DESIGN & CONSTRUCTION PHASE
COMMISSIONING PLAN
TEMPLATE

Based upon B3 Minnesota Sustainable Building Guidelines—VERSION 2.1

Notes to the reader have been added to this document within numerous “text boxes” such as this. These “text boxes” contain references to supporting documentation, suggestions, and/or instructions pertaining to the Commissioning Plan Template.

Please delete these “text boxes” when they are no longer needed.
# TABLE OF CONTENTS

1 INTRODUCTION .................................................................................................................. 3

2 COMMISSIONING TEAM MEMBERS ................................................................................. 4

3 SYSTEMS-TO-BE-COMMISSIONED .................................................................................. 5

3.1 Systems-to-be-Commissioned ......................................................................................... 5

4 COMMISSIONING PROCESS NARRATIVES ...................................................................... 7

4.1 GENERAL COMMISSIONING ACTIVITIES ....................................................................... 7

4.1.1 Commissioning Reports (1.02): .............................................................................. 7

4.1.2 Submit Outcome Documentation (1.03): ................................................................. 8

4.2 SYSTEMS COMMISSIONING ACTIVITIES ...................................................................... 8

4.2.1 AGENCY PLANNING .............................................................................................. 8

4.2.2 PRE-DESIGN – PROGRAMMING .......................................................................... 8

4.2.3 PRE-DESIGN – SITE SELECTION ......................................................................... 8

4.2.4 SCHEMATIC DESIGN ........................................................................................... 9

4.2.5 DESIGN DEVELOPMENT ..................................................................................... 10

4.2.6 CONSTRUCTION DOCUMENTS ............................................................................. 10

4.2.7 CONSTRUCTION .................................................................................................. 11

4.2.8 CORRECTION PERIOD ....................................................................................... 12

4.2.9 ON-GOING OPERATIONS .................................................................................... 12

4.3 CONSTRUCTION AIR QUALITY MANAGEMENT PLAN ...................................................... 12

4.4 CORRECTION PERIOD AIR QUALITY MANAGEMENT PLAN ......................................... 12

4.5 CONSTRUCTION WASTE MANAGEMENT PLAN ........................................................... 12

4.6 ROLES AND RESPONSIBILITIES .................................................................................. 13

4.6.1 GENERAL COMMISSIONING ACTIVITIES ............................................................... 14

4.6.2 AGENCY PLANNING ............................................................................................ 16

4.6.3 PRE-DESIGN/PROGRAMMING ......................................................................... 16

4.6.4 PRE-DESIGN/SITE SELECTION ......................................................................... 17

4.6.5 SCHEMATIC DESIGN PHASE ............................................................................ 17

4.6.6 DESIGN DEVELOPMENT .................................................................................... 19

4.6.7 CONSTRUCTION DOCUMENTS ........................................................................... 20

4.6.8 CONSTRUCTION .................................................................................................. 22

4.6.9 CORRECTION PERIOD ....................................................................................... 26

4.6.10 ON-GOING OPERATIONS ............................................................................... 28

4.6.11 CONSTRUCTION AIR QUALITY MANAGEMENT PLAN ......................................... 28

4.6.12 CORRECTION PERIOD AIR QUALITY MANAGEMENT PLAN ............................... 28

4.6.13 CONSTRUCTION WASTE MANAGEMENT PLAN .................................................... 29

5 SUPPORTING COMMISSIONING DOCUMENTATION ......................................................... 30

5.1 B3-MSBG Tracking Tool (www.msbgtracking.com) ....................................................... 30

5.2 Appendix P-1 Suggested Implementation for All Performance Management Guidelines .... 30

5.3 Appendix P-4 Design and Construction Commissioning Supporting Information .......... 30

5.4 Appendix P-5 Design and Construction Commissioning Matrix .................................. 30
1 INTRODUCTION

Design and Construction Commissioning refers to the process that shall begin in schematic design and conclude after the correction period or after completion of a full year of operation, whichever is later.

The Design and Construction Commissioning Process is the means to verify and document that the facility systems operate in accordance with their design intent and that the operations staff fully understands the system operational procedures and are prepared to continue operating the system per the design intent. This includes documenting system operational goals and design parameters, specifying verification and testing in the contract documents, confirming the successful completion of the verification process, documenting the system operational procedures and training the operations staff. The Design and Construction Commissioning Process is coordinated by the Commissioning Leader and executed by the Commissioning Team.

