auditing will be helpful for data collection and reporting. An outcome of this particular exercise will be more clarity on when to require some special inspections, and may lead to refresher training on special inspection requirements, for both plan reviewers and inspectors.

3.4 TECHNOLOGY TOOLS AND REPORTS

Conclusions about the available technology revealed some gaps in available tools to implement and sustain a QMS. Examples of tools needed include:

- A report for tracking IP estimate versus IP actual for individual and groups, for all review groups.
- A measure of the number of CP cycles for each review groups' projects, to be tracked over time.
- Design a dashboard that allows a Supervisor to easily see the amount of work assigned to each reviewer and what work was completed by reviewer each day – again, consistent across all review groups. Note that there is the need to add work beyond IP review, so the dashboard reflects a complete picture of the work load.
- As a result of the audit pilots, it is clear that tools to track audit results will be needed so that as data accumulate, trends and conclusions can be more easily assessed.
- Finally, a project dashboard – such as Smartsheet, or some other Project Management tool – would be helpful to track process improvement projects (e.g., feedback loops), training initiatives, and overall quality metrics.

It is understood that Accela will impact or change tools needed and tools available, but likely only for the direct IP and CP work. What is not likely to be available through Accela are other tools for tracking training, audit work, etc.

“The CRIQ team has a good deal of past educational presentations online and some good training materials, but it is unclear what is still relevant or what should or should not be used. This is a possible VERY good tool for consistency, knowledge resource and training, but it is underused. This would be a good project to look at when intake volume is lower, such as winter.”

- Ordinance Plan Review SIPOC, pg. 49

3.5 STAFF DEVELOPMENT AND TRAINING

Feedback about staff development and training during the work done in 2015 generally noted the need for a more formal ‘training plan.’ Inconsistencies were generally found across all groups, in the ‘core competencies’ that include methods for doing plan review,¹⁸ writing correction letters, and updating/changing and using the Focused Plan Review (FPR) tool.

Different review groups noted unique technical training needs, and noted that the approach to training varies and depends on supervisors. Feedback from the SIPOC process indicated a need for:

- Training plan for plan reviewers and permit leaders.¹⁹ Further work with the supervisory and management team indicated that such a training plan for plan reviewers needs to be comprehensive to include a specific process and

¹⁸ IBID, pg. 51

¹⁹ See Appendix: SIPOC Report, Page 45

content for the one year on-boarding period followed by a 2-year maturing staff development training and coaching curriculum.

- Core competencies that all plan reviewers and all supervisors need can be identified in this training plan and curriculum developed or refined to apply to all plan reviewers and all supervisors. (see examples of inconsistencies in core skills above).
- The training plan needs to include a range of innovative approaches to develop and deliver training, staff learning, implementing the Ordinance and Structural 3-year code cycle, and adopting other code updates.
- Finally, developing and testing training on how to effectively perform an audit needs to be developed for Supervisors (and others that may be called on to perform audits).

Auditors need training in order to get more consistency in audit practices and performance, and for supervisors to learn from each other about what 'good' looks like when auditing a plan. Training in how doing an audit is different than doing a plan review, is also needed.

3.6 ROLES AND RESPONSIBILITIES

The sidebar provides some background to the history of the design of the current CRIQ structure, and intended vision.

This vision assumes the production and technical leaders would respect and work well (communicate) with each other, and be able to come to agreement on issues that would meet the needs of both. The current reality is that there is a lack of role definition, which affects DPD's ability to get work done. This project has surfaced the need to clarify roles of Managers, Strategic Advisors, supervisors, and seniors. Currently, the responsibility for technical guidance, training, production, process improvements, and QMS is not well-defined.

Conclusions are that if the Managers job is clarified to include process quality (staffing modeling, feedback loops, production monitoring, and decision optimization), both CRIQ and Managers should benefit without diminishing independence. Additionally, recommendations in Section 4 add Strategic Advisor resources to assist Engineering Services to identify and prioritize priority process, quality and training improvements across the system with the essential input of the management and leadership team so that these powerful improvement projects can be realized for the best benefit of all in the most effective manner.

CRIQ was originally created so there would be dedicated supervision and management to deal solely with technical issues, with separate dedicated supervision and management to deal with the non-technical issues (production, process, and HR). Some of the benefits and reasons for CRIQ's creation are to:

- *Allow adequate focus on each "side" of supervision. Previously, supervisors came out of the line staff mostly because of their technical expertise. When they became supervisors, because there wasn't enough time to deal adequately with both technical and non-technical issues, they focused mostly on the technical side, which is where they were most comfortable. This meant difficult HR issues sometimes didn't get dealt with very well (if at all), and uniform production management was non-existent.*
 - *Note that the team sizes prior to the split of responsibilities were 4-6 staff per supervisor. We justified 2 supervisors for each team by combining teams to make them larger (~10 people/team originally), but it theoretically kept the staff/supervisor ratio about the same. Now, the supervisors have twice the staff to tend to and they're back to doing both technical and non-technical supervision, which may be a challenge to an aggressive audit, training and process improvement program.*
 - *Combat staff perception/complaints that all Management cared about was getting the permits out. If there is a separate chain of command for production versus quality with equal responsibility, one (theoretically) cannot override the other.*
 - *Provide dedicated high-level technical decision-making and policy-setting. (Dedicated = time to think through and deal with the issues.) A side benefit of this was we had a better idea where training was needed, at least on a gross level.*
 - *Open up two avenues for advancement as opposed to the previous single avenue (wasn't a direct reason, but it's another side benefit). Now one could rise up in the department via the "pure" management side, or the technical.*
-

As well, strengthening and clarifying the role of the management team to train them in the use of technical modeling tools, such as decision optimization, and the design and monitoring of feedback loops might clarify for them in what ways they are responsible for ensuring process quality for the purpose of optimizing production.

