

[Building Owner] with an office at [address] (the “client”) and [Company] with an office at [address] (the “commissioning provider” or “retro-commissioning provider”) to perform work at [Property] at [address] (the “property” or “building”).

Sample Scope of Work: Existing Building Commissioning / Retro-Commissioning

Background

This sample scope of work is intended for use by properties seeking to improve building performance through retro-commissioning, also known as existing building commissioning. The scope of work provides a foundation to define retro-commissioning activities and roles and responsibilities at the property. It should be adapted as appropriate to capture client priorities and property-specific conditions.

Phase 1 consists of Tasks 1 and 2 and should be priced by prospective retro-commissioning providers at the outset of the project. Phase 2 consists of Tasks 3 and 4 and should be priced following delivery of the preliminary retro-commissioning report so that the specific scope items and implementation activities are aligned.

This scope of work is based on ASHRAE Guideline 0.2 Commissioning Process for Existing Systems and Assemblies and ASHRAE Standard 202 Commissioning Process for Buildings and Systems. The process described herein is intended for general use. While it can help a building meet Building Energy Performance Standards (BEPS) compliance by effectively reducing energy usage and improving ENERGY STAR score, it does not guarantee compliance with the BEPS Prescriptive Pathway retro-commissioning option.

Explanatory notes are included for reference. These notes are italicized throughout and can be deleted in the RFP.

Roles and responsibilities

The retro-commissioning provider will complete the following tasks in collaboration with building staff to implement a retro-commissioning process at the subject building. The systems and equipment to be commissioned and included in the retro-commissioning scope are indicated in Table 1. *Typically, retro-commissioning focuses on major energy using systems like heating, ventilation, and air-conditioning systems, service hot water systems, water-pumping systems, and lighting systems.*

Items listed as deliverables are the responsibility of the commissioning provider to provide.

The client is responsible for participating in the retro-commissioning process, providing access to the building and building systems, and making building documentation available. The value and effectiveness of the retro-commissioning process is a function of the engagement of the building’s day-to-day operations team.

Responsibilities can be shifted between the retro-commissioning provider and building operators as needed to account for the specific conditions at a given building.

A Note on Retro-commissioning Provider Qualifications

The commissioning provider’s technical field staff should have an expert understanding of building systems and equipment. The provider’s point person supervising or conducting the work should carry a commissioning or retro-commissioning credential and have training and experience performing retro-commissioning tasks.

The [Department of Energy and the Environment has identified](#) the following acceptable credentials for retro-commissioning professionals:

- MEP Professional Engineer – Any State Licensing Department
- Building Operator Certification (BOC) Level II
- Certified Energy Manager (CEM)
- Minimum Qualifications to be an Approved Commissioning Agent through DOB

The [Department of Buildings has identified a variety of certifications](#) that qualify an individual to provide commissioning services and maintain a list of approved agencies. The qualifying certifications include: Building Commissioning Association’s Certified Commissioning Professional (CCP), ASHRAE’s Commissioning Process Management Professional (CPMP), ASHRAE’s Building Commissioning Professional (BCxP), ACG’s Commissioning Authority (CxA), NEBB’s Building Systems Commissioning (BSC), AEE’s Certified building Commissioning Professional (CBCP), UW’s Commissioning Process Manager (CxM), UW’s Commissioning Process Authority Professional (CxAP or CAP), and UW’s Green Commissioning Process Provider.

Example Building – 123 Main Street: Systems to be Commissioned

The following table is provided as an example. A similar table should be included in the scope of work for retro-commissioning services so that the client and commissioning provider both agree on what systems and equipment are included in the retro-commissioning process. The systems to be commissioned table also establishes sampling rates, which are typically applied to terminal equipment. The example building is a class-A office building with central station air handlers serving fan-powered VAV terminal units with electric heat.

Table 1 Systems to be commissioned list

SYSTEMS TO BE COMMISSIONED	# TOTAL	SAMPLING RATE ¹
Heating, Ventilating and Air Conditioning Systems¹		
BMS	1	100%
Chilled water plant	1	100%
Central station air handling units	2	100%
Exhaust fans	4	100%
VAV terminal units	217	5%
Garage ventilation	1	100%
Electrical		
Tenant Lighting Control Systems ²	n/a	10%
¹ If economizer modes cannot be tested owing to weather conditions, defer these specific tests and schedule a workable time with the client. For two-pipe, dual-temperature systems, seasonal testing will need to be scheduled. ² The scope of testing for tenant lighting control systems is limited to verifying schedule operation and schedule hours.		