The goals of the Design and Construction Plan are to define the:

1) Systems-to-be-Commissioned
2) Commissioning activities and documentation
3) Scheduling parameters
4) Acceptance criteria
5) Roles and responsibilities of the Commissioning Team members

Add:

6) Construction Air Quality Management Plan
7) Correction Period Air Quality Management Plan
8) Construction Waste Management Plan
9) Correction Period User Comfort and Satisfaction Assessment Plan

The Design and Construction Commissioning Plan is a living document that grows in detail over time, as systems are specified and design details are refined. The following is a description of how the Design and Construction Commissioning Plan shall evolve over the course of the project.
## 2 COMMISSIONING TEAM MEMBERS

<table>
<thead>
<tr>
<th>Role</th>
<th>Company</th>
<th>Title</th>
<th>Name</th>
<th>Phone Number</th>
<th>E-mail Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commissioning Leader</td>
<td></td>
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<td>(XXX) XXX-XXXX</td>
<td></td>
</tr>
<tr>
<td>Facilities Operations Manager (FOM)</td>
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<td></td>
<td>(XXX) XXX-XXXX</td>
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<tr>
<td>Project Manager</td>
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<td>(XXX) XXX-XXXX</td>
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<td>Designers</td>
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<td>(XXX) XXX-XXXX</td>
<td>(XXX) XXX-XXXX</td>
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<tr>
<td>Contractors</td>
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<td>(XXX) XXX-XXXX</td>
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<tr>
<td>Guideline Leader</td>
<td></td>
<td></td>
<td></td>
<td>(XXX) XXX-XXXX</td>
<td></td>
</tr>
</tbody>
</table>

*Please insert the project team contact information (e.g. Company, Title, Name, Phone Number, and E-mail).*
3 SYSTEMS-TO-BE-COMMISSIONED

Please substitute the X's with all the relevant systems-to-be commissioned

3.1 Systems-to-be-Commissioned:

1) Mechanical HVAC System (including Testing, Adjusting, and Balancing)
   a) X
   b) X
   c) X
   d) ...

2) Energy
   a) X
   b) X
   c) X
   d) ...

3) Renewable Energy Systems
   a) X
   b) X
   c) X
   d) ...


4) Power and Electrical Systems
   a) X
   b) X
   c) X
   d) ...


5) Lighting and Daylighting Controls
   a) X
   b) X
   c) X
   d) ...

6) Indoor Air Quality Elements and Systems
   a) X
   b) X
   c) X
   d) ...


7) See Appendix P-4 for more details on requirements under Design and Construction Commissioning Plan
Modify the Systems-to-be-Commissioned List to be project-specific. For example:

1) Mechanical HVAC System
   a) Air Handling System
   b) Chilled Water System
   c) Heating Hot Water System
   d) Domestic Hot Water System
   e) ...
2) Renewable Energy System
   a) Photovoltaic System
   b) ...
3) Power and Electrical System
   a) Normal Power Distribution System
   b) Emergency Power System
   c) ...
4) Lighting and Daylighting System
   a) Lighting Control System
   b) ...
5) Indoor Air Quality Elements and System
   a) ...
6) ...

This list of the systems-to-be-commissioned should be modified to accommodate the project-specific systems. Refer to Appendix P-4 for more details on requirements under Design and Construction Commissioning Plan.

RECOMMENDED SYSTEMS-TO-BE-COMMISSIONED:

1) Plumbing Systems: In addition to required flow rate commissioning above as needed to support operational achievement of guidelines: S.7, S.8, S.13
2) Interior materials (specification, installation): As needed to support operational achievement of guidelines: I.2, M.1, M.2
3) Envelope integrity: In addition to required water infiltration commissioning above as needed to support operational achievement of guidelines: I.3, M.1, M.2
4) IEQ: Vibrations/acoustics/noise: In addition to occupant surveys above, perform physical measurements as needed to support operational achievement of guidelines: I.7, I.8
5) Plumbing Systems: Flow Rate
6) Envelope Integrity: Test Building Envelope for Water Infiltration
4 COMMISSIONING PROCESS NARRATIVES

The following section defines the General Commissioning Activities, System Commissioning Activities (in chronological order from Agency Planning to On-Going Operations), and the roles & responsibilities of the various team members.

4.1 GENERAL COMMISSIONING ACTIVITIES

The following are common or general Commissioning activities that occur throughout the Project Phase from Agency Planning to the Correction Period.

The numbers captured enclosed within parentheses (e.g. 1.01) refer to the task number found in Appendix P-5: Design and Construction Commissioning Matrix.

Design & Construction Phase Commissioning Plan (1.01):
The Commissioning Plan is a document that outlines the Commissioning Process and its related activities, the roles & responsibilities of the Commissioning Team, and Commissioning-related requirements. Throughout the project phase, the Commissioning Plan is updated to reflect changes in the Design Intent Document. Criteria that could not be met, summation of the associated events, impacts to the Design Intent Document, and the resulting Design Intent Document modifications should be documented.

4.1.1 Commissioning Reports (1.02):
Commissioning Reports shall be prepared at the end of each phase of design and construction documenting progress in and compliance with the Commissioning Plan for that phase. Each report should include recommendations for adjustments in the Commissioning Plan for the next phase. Starting with the Pre-Design Phase and going through the Construction Documents Phase, the Commissioning Reports should include design review comments documenting the Commissioning Team’s evaluation of the ability of the facility, as defined or described at the Phase, to meet the Design Intent Document criteria. The end-of-Correction Period Commissioning Report shall be the final deliverable of the Design and Construction Commissioning Process. The Report shall state that the Design and Construction Commissioning Plan has been completed and the Design Intent Document criteria have been achieved. If the owner accepts systems that do not meet the Design Intent Document criteria, the Report shall document which deviations were approved by the owner. The report shall also include, but not be limited to, the following:

- Design Intent Document
- Other System Requirements and Parameters
- Specifics of Equipment and Systems Operation
- Test Procedures
- Testing Record
- O&M Training Record
- Commissioning Team Participants
4.1.2 Submit Outcome Documentation (1.03):
Submit documentation as required by the MSBG at the end of each phase of the design and construction process using the online B3-MSBG Tracking Tool (www.msbgtracking.com).