3.7 MEASURES AND METRICS

Compiled from the lessons-learned and insights gained from the SIPOC and pilot projects a collection of potential measures and metrics has emerged that reflect potential indicators of quality performance at process milestones. These are compiled below.

Process	Potential metrics
Intake	<ul style="list-style-type: none"> • Impact of accepting poor quality submittals; e.g., increase in CP cycles, increase in IP hours or days, impact on customer satisfaction, and/or impact on percent of projects rejected • Percent or number of STFI permit errors at intake • Having quality plans submitted that are ready to review measured by feedback from plan review about quality submittals • An increasing number or ratio of consistently prepared applicants (CPAs) for those returning applicants • Quality of coaching targeted toward better quality submittals measured by feedback from customers about quality of coaching effective toward preparing for intake • Customer satisfaction from survey
Plan Review	<ul style="list-style-type: none"> • IP estimate versus actual data by review and across a given project type. • IP estimate versus IP actual measure for Ordinance and Structural reviews that represents an average per reviewer or average per review group (all of Ordinance for example) instead of by project • Audit performance (by group or issue): overall performance on technical and communication ‘meets expectations’ plus IP/CP performance (audit) • Audit performance (by group or issue): consistency within groups of auditors – primarily supervisors. • Metrics could include the cost of checking and validation (in resources and in performance) versus the potential cost of error. • Total CP cycles by type of permit, by review group, and potentially by individual will also add some insight about the benefit of a quality plan at intake and quality practices of plan review, particularly good communication quality. • Performance of the entire permit process from intake to issuance, with total days, and percent of total that are DPD days, versus percent that are customer days. (Requires both the operational definition of time in DPD court, as well as tools and training to support such data.) • Technical performance on ‘single issue’ audits following focused training/coaching • Customer satisfaction feedback from survey
Issuance	<ul style="list-style-type: none"> • Cost of checking and validation (in this case ‘cost’ is reflected in FTE resources and or performance to target/performance, only where missing the target causes rework; e.g. spending more) versus the ideal budget. • Performance of the entire permit process from intake to issuance, with total days, and percent of total that are DPD days, versus percent that are customer days • Inspectability audit performance is also a potential performance metric for issuance if correctness of cover sheet, and plan review package is included
Inspections	<ul style="list-style-type: none"> • Percent ‘meets expectations’ on Inspectability audit after validation discussion • Percent of special inspections errors made by plan reviewer per period • Percent of special inspections errors made by inspectors per period

4 RECOMMENDATIONS FOR THE FUTURE DPD QMS

Aligned with the previous chapter, recommendations are provided for the seven major conclusions identified during the pilot project, to include:

- Shared Vision of Plan Review Quality
- Audit Program
- Feedback Loops and Processes
- Technology Tools and Reports
- Staff Development and Training
- Organizational Recommendations
- Measures and Metrics
- Summary

4.1 SHARED VISION OF PLAN REVIEW QUALITY

As noted in the Conclusions section, the work done in 2015 by this project set the stage for some of the work needed to maintain, update and communicate the shared vision of plan review quality, and identified a scope of work that needs to be included in an ongoing QMS program. Recommendations to invest in 2016 to strengthen this shared vision include an ongoing emphasis on shared vision, goals and objectives, particularly as a designed part of an onboarding plan review training program for new review staff.

For example, the relationship between production (e.g., a well-functioning business process) and quality technical skills is one of these ‘shared’ objectives. There is a natural synergy between the two that makes for a strong organization, great employees and happy customers. Working together to achieve this synergy is a managing philosophy of Engineering Services.

Some of the current activities that have been successful in communicating, supporting and sustaining a shared vision of plan review quality that will need continued investment in 2016 and beyond include:

- Code interpretation meetings at the Ordinance and Structural and Specialty Review levels
- Partnerships and communication feedback loops between review and plan groups
- Training program design and outcome metrics
- Feedback loops between intake processes and plan review; plan review and issuance; issuance and inspection
- Develop customer feedback program
- Develop Audit program
- Continue supervisory development of consistency
- Develop staff onboarding training (more formal one and three-year training and development program)
- Develop auditors training program

4.2 AUDIT PROGRAM

While the audits conducted in 2015 were a useful first step, several lessons-learned should be considered going forward:

- Auditors need more training than the simple orientation to the scoring sheet provided in order to get more consistency in audit practices and performance, and for supervisors to learn from each other about what ‘good’ looks like when auditing a plan. Training in how doing an audit is different than doing a plan review is also needed.
- Consider expanding plan review scoring to include three criteria – technical (did they miss any big code issues), value-added by corrections/correction letter, and time spent (actual IP clock hours and calendar days) to get a more complete evaluation of the plan reviewer’s performance.

- Develop a numeric rating scale -- supported by descriptions – to help auditors align their perspectives of ‘good’ (see potential example below) and provide training and examples of application for auditors in its use. This would yield a numeric rating score for the quality of the plan review. This summary score will enable the auditor to ‘grade’ the overall plan review performance for a given plan.
- Identify desired follow up actions immediately after the audit process. These might include staff coaching sessions conducted by Supervisors or CRIQ, design and implementation of a training course or workshop to address an audit finding, or identifying and resolving policy issues with CRIQ.
- Consider expanding the auditor role to include other SMEs such as Senior review staff, Strategic Advisors and other uniquely qualified SMEs. Communicating any individual staff feedback should remain the responsibility of the supervisor of that individual, however.