Phase 1: Planning and Investigation

Task 1: Planning

During the planning stage, the commissioning provider becomes familiar with the building and develops a detailed, customized plan for conducting functional tests and making other observations during the Investigation Phase of the retro-commissioning process.

At the start of the project, commissioning provider will:

1. Facilitate a kickoff meeting for the retro-commissioning project on-site with property management, building operators, key ongoing service providers, and other stakeholders identified by the client. The purpose of this meeting is to review roles and responsibilities, identify a site representative, schedule testing activities, and review current facilities requirements.
2. Review of building operating documents provided by client including:
 - a. Energy benchmarking report from the last 12 months.
 - b. As-built drawings and sequences including all available mechanical, electrical, and plumbing drawings for the facility.
 - c. Stack plans, space utilization plans, or other documents that show a breakdown of floor area by space use type.

- d. Preventive maintenance records and access to the computerized maintenance management system (CCMS).
- e. Current capital and financial plan including planned improvements.
- f. Relevant engineering studies completed at the property in the last five years.
- g. Original commissioning report if available.
- h. Existing Current Facilities Requirements (CFR) if available.

The client is responsible for providing documentation listed above for the retro-commissioning provider to review. It is recommended that the scope be customized to account for available documentation. The list provided here is a typical example. None of those documents are essential to the retro-commissioning process, but missing documentation like an energy benchmark or drawings may require additional time and fees to develop a successful retro-commissioning process.

3. Develop a Current Facilities Requirements (CFR) document. The CFR will include the building operating schedule, space temperature and humidity requirements, ventilation requirements, energy performance goals, maintenance schedule, list of required operator training, and other requirements applicable to the facility. *Any facility-specific requirements should be identified in the scope of work.*
4. Develop Retro-Commissioning Plan. The plan will define the commissioning team and describe, in detail, the retro-commissioning process. The retro-commissioning plan will identify the systems and equipment to be tested and sample rates for installation verification and functional testing for each system. In addition, the retro-commissioning plan will include roles and responsibilities for the commissioning team, project schedule details, and recommended trend data logs. The systems to be retro-commissioned will include those identified in the table above.
5. Conduct installation verification site visit(s). The purpose of this field work is for the retro-commissioning provider to assess the condition, location, control points, and other quality aspects of the systems and equipment to be commissioned. Nameplate data for prime movers will also be collected. The retro-commissioning provider will document installation verification site visits by creating a checklist and completing a checklist. Trend data collection capabilities of the BMS will be assessed during initial installation verification site visit by the retro-commissioning provider.

If the retro-commissioning provider is already familiar with the facility, this step can be skipped, and the applicable sections of the installation verification checklists included as part of the functional performance test procedures developed in the next sub-task.

6. Develop functional performance test (FPTs) procedures based on CFR, equipment documentation, observations made during the installation verification site visit, and industry best practices. The intent of the test procedures is to document equipment operation, identify opportunities to improve performance, and identify equipment that is not functioning as expected.

Site visits and meetings:

- One kickoff meeting on-site
- Installation verification site visit(s). *The number and duration of the initial site visits will depend on the quantity and complexity of the systems to be commissioned.*

Deliverables:

- Kickoff meeting agenda and minutes
- Current Facilities Requirements document
- Retro-Commissioning Plan
- Completed installation verification checklists
- Functional performance test procedures

Task 2: Investigation

During the investigation phase, commissioning provider will:

1. Conduct functional performance tests in coordination with the property manager and on-site facilities staff.

The client's site representative will be responsible for coordinating access to the building and must be intimately familiar with the buildings' heating, ventilation, air conditioning, lighting, domestic hot water, and controls systems. The site representative must always accompany the retro-commissioning provider on site. The site representative will provide access to all mechanical and back of house spaces, a sample of tenant spaces and the building's energy management system.

2. Review trend data for major energy using systems. The trend review will identify potential opportunities to improve energy efficiency, reliability, thermal comfort, or other aspects of building system performance. Typical trend reviews look for schedule adherence, set points, simultaneous heating and cooling, valves leaking by, ventilation system operation, and economizer performance.