4.2 SYSTEMS COMMISSIONING ACTIVITIES

4.2.1 AGENCY PLANNING
In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during Agency Planning:

Planning Baseline: The Project Manager will work with the Designers to develop broad building-wide expectations and criteria. This becomes the framework for an initial design intent document. Prior to developing the Planning Baseline, the Commissioning Leader can provide the Project Manager with insight as to what to define during these early stages from a commissioning perspective.

4.2.2 PRE-DESIGN - PROGRAMMING
In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during Pre-Design - Programming:

Engage Acting Commissioning Team (2.01): The Acting Commissioning Team is assembled to facilitate and oversee commissioning activities during the Planning and Pre-Design phases of the project. The Acting Commission Team shall include the following members. These team members may or may not be the same people who serve of the Design and Construction Commissioning Team.
- Commissioning Leader
- Facilities Operations Manager (FOM)
- Project Manager
- Guideline Leader
The Commissioning Leader facilitates and coordinates the efforts of the Commissioning Team. For Design and Construction Commissioning, the Commissioning leader shall have a distinct role from the design team but may be employed within a firm providing design services.

The Facility Operations Manager is accountable for facility performance during ongoing occupancy and will manage or perform ongoing operations and maintenance following construction. This person is available to participate throughout the design and construction process for continuity into final operation.

Programming Baseline: The Project Manager will continue to work with Designers to refine the building criteria and expectations. Prior to developing the Programming Baseline, the Commissioning Leader can provide the Project Manager with insight as to what to define during these early stages from a commissioning perspective.

4.2.3 PRE-DESIGN – SITE SELECTION
In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during Pre-Design – Site Selection:

Engage Acting Commissioning Team (2.01): Refer to previous description.
Programming Baseline: The Project Manager will continue to work with Designers to refine the building criteria and expectations. Prior to developing the Programming Baseline, the Commissioning Leader can provide the Project Manager with insight as to what to define during these early stages from a commissioning perspective.

Review Site Alternatives for Ability to Achieve Performance Goals (2.02): Review Site Alternatives for their impact on the ability of the systems being commissioned to achieve their Design Intent criteria.

4.2.4 SCHEMATIC DESIGN
In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during Schematic Design:

Design Baseline: Given the previously developed baselines, the Designer will develop the drawings and specifications which owner’s needs and requirements. The schematic design should include (but not limited to): specifications, site details, landscaping, building exterior envelope, structural, building interior, elevators, plumbing, HVAC, HVAC controls, electrical, fire protection, lighting, electrical power distribution, fire alarm, telecommunications, and service facilities.

Engage Acting Commissioning Team (2.01): Refer to previous description.

Design Intent Document (2.04): The Design Intent Document shall quantify functional performance expectations and parameters for each system to be commissioned. The Design Intent Document provides the common understanding that focuses design, construction, and commissioning activities on the desired outcome. The Design Intent Document shall be written in objective and measurable terms. Quantify parameters such as space temperatures, humidity levels, lighting levels, sound levels, and ventilation rates when applied to the conditioned building spaces. The Design Intent Document shall be updated every time the owner accepts an alternate performance criterion – due to owner desires, schedule, or budget. This might occur through normal design evolution, value engineering, change orders, or other supplemental instructions during construction. During the Correction Period and On-Going Operations, the Design Intent Document helps the owner/operators understand the original design intent. It also provides the benchmark for maintenance, repair, and replacement decisions. The Design Intent Document is developed by the Owner.

Basis of Design (2.05): The Basis of Design is a narrative description of how the systems will be designed in order to achieve the design intent acceptance criteria. The Basis of Design is developed by the Designers.

Commissioning Design Review (2.06): At least once during each of the Schematic Design, Design Development, and Construction Documents Phases, the Commissioning Leader will review the design progress against the goals of the Design Intent Document. Commissioning Design Review comments shall be documented in writing and responses prepared by the Designers.

1) Performance Check: Commissioning Team shall review design as documented to verify that it meets the physical outcomes and operational performance defined at that phase. Performance areas include, but are not limited to:
   a) Design Intent acceptance criteria for all required or additional pursued guidelines
b) Requirements for specific operational scenarios of the building

c) Regular maintenance, cleaning, and servicing (including ISO 14000 cleaning materials)

2) Measurability/Testability Check: Commissioning Team shall review design as documented to verify that it meets criteria for testing and verification of performance for Design and Construction Commissioning as well as Operations Commissioning monitoring during On-going Occupancy. Performance areas include, but are not limited to:

a) Measurements and testing required during all phases of Design and Construction Commissioning.

b) Measurement, monitoring, and control of energy, water, indoor environmental quality during Ongoing Occupancy.