Recommendations for the next several years focus on building from the lessons-learned in 2015 and applying newly assigned resources and strategy to the QMS vision. The first objective will be to build a sustainable audit program, with equal attention to formal training and process improvement that complements audit findings. Outcomes will be a staff more engaged in measurement for the benefit of improvement and learning, more efficient and effective processes and people, and leading edge business practices.

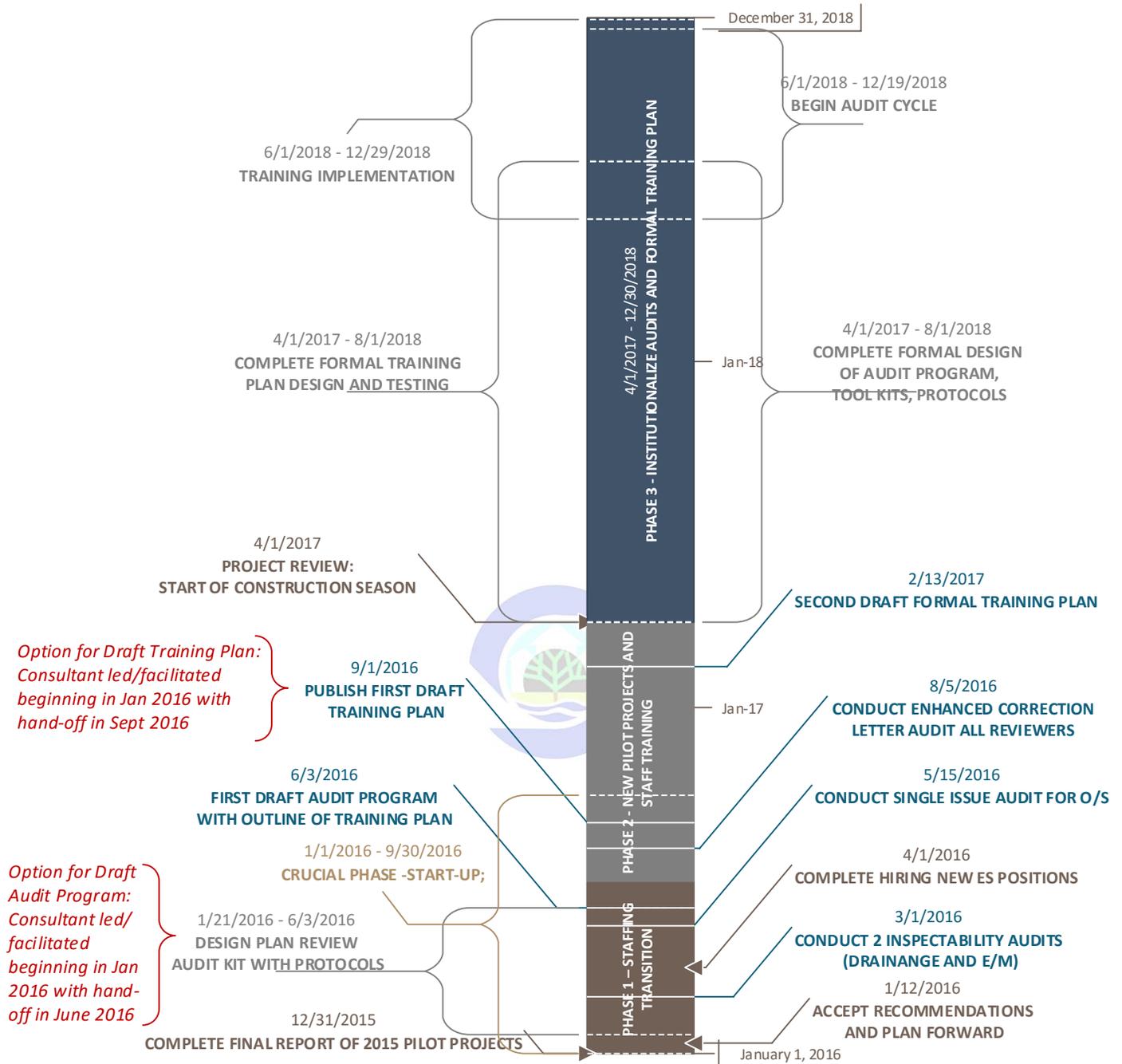
Next round of audits – following auditor training by Strategic Advisors, Rick and Steve, another round of Ordinance and Structural audits should be done in order to pilot other audit types and have a large enough sample size that the audit would yield a useful measurement of quality. This could be an audit of a single project type (apartments or a SFR?) or it could be a targeted (single issue) audit of a larger building type.

For the specialty review groups, auditing a larger sample of a project type should be considered (the pilot audit that was completed just has a sample size of one, for a variety of project types). January - February is typically a good time to do these audits, in terms of plan review workload.

4.2.1 2016 Recommended Program

For 2016, as mentioned previously, it is helpful if the momentum from 2015 continues because the enthusiasm and buy-in from staff can easily be lost if the feedback process generated by the pilot projects stops entirely. Therefore, on the immediate list of efforts for CRIQ to support is a comprehensive list of projects. These are outlined in some order below and illustrated on a timeline on the following page.