Some buildings do not have direct digital control (DDC) systems. Some buildings with DDC systems do not have trend definitions setup. If a building has a DDC system but no trend data history or archive, then setting up best practice trend logs is recommended. If a building has no DDC system, spot metering or temperature and humidity logging may be necessary. The scope to setup spot metering and data logging should be included here instead of trend review.

3. Maintain issues log. The issues log will include a variety of items where action may be recommended. Each issue should include a description, an identification of the equipment and systems involved, a recommendation to resolve the issue, and an indication of relative priority.
4. For issues identified, develop specific retro-commissioning measures including: recommended action, opinion of probable cost, and estimate value of energy and non-energy benefits.

Note that there is often a many to one relationship between issues and retro-commissioning measures. For example, an issue might be an observation of a pump variable frequency drive (VFD) operating in hand. There may be multiple instances of pump VFDs operating in this way. The retro-commissioning measure might be: implement a daily check of pump VFDs or implement a sequence in the building management system that throws an alarm if VFDs are being operated in hand for more than one hour.

5. Document findings in a preliminary retro-commissioning report. The preliminary report will include current facilities requirements, installation verification records, test results, the issues log, and corrective measure recommendations. *For buildings following the BEPS prescriptive pathway, that submitted an energy audit to DOE and received a retro-commissioning notification, use the DC reporting template provided. This is not applicable for most users of this SOW.*
6. Facilitate a meeting to present preliminary retro-commissioning report and present corrective action recommendations to the client and project team.

Site visits and meetings:

- 4 to 8 person-days of functional testing per building is typical. If large terminal unit samples are desired, additional functional testing will be required. *Commissioning provider to provide estimated number of days with proposal for inclusion in the final scope of work.*
- One meeting to present preliminary retro-commissioning report and corrective action/retro-commissioning measures.

Deliverables:

- Functional performance test results
- Retro-commissioning issues log
- Retro-commissioning measures list
- Preliminary retro-commissioning report

Phase 2: Implementation and Turnover

Phase 2 should be priced following completion of Phase 1 and delivery of the preliminary retro-commissioning report so that the specific scope items and implementation activities are aligned.

The scope of consultant support during implementation and turnover is highly dependent on the complexity of the measures being proposed for implementation and the project management and execution interest and capabilities of the client. The scope could range from turnkey implementation where the commissioning provider manages the process with the contractor on one end, to a collaborative implementation approach where activities are divided among building staff, commissioning provider, incumbent controls provider, and additional contractors may be involved to implement more significant, hard-ware dependent type measures.

Task 3: Implementation

What is presented here are typical implementation activities to consider including in a scope of work for a retro-commissioning provider. This task should be adjusted accordingly including defining roles and responsibilities.

1. Update Retro-Commissioning Plan to include specific implementation phase activities, an updated schedule, the list of measures selected for implementation, and the roles and responsibilities of the client, the commissioning provider, and other stakeholders.

2. Scope of work and request for proposal development for measure packages. Scopes should identify the roles and responsibilities of installing contractors, identify any design or design-build requirements, schedule, and provide enough information about the building for potential bidders to develop proposals.
3. Bid facilitation. Identify prospective bidders. Facilitate site walks and pre-bid requests for information. Collect and level bids on behalf of the client. Assist building management with selecting a bidder and negotiating scope.
4. Construction oversight. Conduct periodic meetings, site inspections, and conference calls as part of the implementation project. Alongside the engineer of record, if applicable, review and approve submittals and shop drawings.
5. Functional testing of measures implemented. Conduct tests, document findings, and work with installing contractor to correct deficiencies identified.
6. Implementation phase retro-commissioning report documenting the work completed during the implementation phase.

Site visits and meetings:

Meetings and site visits will vary depending on the measure being implemented and the implementation assistance required. Here are some examples:

- 2 pre-bid site walks with potential implementation vendors/contractors
- Implementation progress meetings and conference calls
- Implementation progress site inspections
- 3 to 6 person-days of functional testing
- 1 person-day of verification

Deliverables:

Deliverables provided by the commissioning provider will vary depending on the scope of work ultimately identified in this Task. Here are some examples:

- Updated Retro-Commissioning Plan
- Bid reviews to client
- Site inspection reports
- Functional performance test results
- Updated retro-commissioning issues log including findings from implementation
- Implementation phase retro-commissioning report

Task 4: Turnover

The specific content and associated level of effort in the turnover phase is a function of the measures selected for implementation and should be adjusted accordingly, including meetings, site visits, and deliverables.