Coordinate with Operations Commissioning Requirements (2.07): Cooperate with the Operations Commissioning Team by incorporating design features required to perform Operations Commissioning. Refer to Guideline P.5 Operations Commissioning for an understanding of what these features might be.

4.2.5 DESIGN DEVELOPMENT

In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during Design Development:

Commissioning Design Review (2.06): Refer to previous description.

Coordinate with Operations Commissioning Requirements (2.07): Refer to previous description.

List of I/O Data Points (2.08): The Designer will submit a list of input and output (I/O) data points as part of outcome documentation before the end of Design Development to the Commissioning Leader. These shall be submitted for all computer-based control systems, e.g., HVAC, lighting controls, etc.

Measurement & Verification Baseline (2.09): The Measurement and Verification Baseline(s) are used to calculate savings as part of the Measurement and Verification Process. See details of Measurement and Verification under Guideline P.5 Operations Commissioning.

4.2.6 CONSTRUCTION DOCUMENTS

In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during Construction Documents development:

Commissioning Design Review (2.06): Refer to previous description.

Coordinate with Operations Commissioning Requirements (2.07): Refer to previous description.

Incorporate Commissioning Criteria & Scope into Construction Documents (2.10): The Designer will incorporate a commissioning specification section into Division 1 of the project manual. The commissioning specification shall define and elaborate on the contractor’s responsibilities as
defined in the Commissioning Plan. Incorporate the Commissioning Plan into the contract
documents by reference in order to communicate the context of the commissioning specification
and information regarding other team member responsibilities. The commissioning specification
will be developed by the Commissioning Leader.

4.2.7 CONSTRUCTION

In conjunction with the general Commissioning activities, the following are specific Commissioning
activities addressed in during Construction:

Coordinate with Operations Commissioning Requirements (2.07): Refer to previous description.

Review Contractors’ Submittals (2.11): The Commissioning Leader will review Contractor’s
submittals for commissioned equipment and other commissioned design elements. These design
reviews include a general quality review, discipline coordination, specification coordination, and
adherence to the design intent.

Verify Installation (2.12): The Contractor will complete customized system installation checklists
prior to acceptance by the owner. The installation checklists will be developed by the
Commissioning Leader and will be included in the Design and Construction Commissioning Plan.

Verify Functional Performance (2.13): The Contractor will complete all of the customized system
functional performance test procedures prior to system acceptance by the owner. The
Commissioning Leader will facilitate the Contractor’s implementation of these tests. The functional
performance test procedures will be developed by the Commissioning Leader and will be included
the Design and Construction Commissioning Plan.

Verify O&M Documentation (2.14): The O&M documentation provides information needed to
understand, operate, and maintain equipment. The O&M documentation is by the facilities staff as
reference throughout the life of the facility. The O&M documentation is provided by Contractors
and is component to the systems manuals. The Commissioning Leader will verify that the O&M
documentation provides the necessary information to operation and maintain the equipment prior
to construction completion and the system acceptance by the Owner.

Verify O&M Training (2.15): The facilities staff is provided with O&M training to ensure they have
the knowledge and skills required to understand, operate, and maintain the systems and
equipment. Typically, the Designers provide systems training and the Contractors provide
equipment training. The Commissioning Leader will verify that the training sessions provide the
necessary information to operation and maintain the facility prior to construction completion and
system acceptance by the Owner.

Cohesive O&M Systems Manual (2.16): The O&M Systems Manual provides information needed to
understand, operate, and maintain the systems. The O&M Systems Manuals are for the facilities
staff not involved in the design or construction process and utilized throughout the life of the
facility. The O&M Systems Manual are created by the Contractors and are continually updated
throughout the design and construction phases of the project. The Contractor will coordinate the
contents of the Commissioning Report and combine into the cohesive O&M Systems Manual to be
delivered to the Owner.
4.2.8 CORRECTION PERIOD

In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during the Correction Period:

*Coordinate with Operations Commissioning Requirements (2.07):* Refer to previous description.

*Deferred Verification (2.17):* Some of the system functional performance test procedures will not be practical or meaningful to complete prior to the Correction Period. This may be due to construction phasing or climate constraints. Those test procedures shall be completed at an appropriate time during the Correction Period by the Contractor. The Commissioning Leader will facilitate these deferred test procedures.

*Ten-Month O&M Review (2.18):* Ten-months into the Correction Period, the Commissioning Team will review the building operation with the O&M staff and create a plan for resolution of outstanding commissioning-related issues.

4.2.9 ON-GOING OPERATIONS

In conjunction with the general Commissioning activities, the following are specific Commissioning activities addressed in during On-Going Operations:

Add any additional Commissioning activities specific to the On-Going Operations Phase.