- Additional staffing to support an audit, training and process improvement program focused on plan review in January 2016.
- Design and support of a SFR zoning plan review audit to be conducted by the permit specialist supervisors (in collaboration with Land Use management) in early 1st quarter 2016. This work would consist of audit training, data analysis and assistance in providing feedback to staff. Incorporating findings to an audit data file will also be needed. Develop action plans for training or process improvement if needed.
- Transition work to new audit program CRIQ staff (new Strategic Advisors) in early 2016.
- Develop data base repository for audit data. Include records of projects, auditors, scoring sheets, findings, dates and action items.
- Design Plan Review Audit Toolkit: Correction Letter, Correction Letter “Plus,” Full Plan Review, Targeted Subject Plan Review, CP#3 or greater, Complaint Based. Audit types could differ based on triggering event (training, complaints, code changes) and purpose. Include in the tool kit auditor training for each type of audit.
- Develop an ‘ideal’ Audit type and schedule: e.g., Can be different for the various review groups, but would provide the best reflection of plan review quality performance.



- Design and support of two more Inspectability audits, one for drainage and one for energy/mechanical projects. This work would include working with the right inspections groups to develop the scoring list and methodology, selecting projects, providing analysis support and facilitating feedback sessions. Incorporating data into an audit file will be required as well as resolving any policy issues needed. Develop action plans for training or process improvement if needed.
- Develop and conduct refresher training on communication/correction letter quality (note poor pilot audit scores) for all plan reviewers. This would be for Ordinance and Structural and Drainage/Site reviewers, and may happen in team meetings. This has already been completed for geotechnical and energy/mechanical.

- Develop and schedule broad “correction letter plus” audit (see correction letter recommendation) in either 1st or 4th quarter 2016 for all plan review staff and facilitate feedback sessions by workgroup. Include a supervisory consistency correction letter audit and compare findings with audit project. Debrief with supervisors and train and coach as needed.
- Design and schedule a ‘single issue’ plan review audit for a larger cross-section of plans for 2nd quarter 2016. Select and train auditors, develop scoring sheet and schedule. Develop action plans for training or process improvement if needed.
- Design and schedule broad correction letter audit in 4th quarter 2016 for all plan review staff and facilitate feedback sessions by workgroup. Include a supervisory consistency correction letter audit and compare findings with audit project. Debrief with supervisors and train and coach as needed.
- Write final audit report findings for 2016 and plan for 2017.
- Refine the lists of code issues and categories developed for the 2015 pilot audit scoring sheets and share these with staff. Some may be developed into QA job aids.
- Develop a method for regularly gathering customer feedback on the quality of plan review and customer service provided by reviewers.
- Review correction letter audit in team meetings with Ordinance, Structural and Site/Drainage reviewers, as was done with Geotechnical and Energy/Mechanical teams.

4.2.2 Potential Design Changes for Audits

Correction Letter Audit -- Modifying the Correction Letter Audit would be useful to pilot as a next step. In the audit piloted, the plans were not used; only the communication quality of the corrections was assessed. Supervisors found that they had questions about the technical correctness of some corrections (was this correction appropriate for this project type?), and it would be useful to pilot a “Correction Letter Plus” audit that included using the plans only as needed to determine if “questionable” corrections were technically correct and appropriate.

Ad Hoc or Incidental Audits -- These ‘non-blind’, single plan audits that are prompted by some event or issue conducted by Supervisors as part of their normal staff development work, may become part of the larger Audit Program. Developing the Ad Hoc Audit methods as part of the overall QMS means creating a disciplined, repeatable process for selecting, conducting, scoring, documenting and providing feedback on these ‘one-off’ audits, similar to the practices used for the larger audit program. Developing scoring and documentation that aligns with the correction letter audit would be a helpful process so that this information can be effectively used both in giving good feedback to the individual (comparative to the organization) and be used in their performance evaluation.

4.3 FEEDBACK LOOPS AND PROCESS

Four primary areas for formal feedback design were selected as a focus for recommendations going forward. These need to be included in the design work of the Audit program, the training plan and the process improvement planning. These include:

- After-audit feedback that insures there is a well-designed, efficient and effective feedback process following every audit.
- Process improvements between plan review and intake processes, plan review and issuance, and plan review and inspections so that the work flow, and process design work effectively to assure that communication, problem-solving and learning are ‘built-into’ the daily work.

- Technology tool and technology systems are evaluated – sometimes as a part of processes, sometimes independently – to ensure that technology serves as a coordinating mechanism for the management and supervision of the process.
- Develop strong feedback from the training program plan and products so that ongoing and continual improvement of both occur. Course feedback, audit of learning, evaluation of the training plan, etc. are all essential feedback efforts.

4.3.1 After-Audit Feedback

Feedback follow-up work to each audit (see Conclusions, Section 3.3) includes, at minimum, and in a timely fashion:

- Analyzing the results and formatting them in such a way they can be easily communicated and tracked consistently.
- Discussing and resolving inconsistencies among auditors and reaching consensus or elevating the issue to CRIQ for a “policy decision,” and then documenting the outcome of the discussions.
- Developing ‘lessons learned’ from the audits and communicating them to the appropriate parties (e.g., policy or auditor decisions may need to be communicated to review staff).
- Acting on these lessons – by providing training and process improvements as appropriate (and individual coaching, if the audits are used to assess individual performance).

4.3.2 Process Improvements

Intake and Plan Review -- The conclusions from staff and supervision is that there is a need to either formalize the ad hoc feedback loops or create formal feedback loops where none appear to exist. Minimizing project ‘rescues’ that happen on an individual basis, rather than process fixes, is the goal of this targeted process improvement (See Conclusions Section 3.3).

Inspections and Plan Review – The feedback loops evaluated though the pilot work involved relationships and processes between Inspectors and Plan Review including: Building inspectors and Ordinance and Structural reviewers; Building inspectors and Permit Specialists; Site inspectors and drainage reviewers; Site inspectors and geotechnical reviewers; Mechanical inspectors and Energy Mechanical reviewers; and Mechanical inspectors and Energy Mechanical counter staff. Establishing a protocol, ground rules, action plans for identified issues, metrics and providing facilitation for some groups would be a first step.