During turnover, commissioning provider will provide the following:

2. Training – the retro-commissioning provider will provide and document training on new and modified systems. The training will include a review of the concept of operations for new and modified systems, a review of the systems manual with operations and maintenance staff, and a review and demonstration of any new or changed preventive maintenance procedures. The training will be video recorded, and handouts, manuals, and logs added to the facility’s system manual.
3. Systems manual – the retro-commissioning provider will assemble a systems manual for the building including:
 - a. As-built drawings and construction records like shop drawings and product data.
 - b. Sequences of operation.
 - c. Set points.
 - d. Schedules.
 - e. Equipment manuals.
 - f. Equipment and system test records (e.g. testing, adjusting, balancing (TAB), infrared (IR) scans, water quality reports, etc.).
 - g. template test procedures for future use.
 - h. Maintenance schedules and procedures.
 - i. Commissioning records from tenant improvements and refits.
 - j. Contact information for contractors and service providers.

ASHRAE Guideline 1.4-2019 provides a detailed procedure for developing systems manuals and a comprehensive list of appropriate contents. The list presented here is an example. This should be modified to suit your building. If a well-organized set of operating plans and documentation is available, then the scope should be to update the existing documentation with changes resulting from the retro-commissioning process. If no or a small quantity documentation is readily available, then the scope should be to assemble a new systems manual.

The client is responsible for providing documentation for inclusion in the systems manual. The retro-commissioning provider is responsible for collecting and

organizing system manual components and making an electronic copy of the system manual available to the project team.

4. Ongoing commissioning plan – develop and provide the client with a plan to ensure that performance improvements realized from the retro-commissioning process persist over time. The ongoing commissioning plan will identify roles and responsibilities, key performance indicators, how data will be collected, and a corrective action process.

ASHRAE Guideline 0.2-2015 includes Informative Annex N – Ongoing Commissioning and provides more detailed information on the detailed steps and purpose of ongoing commissioning. The purpose of this subtask is for the commissioning provider to develop an Ongoing Commissioning Plan with the client's feedback. Implementation and further consulting on an ongoing commissioning plan is a separate scope from retro-commissioning.

5. Facilitate a lessons learned workshop to identify and feed forward approaches, activities, and other information to future projects.
6. Final Retro-commissioning report including an updated issues log and comprehensive documentation on the retro-commissioning process.

Site visits and meetings:

- 2 person-days of training on site
- 1 lessons-learned meeting
- 1 final retro-commissioning report review meeting

Deliverables:

- Training sign-in sheets, agendas, and recordings
- Systems manual
- Updated retro-commissioning issues log
- Final retro-commissioning report including lessons learned meeting read-out, updated retro-commissioning issues log, and list of implemented retro-commissioning measures.

Project Schedule

A project schedule should be included as part of an agreement for services. The schedule could be prescribed by the client and included in the scope of work or proposed by the commissioning provider. A typical duration for the planning and investigation phase (phase 1) of the retro-commissioning process should be 12 to 16

weeks. The schedule for implementation and turnover (phase 2) will be a function of the measures selected for implementation, the client's goals, and building-specific factors and an example for phase 2 is not listed here.

Example schedule for Phase 1, to be provided by retro-commissioning provider:

- Notice to proceed (NTP) + 3 weeks – Planning phase/kickoff meeting
- NTP + 6 weeks – Functional testing, updated issues log
- NTP + 8 weeks – Complete trend review, updated issues log
- NTP + 12 weeks – Preliminary retro-commissioning report
- NTP + 13 weeks – Meeting to present retro-commissioning findings and discuss next steps

If economizer sequences cannot be tested during the weather conditions at the time of functional testing, then economizer tests will be deferred until conditions allow.

For two-pipe, dual temperature buildings, seasonal testing will be scheduled to conduct functional tests of cooling operation in the cooling season and functional tests of heating operation in the heating system.