4.3 CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

Add descriptions for Construction Air Quality Management Plan (steps 3.01 through 3.09)

4.4 CORRECTION PERIOD AIR QUALITY MANAGEMENT PLAN

Add descriptions for Correction Period Air Quality Management Plan (steps 4.01 to 4.02)

4.5 CONSTRUCTION WASTE MANAGEMENT PLAN
4.6 **ROLES AND RESPONSIBILITIES**

Understanding and clearly defining the role of each team member is crucial to successfully implementing the Commissioning Process. These roles and responsibilities should be contractually defined between the (1) Owner and the Contractor and (2) Owner and the Designers.

The roles and responsibilities for the Commissioning Leader, Facilities Operations Manager (FOM), Designers, Contractors, and the Guideline Leader are defined below:

The Suggested Implementation is presented in the form of the attached Design and Construction Commissioning matrix.

Roles and responsibilities for each Commissioning Team member are flexible and need to be defined as part of the project-specific Commissioning Plan. However, some team members are prohibited from performing some of the activities due to inherent conflicts of interest.
### 4.6.1 GENERAL COMMISSIONING ACTIVITIES

<table>
<thead>
<tr>
<th><strong>GENERAL COMMISSIONING ACTIVITIES</strong></th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design &amp; Construction Phase Commissioning Plan</td>
<td>Develop and Update</td>
<td>Review</td>
<td>Review</td>
<td>Review</td>
<td>Review</td>
<td>Review</td>
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<tr>
<td>Commissioning Reports</td>
<td>Provide periodic Commissioning Reports</td>
<td>Provide acceptable representation with the means and authority to prepare and coordinate implementation of the Commissioning Process as detailed in the Contract Documents</td>
<td>Review periodic Commissioning Reports</td>
<td>Review and comment on the Commissioning Leader’s Commissioning reports and Commissioning Issues Log</td>
<td>Review periodic Commissioning Reports</td>
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<tr>
<td><strong>GENERAL COMMISSIONING ACTIVITIES</strong></td>
<td><strong>Commissioning Leader</strong></td>
<td><strong>Facilities Operations Manager (FOM)</strong></td>
<td><strong>Project Manager</strong></td>
<td><strong>Designers</strong></td>
<td><strong>Contractors</strong></td>
<td><strong>Guideline Leader</strong></td>
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</tr>
<tr>
<td>Submit Outcome Documentation</td>
<td>Provide outcome documentation from Commissioning activities</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Submit the Outcome Documentation as required by the MSBG at the end of each phase of the design and construction process. Interpret and provide guidance relevant to the implementation Minnesota Sustainable Building Guidelines (MSBG)</td>
</tr>
<tr>
<td>Meetings</td>
<td>Conduct and document Commissioning Coordination Meetings Conduct and document Commissioning Kick-off Meetings during the pre-design and pre-construction phases</td>
<td>Participate</td>
<td>Participate</td>
<td>Participate in Pre-Design, Schematic Design, Design Development Phase coordination and review meetings Attend the pre-bid and pre-construction meetings as scheduled by the Commissioning Leader</td>
<td>Participate in the pre-construction and Commissioning Team meetings</td>
<td>Participate</td>
</tr>
</tbody>
</table>

The State of Minnesota Sustainable Building Guidelines
### 4.6.2 AGENCY PLANNING

<table>
<thead>
<tr>
<th><strong>AGENCY PLANNING</strong></th>
<th>Commissioning Leader</th>
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<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
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<tbody>
<tr>
<td>Planning Baseline</td>
<td>Advises Owner</td>
<td>Assists in development</td>
<td>Assists in development</td>
<td>Develops</td>
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### 4.6.3 PRE-DESIGN/PROGRAMMING

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<th>Commissioning Leader</th>
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<th>Project Manager</th>
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<th>Contractors</th>
<th>Guideline Leader</th>
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</thead>
<tbody>
<tr>
<td>Engage Acting Commissioning Team</td>
<td>Organize, lead, and engage Commissioning Team</td>
<td>Participates</td>
<td>Participates</td>
<td>Participates</td>
<td>-</td>
<td>Participates</td>
</tr>
<tr>
<td>Programming Baseline</td>
<td>Advises Owner</td>
<td>Assists in development</td>
<td>Assists in development</td>
<td>Develops</td>
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### 4.6.4 PRE-DESIGN/SITE SELECTION

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<td>Assists in development</td>
<td>Assists in development</td>
<td>Develops</td>
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<td>-</td>
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<tr>
<td>Review Site Alternatives for Ability to Achieve Performance Goals</td>
<td>Review to ensure that that systems being commissioned can achieve their Design Intent criteria</td>
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### 4.6.5 SCHEMATIC DESIGN PHASE