Inspectors need a single point of contact to which to bring permits with problems. This person will need to do a quick check to see the source of the original problem or mistake (intake/Hansen data entry or plan review?) in order to know to which group the concern should be forwarded for resolution. The advantage of this single point of contact is that this person can start to see trends and identify needs for process improvements or training. (A Quality Project staff person has been this person temporarily, as an ad hoc pilot. She has collected a file of these problem permits.)

When the inspector has a plan review issue, going to the plan reviewer directly is good in that it can get the problem solved quickly and the reviewer gets the direct feedback. But it is not possible to identify trends and needs for training and process improvements this way. As a result, what are process problems or needs for training don’t get addressed.

Inspections and Intake – The focus of this feedback loops would be to improve issuance of STFIs, and help ensure that only projects that fall within the (clear and understandable!) guidelines are issued an STFI permit.

4.3.3 Technology Tools Feedback

Evaluating the efficacy of existing technology tools in terms of whether they are serving their intended purpose, particularly if the purpose is one of being a coordinating mechanism of the work flow – to assist with communication, planning, status, reporting, tracking, monitoring, etc. – is an important job of management and supervision. These tools must work

consistently and reliably across the system and processes they are designed to support. An occasional assessment or audit of technology performance for plan review supervisors is a recommendation.

4.3.4 Training Feedback

The recommendation to develop a formal training plan also is supported by the need for disciplined feedback tools and processed to help DPD continue to refine both the plan and training products developed and delivered. This might include pre and post-training assessments, post training audits, training plan surveys and audits and so forth. These are all feedback mechanisms essential for a good quality training plan and products.

4.4 TECHNOLOGY TOOLS AND REPORTS

As discussed in the conclusions section, some additional technology tools and dashboards are recommended to support a well-designed QMS and a better functioning plan review process. These require changes to other systems and processes.

Examples of tools recommended include:

- A report for tracking IP estimate versus IP actual for individual and groups, for all review groups.
- A measure of the number of CP cycles for each review groups' projects, to be tracked over time.
- Design a dashboard that allows a Supervisor to easily see the amount of work assigned to each reviewer and what work was completed by reviewer each day – again, consistent across all review groups. Note that there is the need to add work beyond IP review, so the dashboard reflects a complete picture of the work load. Well-designed dashboards provide the feedback data that helps the Supervisor understand more about the individual's areas of performance strengths and weaknesses based on performance, provides a ready window into projects that an individual may be struggling with more than others, and gives the Supervisor ready access to production performance trends that may be reflective on quality issues.
- As a result of the audit pilots, it is clear that tools to track audit results will be needed so that as data accumulate, trends and conclusions can be more easily assessed.
- Finally, a project dashboard – such as Smartsheet, or some other Project Management tool – would be helpful to track process improvement projects (e.g., feedback loops), training initiatives, and overall quality metrics.

It is understood that Accela will impact or change tools needed and tools available, but likely only for the direct IP and CP work. What is not likely to be available through Accela are other tools for tracking training, audit work, etc.

4.5 STAFF DEVELOPMENT AND TRAINING

4.5.1 Staff Involvement

It is important that employees have a good sense of what success might look like. The more the audits are a part of an overall program, and that program is transparent in its intent, design, and outcomes, the less there is to fear. A goal should be to continually drive fear out of the workplace since it hinders productivity and impairs good judgment. Tying audits to training and mentoring needs, as well as to identifying policy issues and other feedback mechanisms is also important to emphasize the value added by this investment.

Good metrics will:

- Drive the strategy and direction of the organization
- Provide focus for an employee, a review group, or engineering services
- Help make decisions about training and mentoring needs, as well as some process improvements
- Drive performance and promote dialog
- Change and evolve with the organization

Produce good internal and external public relations

A recommendation is to move in 2016 to engaging staff in audits so that individual feedback as well as group metrics becomes a part of each audit. In this way, the individual need to get meaningful feedback and insight about their work relative to the group, in a safe and non-threatening way, is met. As well, the data about group and division performance is captured so that program insights and decisions can be made, course corrections for training and development, technology tools and other interventions can be evaluated.

The purpose of the audits and resulting metrics is to promote improvement and drive better performance across the whole system, which includes helping supervisors and individual staff members perform better within that system. Individual feedback may take the form of discussions with reviewers that occur separate from the presentation of overall audit findings. These can become routine, or occur only as needed.

When an audit is done specifically to see if training on a topic is being applied well across a range of plan types, the feedback process would be designed as part of the audit design itself. The audit might be conducted six months following the training and any negative findings shared with the trainer and selected individuals that need a refresher. The purpose of the audit is clear and employees expect the specific feedback.

What is important is to develop elegance around the feedback process post-audit, communicating the findings well and developing next steps for learning to close any performance gaps.

4.5.2 Proposed QMS Projects

Electronic meeting with San Antonio – as San Antonio has extensive experience with plan review audits, a virtual meeting with them would be very beneficial as a way to learn from their experience.

Draft questions:

- a) How did supervisors gain/learn audit skills (or do they redo the whole plan review?)
- b) How does staff make time to do the audits? (How big are their teams? What other duties do they have?)
- c) How did staff learn to accept the feedback/criticism?
- d) What difference have audits made to their business?
 - To the technical quality of reviews
 - To production/efficiency
 - To their customers
 - To staff retention and recruiting
 - To city leadership (major, city council, etc.)

4.6 ORGANIZATIONAL RECOMMENDATIONS

4.6.1 Objectives and Charter of QMS/CRIQ

Defining the purpose and scope of the QMS effort is the first step to continuing the effort to build a shared and sustainable vision of a quality management system for plan review in Engineering Services. These are some elements of that purpose and scope:

- Assess and measure the quality of plan review and develop sustainable metrics.
- Develop standards for quality of plan review and inspection, understanding that we have a good foundation, and that the industry we work in changes and moves forward necessitating our continuous learning, improvement and adjustment.

- Develop standards for quality of plan review and efficiency to help the range of experienced plan reviewers apply best judgment to perform a quality review within an acceptable ‘bandwidth’ of IP and CP performance efficiency
- Identify opportunities for insight and learning through audit and analysis, and facilitate learning.
- Design efficient, effective and state-of-the-art technical training and learning opportunities for all technical staff that keep pace with the demand.
- Forecast learning and knowledge gaps and work with managers, supervisors and others to develop effective plans to meet those challenges.
- Provide policy direction, code interpretation, training, coaching, mentoring and technical leadership as needed to assure Supervisors and staff provide quality decisions.
- Support customers as needed in delivering policy direction, code interpretation, coaching, and technical leadership as needed to assure Supervisors and staff provide quality decisions.

A Program or Project Management Organization (PMO) type structure is recommended to manage the tasks of audit design, priority setting, data collection, analysis, training, process improvement issue identification, and facilitation of feedback (see sidebar). Without a central office to do this work, the concerted effort required to do the challenging work of QMS will likely not occur.

4.6.2 Overall Roles and Responsibilities

Manager Team. Recommended for 2016 is a deliberate and formal shift in the role and duties of the three managers that entails offloading current scheduling and coordination duties to Permit Specialist and (the new) Permit Leader Supervisors. Managers will then shift to be accountable for working closely with the newly structured QMS/CRIQ team as ‘facilitators’ to ensure that identified issues (policy, production, process, training) are resolved in a timely manner. As such, they would assure that the ‘program’ of quality (audits, process improvements, and training) remains an active and important part of supervisor’s attention, without adverse effect to production. In this role, managers would be an essential resource to the Strategic Advisor (SA) managed process, helping to set reasonable priorities, understanding resource constraints, customer and staff needs, and being an integral part of the QMS planning (see role and responsibilities diagram, top of next page).

Managers would continue their current HR duties supporting ES Supervisors, and take an active role in supporting resource (staff) planning and facility management. The biggest shift for managers is greater clarity in their role in guiding the implementation of process and technical improvements, ensuring good resource management practices to support training, and supporting planning to accomplish quality goals.

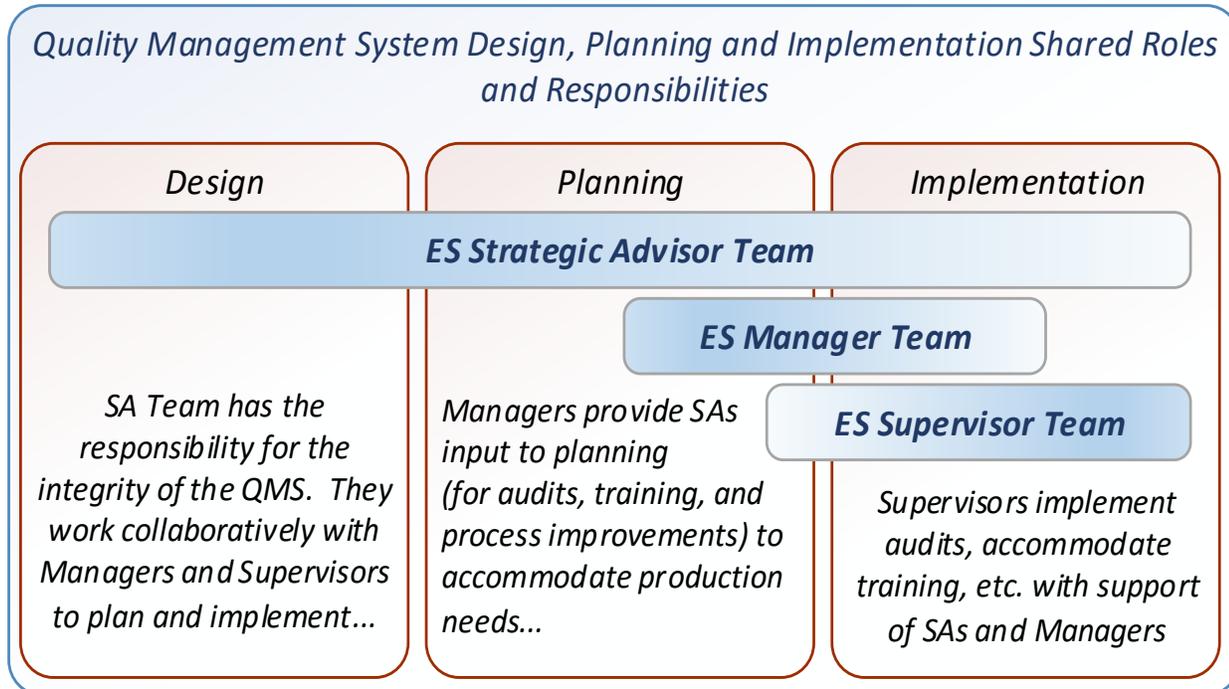
Strategic Advisor Team would continue their focus on the technical integrity of the Quality Management System, specifically overseeing the Design (*what do we want to accomplish?*), Planning (*How much and when will we do it?*) and Implementation (*who does it, and how?*) aspects of the QMS to include:

- A formal audit program plan using lessons learned from pilot studies done in 2015,
- A standardized training plan for Engineering Services (ES) that includes and/or updates:
 - On-boarding plan for new (probationary) staff, by review specialty
 - 3-year development on-boarding by review specialty

Project or Program Management Organizations may take other functions beyond standards and methodology, and participate in Strategic project management either as facilitator or actively as owner of the process. Tasks may include monitoring and reporting on active projects (following up project until completion), and reporting progress to top management for strategic decisions on what projects to continue or cancel.