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<td>Design Baseline</td>
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<td><strong>Project Manager</strong></td>
<td><strong>Designers</strong></td>
<td><strong>Contractors</strong></td>
<td><strong>Guideline Leader</strong></td>
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<tr>
<td>Design Intent Document</td>
<td>Facilitate and document DID</td>
<td>Approve</td>
<td>Approve</td>
<td>Participate and assist in the documentation of the DID</td>
<td>-</td>
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</tr>
<tr>
<td>Basis of Design</td>
<td>-</td>
<td>Approve</td>
<td>Approve</td>
<td>Develops based on the DID</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Commissioning Design Review</td>
<td>Review schematic design documents in accordance with the DID</td>
<td>-</td>
<td>-</td>
<td>Respond to Commissioning Team design review comments and other issues in a timely manner</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coordinate with Operations Commissioning Requirements</td>
<td>Assist Designers</td>
<td>-</td>
<td>-</td>
<td>Cooperate with the Operations Commissioning Team by incorporating design features required to perform Operations Commissioning</td>
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</tbody>
</table>
### 4.6.6 DESIGN DEVELOPMENT

<table>
<thead>
<tr>
<th>DESIGN DEVELOPMENT</th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
</thead>
</table>
| Commissioning Design Review | Review schematic design documents in accordance with the DID  
Complete Performance Check  
Complete Measurability & Testability Check | - | - | Respond to Commissioning Team design review comments and other issues in a timely manner  
Review and incorporate (as appropriate) the Commissioning Leader’s submittal reviews | - | Verify performance that is not covered under Commissioning Section |
| Coordinate with Operations Commissioning Requirements | Assist Designers | - | - | Cooperate with the Operations Commissioning Team by incorporating design features required to perform Operations Commissioning | - | - |
| List of I/O Data Points | Review I/O Data Points for completeness and accordance with the DID | - | - | - | Provide list of I/O data points to the Commissioning Leader for review | - |
### 4.6.7 CONSTRUCTION DOCUMENTS

<table>
<thead>
<tr>
<th>CONSTRUCTION DOCUMENTS</th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commissioning Design Review</td>
<td>Review design documents in accordance with the DID</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Provide submittals to Commissioning Leader for review</td>
</tr>
<tr>
<td></td>
<td>Review contractors’ submittals for completeness and accordance with the DID</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Coordinate with Operations</td>
<td>Assist Designers</td>
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<tr>
<td>Commissioning Requirements</td>
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</tr>
<tr>
<td><strong>CONSTRUCTION DOCUMENTS</strong></td>
<td><strong>Commissioning Leader</strong></td>
<td><strong>Facilities Operations Manager (FOM)</strong></td>
<td><strong>Project Manager</strong></td>
<td><strong>Designers</strong></td>
<td><strong>Contractors</strong></td>
<td><strong>Guideline Leader</strong></td>
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</tr>
<tr>
<td>Incorporate Commissioning Criteria &amp; Scope into Construction Documents</td>
<td>Verify that the Commissioning Process is clearly defined in all scopes of work</td>
<td>-</td>
<td>Include costs for the Commissioning Process in the contract price</td>
<td>Prepare the Construction Documents with the integration of the Commissioning criteria and scope</td>
<td>Provide Commissioning criteria and scope in all subcontractors’ contracts</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Assist in the integration of the Commissioning criteria and scope into construction documents</td>
<td></td>
<td></td>
<td>Specify and verify the O&amp;M documentation has been adequately detailed in the construction documents</td>
<td>Include costs for the Commissioning Process in the contract price</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assist in integrating Commissioning activities into the project schedule</td>
<td></td>
<td></td>
<td></td>
<td>Include Commissioning criteria, scope, and activities in each purchase order or subcontract written</td>
<td></td>
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<td></td>
<td></td>
<td>Obtain cooperation and participation of all subcontractors and manufacturers</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>Include Commissioning activities into the project schedule</td>
<td></td>
</tr>
<tr>
<td><strong>CONSTRUCTION DOCUMENTS</strong></td>
<td>Commissioning Leader</td>
<td>Facilities Operations Manager (FOM)</td>
<td>Project Manager</td>
<td>Designers</td>
<td>Contractors</td>
<td>Guideline Leader</td>
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<tr>
<td>Incorporate Commissioning Criteria &amp; Scope into Construction Documents</td>
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</table>