The degree of control and influence that PMOs have on projects depend on the type of PMO structure within the enterprise; it can be:

- Supportive, with a consultative role
 - Controlling, by requiring compliance for example
 - Directive, by taking control and managing the projects
-



- IBC (and other regulation) code update cycle (develop standard training practices)
 - Policy and protocols for developing in-house training
 - Policy and protocols for purchase and modification of external training
 - Tracking and monitoring training policies; quality, quantity, auditing, etc.
 - Certifications and licenses, testing, and required tracking
- Creation of quality dashboards that reflect useful audit program metrics; e.g.:
 - Production triggers that prompt audits and subsequent audit findings, such as Report of CP cycles by project type followed by audits of projects with high CP cycles with findings report. Projects that significantly exceed (e.g. over 25 percent) IP actual to IP estimate by project type, followed by audits of these specific reviews with findings report. Outcomes expected may be process improvements, feedback loops, or targeted training.
 - Single issue audits that sample a large selection of plans of many types, auditing for quality of review on a single high value issue (e.g., exiting) with a findings report and staff feedback session.
 - Correction letter audits (blind as to author) done by review group on a regular basis with numerical score that can be used as an ongoing score for quality of communication both by group and for ES.
 - Inspectability audits that identify and promote dialog between plan review groups and inspection groups, identifying standard criteria to be audited for projects post issuance (an audit of the approved plans).

Supervisor Team. As mentioned previously, the recommendation is to create a supervisory position for the Permit Leaders, and to use the Permit Specialist Supervisory position as well to assume some of the current scheduling and administrative tasks Managers have carried over from their past supervisory roles. Additionally, as Accela comes on line, it is recommended that the department pay particular attention to the development of dashboards and production reports that are specifically and uniquely useful to Supervisors to improve and monitor quality, so that roles Managers and individual Supervisors have filled in the past to 'create' weekly production reports, will now be easily generated daily by every Supervisor. Those production details should also yield more specific detail, more forecasting information, and be more timely.

As well, the Supervisors will benefit from a more formal training plan for their staff, a process improvement strategy as appropriate, and an audit program that provides the ability to gain insight when quality and consistency need attention. Managers will be supportive in facilitating resolution of issues (policy, technical, and process) in addition to providing HR support. Strategic Advisors will be designing and delivering high quality technical and training programs with the support of the management team.

4.6.3 Staffing

The audit pilot work has demonstrated that an additional two technical and one administrative FTE of resource should be dedicated to developing and managing the QMS going forward. The recommendation for how these resources would be used follows:

- Both FTEs would be Strategic Advisors working with the CRIQ technical support group, focused on advancing the QMS as a formal program, building disciplined, sustainable business practices with regular, reliable metrics.
- One FTE would be primarily dedicated to the continued development of the audit plan (design, implementation, data management and quality control)
- One FTE would be primarily dedicated to QMS process quality, particularly as it affects plan review. This work would also include the design of an ES training plan, and identifying process improvements that enhance the QMS, from intake through issuance. Such improvements might include design of improved feedback loops, improved partnerships between workgroups, specific data collection and dialog between workgroups, or cross training. Additionally, supporting the work of FPR improvements, developments and training.
- Additionally, administrative support is needed to support all of ES to be used for scheduling training rooms, copying training materials, ordering books and materials, and other administrative tasks that are significantly time consuming for this program.
- Other ancillary staffing concerns identified during the SIPOC and Audit pilot work include the need for a Site Inspector Supervisor. This need might be addressed by a Strategic Advisor who is a technical resource for the Drainage supervisor - possibly someone from Seattle Public Utilities. Some chartering work will be needed to avoid problems with unclear role and responsibilities for such a position.
- Finally, there is a potential staffing gap in providing Strategic Advisor support responsible for quality and training for inspections in general, or perhaps for building inspection only.

4.7 MEASURES AND METRICS

A recommended list of metrics, as provided in the Conclusion section would necessarily be narrowed and targeted to a list of those that would be most useful and could be sustained by the organizations data systems. Work in 2016 will continue to refine the selection and testing of metrics that are useful for external publication versus internal management.

As noted previously, the definitions of ‘good’ plan review quality are, and likely will remain, somewhat subjective. Given this, more qualitative versus quantitative tools are recommended to gain insights about the range of performance, both individually and collectively. For quantitative and qualitative data collection programs, a similar program design construct is recommended (see next page).

For the work conducted in 2015, the following basic construct was useful to guide the work plan. For 2016, building an audit program will contain at least the following major program elements.

Define the Quality Program. Much of this work has been done in 2015, however, moving forward, the ‘defining work’ will continue to be a necessary part of the program as the environment of DPD changes. Every budget cycle, political change, regulatory and technology shift will pose nuances that reframe the basic business need, business context, and the impacted groups (stakeholders) affected by the QMS. As well the potential reasons for the QMS and the timelines for action will need to be adjusted – either more aggressively or more modestly – in response to all these factors.

Additionally, the practical tools that manage the real-time defining of a program, such as a communication and outreach plan that work effectively internally and externally, must be well-developed and actively managed. A risk and mitigation plan that proactively identifies current and emerging issues, threats and opportunities for the program and merges these into program, communication and outreach planning is also needed as part of this definition and planning work.