**4.6.8 CONSTRUCTION**

<table>
<thead>
<tr>
<th><strong>CONSTRUCTION</strong></th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinate with Operations Commissioning Requirements</td>
<td>Assist Designers</td>
<td>-</td>
<td>-</td>
<td>Cooperate with the Operations Commissioning Team by incorporating design features required to perform Operations Commissioning</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Review Contractors’ Submittals</td>
<td>Review and Comment in accordance with the DID</td>
<td>Review and Comment</td>
<td>Review and Comment</td>
<td>Review and Comment</td>
<td>Provide submittals to the Owner, Designers, and Commissioning Leader</td>
<td>-</td>
</tr>
<tr>
<td>CONSTRUCTION</td>
<td>Commissioning Leader</td>
<td>Facilities Operations Manager (FOM)</td>
<td>Project Manager</td>
<td>Designers</td>
<td>Contractors</td>
<td>Guideline Leader</td>
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</tr>
<tr>
<td>Verify Installation</td>
<td>Verify installation by reviewing successful completion of installation checklists Periodically review Record Drawings for accuracy</td>
<td>-</td>
<td>-</td>
<td>Review and accept record drawings as required by construction documents</td>
<td>Complete and submit the installation checklists Continuously maintain the record drawings</td>
<td>-</td>
</tr>
<tr>
<td><strong>CONSTRUCTION</strong></td>
<td><strong>Commissioning Leader</strong></td>
<td><strong>Facilities Operations Manager (FOM)</strong></td>
<td><strong>Project Manager</strong></td>
<td><strong>Designers</strong></td>
<td><strong>Contractors</strong></td>
<td><strong>Guideline Leader</strong></td>
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<tr>
<td>Verify Functional Performance</td>
<td>Verify Functional Performance by facilitating successful completion of functional performance tests</td>
<td>-</td>
<td>-</td>
<td>Review test procedures submitted by the Contractors</td>
<td>Notify the Commissioning Leader when the systems and equipment are ready for testing</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Develop, track, and update Commissioning Issues Log</td>
<td></td>
<td></td>
<td>Review and comment on the Commissioning Leader’s Commissioning Issues Log</td>
<td>Implement the functional performance tests</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Facilitate retesting of functional performance testing</td>
<td></td>
<td></td>
<td></td>
<td>Remedy deficiencies identified by the Commissioning Leader during the completion of the installation checklists and functional performance testing</td>
<td></td>
</tr>
<tr>
<td>CONSTRUCTION</td>
<td>Commissioning Leader</td>
<td>Facilities Operations Manager (FOM)</td>
<td>Project Manager</td>
<td>Designers</td>
<td>Contractors</td>
<td>Guideline Leader</td>
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</tr>
<tr>
<td>Verify O&amp;M Documentation</td>
<td>Verify that the contractor creates and submits O&amp;M manuals for the owner prior to construction completion and system acceptance by the owner</td>
<td>Accepts O&amp;M Documentation</td>
<td>Accepts O&amp;M Documentation</td>
<td>-</td>
<td>Submit O&amp;M documentation</td>
<td>-</td>
</tr>
<tr>
<td>Verify O&amp;M Training</td>
<td>Facilitate training sessions</td>
<td>Provide staff to attend O&amp;M training</td>
<td>Provide staff to attend O&amp;M training</td>
<td>Participate in the training sessions presenting a systems overview</td>
<td>Implement the O&amp;M training as detailed in the contract documents</td>
<td>-</td>
</tr>
</tbody>
</table>
## 4.6.9 CORRECTION PERIOD

<table>
<thead>
<tr>
<th><strong>CORRECTION PERIOD</strong></th>
<th><strong>Commissioning Leader</strong></th>
<th><strong>Facilities Operations Manager (FOM)</strong></th>
<th><strong>Project Manager</strong></th>
<th><strong>Designers</strong></th>
<th><strong>Contractors</strong></th>
<th><strong>Guideline Leader</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinate with Operations Commissioning Requirements</td>
<td>Assist Designers</td>
<td>-</td>
<td>-</td>
<td>Cooperate with the Operations Commissioning Team by incorporating design features required to perform Operations Commissioning</td>
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<td>-</td>
</tr>
</tbody>
</table>
| Deferred Verification | Facilitate deferred verification of functional performance testing  
Develop, track, and update Commissioning Issues Log | - | - | - | Implement deferred functional performance testing | - |
<p>| Ten-Month O&amp;M Review | Participate in 10-Month O&amp;M Review | Participate in 10-Month O&amp;M Review | Participate in 10-Month O&amp;M Review | - | Participate in 10-Month O&amp;M Review | Participate in 10-Month O&amp;M Review |</p>
<table>
<thead>
<tr>
<th>CORRECTION PERIOD</th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
</thead>
</table>
| Final Commissioning Report | Develop Final Commissioning Report  
Update final Commissioning Report (as necessary) | Review the Final Commissioning Reports (as necessary) | Review the Final Commissioning Reports (as necessary) | -         | -           | -               |

Add the roles and responsibilities relevant to the
1) Construction Phase Air Quality Management,
2) Correction Period Air Quality Management,
3) Construction Waste Management
4) Correction Period User Comfort & Satisfaction Assessment
### 4.6.10 ON-GOING OPERATIONS

<table>
<thead>
<tr>
<th>ON-GOING OPERATIONS</th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
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</thead>
<tbody>
<tr>
<td>Add Commissioning Task</td>
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<td>Add Commissioning Task</td>
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<td>Add Commissioning Task</td>
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</tbody>
</table>

### 4.6.11 CONSTRUCTION AIR QUALITY MANAGEMENT PLAN

<table>
<thead>
<tr>
<th>CONSTRUCTION AIR QUALITY MANAGEMENT PLAN</th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add Commissioning Task</td>
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<td>Add Commissioning Task</td>
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<td>Add Commissioning Task</td>
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</table>

### 4.6.12 CORRECTION PERIOD AIR QUALITY MANAGEMENT PLAN

<table>
<thead>
<tr>
<th>CORRECTION PERIOD AIR QUALITY MANAGEMENT PLAN</th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add Commissioning Task</td>
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<td>Add Commissioning Task</td>
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<td>Add Commissioning Task</td>
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</tr>
</tbody>
</table>
### 4.6.13 CONSTRUCTION WASTE MANAGEMENT PLAN