In short, this is a substantial investment, and reflective of the importance of a successful and relevant program.

Program Plan. Creating a useful Program Plan means having both effective planning process and planning product. The products of this program plan include: goals, objectives, clear hypotheses, clear and useful data for the planning process, a clear methodology – e.g., audit types – and scenarios that assure sustainability, measures of success, and so forth. Additionally, a good plan defines a process that is inclusive, endorsed, engages those that are most affected by its content, and has some means to validate its process.

Finally, for this specific Project Plan, we anticipate it should include project elements such as 1) training auditors, 2) how to manage “blind” audit selections and provide meaningful feedback, 3) audit data collection, 4) audit data validation, 5) audit analysis and trending, 6) data record management, and 7) feedback.

These sub-elements of the Audit Program Plan are developed such that the Program creates sustainable protocols that are well supported by the DPD culture, and facilitate how DPD expects to conduct and manage its quality management system at both a constrained and expanded level. This methodology would describe rules of engagement with staff, kinds and types of tools used to measure quality, and would share lessons-learned – positive and negative – from past experiences. Some, but not all, these protocols would include a tool kit of audit types appropriate to gain insight or address specific questions from stakeholders (managers, partners, customers, etc.), to include:

- Reviewing patterns – of missings, issues, regulatory concerns, or priorities, etc. -- and look for the unusual
- Prove hypothesis; e.g., training effectiveness, quality of review or communication, inspection, getting the ‘big rocks,’ or connection between communication and CP cycles, etc.
- Quantify and qualify impact of findings – such as connection between CPA and IP performance/CP cycles, etc.

Finally, both publishing and facilitating meaningful discussion of findings from these designed audits is an essential step after analysis before developing recommendations. These stakeholder/auditor/supervisor/staff conversations enable the necessary process of editing originally hypotheses, questioning the viability of draft findings, and generating viable and actionable recommendations. Through this process, the QMS builds credibility and cultural significance.

Documentation of this work, while time consuming, is necessary to capture these valuable lessons-learned for future best practices.

Optional Support: To ensure ongoing support of the work described in this report and to facilitate a seamless transition to the recommended dedicated staff that will assume responsibility for the QMS in 2016, DPD could continue the Audit Program and Training Plan with consultant labor the first half of 2016 (see timeline for options). The goal and approach would require the consultant – Demarche --- to function as a facilitator, leading the supervisors and SMEs through next steps to refine specific elements of the Audit toolkit, Audit protocols, and auditing schedule for 2016. All this work would then be a hand-off to the strategic advisor hired in 1st or 2nd quarter 2016.

As well, an option is also to have Demarche complete an inventory of training assets, conduct a needs assessment, develop a draft training plan and structure that aligns to the audit program. This work would continue into the 3rd quarter of 2016 and also be transferred to a strategic quality advisor at DPD to become part of the final formal training plan for Engineering Services.

4.8 SUMMARY

In closing, the 2015 Quality Project for plan review has shown that a) audits are the best way to assess the quality of plan review and should be further developed and implemented going forward, that b) the follow-up to audits is hard but important work, and that c) processes and process improvements significantly impact the quality of plan review. The lessons learned in this project will be valuable in improving and expanding DPD Engineering Services' Quality Management System.



5 LIST OF APPENDICES

5.1 APPENDIX: EXISTING QUALITY PROGRAM EFFORTS AND STANDARDS: DPD QMS PROJECT

This report is an inventory of the current QMS practices identified in 2015 in place in Engineering Services, primarily focused on quality of plan review.

5.2 APPENDIX: CURRENT PROCESS OVERVIEW-SIPOC MAPS: DPD QMS PROJECT

This report is a summary and detailed notes and maps from 11 workshops held with subject matter experts representing the major process framework of plan review at DPD.

5.3 APPENDIX: THEMATIC ANALYSIS REPORT OF INTERVIEWS: DPD QMS PROJECT

This report contains a summary analysis of interviews conducted with the leadership team of the Engineering Services Division.

5.4 APPENDIX: ANALYSIS REPORT OF STAFF SURVEY: DPD QMS PROJECT

This report contains the analysis of the survey of Engineering Services staff designed to confirm and qualify the definitions of quality as applied to plan review.

5.5 APPENDIX: DPD QMS METRIC DESIGN AND DPD QMS MEASURES AUDIT PILOT PROJECT REPORT

This report contains the findings and lessons-learned from the audit pilot projects conducted in 2015.

5.6 APPENDIX: SPECIAL INSPECTION SPREADSHEET

This document is an excel spreadsheet that contains an 'issue list' of special inspections differences between inspections and plan review that were captured by inspections staff, reviewed and discussed by plan review Supervisors and the CRIQ team during 2015.

5.7 APPENDIX: INSPECTABILITY AUDIT DOCUMENTS

This appendix contains three documents that capture the follow up work done after completion of the Inspectability audit. First is the record of a meeting between the inspection auditors, their supervisor and the CRIQ team project managers. Second is the copy of the audit check list used by the inspectors to record and score their findings. The final document is a table of the Inspectability audit issues that require follow-up work.

5.8 APPENDIX: PLAN REVIEW AND CORRECTION LETTER AUDIT DOCUMENTS

This appendix contains documents that capture the follow up work done after completion of the Plan Review and Correction Letter Audits. It also includes a developing 'Audit Tool kit' which is a list of potential audit types and approaches.

5.9 APPENDIX: CUSTOMER FEEDBACK DPD QMS PROJECT

This appendix contains the response data from the customers invited to provide feedback on the quality of plan review in the categories of pre application, correction letter quality, plan review quality, and customer service.