<table>
<thead>
<tr>
<th>CONSTRUCTION WASTE MANAGEMENT PLAN</th>
<th>Commissioning Leader</th>
<th>Facilities Operations Manager (FOM)</th>
<th>Project Manager</th>
<th>Designers</th>
<th>Contractors</th>
<th>Guideline Leader</th>
</tr>
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<tbody>
<tr>
<td>Add Commissioning Task</td>
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<td>Add Commissioning Task</td>
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</tbody>
</table>
5 SUPPORTING COMMISSIONING DOCUMENTATION

5.1 B3-MSBG Tracking Tool (www.msbgtracking.com)

5.2 Appendix P-1 Suggested Implementation for All Performance Management Guidelines

5.3 Appendix P-4 Design and Construction Commissioning Supporting Information

5.4 Appendix P-5 Design and Construction Commissioning Matrix
DESIGN & CONSTRUCTION PHASE
COMMISSIONING PLAN
CONSTRUCTION AIR QUALITY MANAGEMENT PLAN TEMPLATE

Based upon B3 Minnesota Sustainable Building Guidelines—VERSION 2.1

Notes to the reader have been added to this document within numerous “text boxes” such as this. These “text boxes” contain references to supporting documentation, suggestions, and/or instructions pertaining to the Commissioning Process’ Construction Air Quality Management Plan. They are intended to be deleted once the template is customized for a particular project.
TABLE OF CONTENTS

1 Introduction............................................................................................................................................................................... 3

2 Protect Stored Absorptive Materials (3.02) .................................................................................................................. 4

3 Replace Filtration Media (3.03) .......................................................................................................................................... 5

4 Temporary Construction Ventilation (3.04) .................................................................................................................. 8

5 Protect HVAC System (3.05) .......................................................................................................................................... 10

6 Offsite Product Preconditioning (3.06) ...................................................................................................................... 11

7 Remove Moisture Damaged Materials (3.07) ............................................................................................................... 14

8 Protect Porous Materials (3.08) ........................................................................................................................................ 16

9 Building Flush-out Period (3.09) ............................................................................................................................. 18

10 Appendix ........................................................................................................................................................................... 19

10.1 Design & Construction Commissioning Matrix – Activities & Responsibilities ........................................... 19
## Introduction

The Construction Air Quality Management Plan is part of the Design and Construction Commissioning Plan. Its intent is to define practices to prevent the introduction of air quality problems as a result of the construction process. A Construction Air Quality specification and the Construction Air Quality Management Plan should outline:

1. Protecting Stored Absorptive Materials
2. Replacing Filtration Media
3. Temporary Construction Ventilation
4. Protecting HVAC System
5. Offsite Product Preconditioning
6. Removing Moisture Damaged Materials
7. Protecting Porous Materials
8. Building Flush-out Period

The Construction Air Quality Management Plan should be developed during design, and the resulting bid documents should comply with the Construction Air Quality Management Plan.

The construction air quality requirements must meet the SMACNA IAQ Guideline for Occupied Buildings under Construction. Requirements include elements for IAQ protection during construction (From CHPS section 01350, 1.6).

Please refer to the Design & Construction Commissioning Matrix - Activities & Responsibilities (refer to 10 Appendix). This matrix outlines when the Construction Air Quality Management tasks should occur.

The following sections should be included in the Construction Air Quality Management Plan. It is recommended that these headings be used. As part of implementing the Construction Air Quality Management Plan, the requirements defined in the Plan need to be incorporated into the construction specifications in order to contractually obligate all contractors and subcontractors to participate in the Plan.

The number designations in parentheses (e.g. 3.01, 3.02, 3.03, etc.) are references to other MSGB documents. For example in Appendix 4.1, the Construction Air Quality Management tasks are referenced by these number designations.

Insert project customized introduction.
2 Protect Stored Absorptive Materials (3.02)

2.1 Processes and Procedures

Protect stored on-site or installed absorptive materials from moisture damage.

Provide a detailed narrative describing the project’s means of protecting stored absorptive materials from moisture damage. Use Table 1 – Absorptive Materials to provide an inventory of all absorptive materials planned for use in the project and the intended pre-installation storage and post-installation protection of those materials.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

<table>
<thead>
<tr>
<th>#</th>
<th>Description of Absorptive Materials</th>
<th>Pre-Installation Storage</th>
<th>Plan for Preventing Moisture Damage after Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2</td>
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<tr>
<td>5</td>
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</tr>
</tbody>
</table>

Table 1 – Absorptive Materials

2.2 End of Project Summary

At the end of construction, include a brief summary of the project’s means of protecting stored absorptive materials, include captioned photos to highlight the Construction Air Quality Management Plan practices, and provide information regarding special considerations, notes, or additional comments.

Insert your End of Project Summary here.
3 Replace Filtration Media (3.03)

3.1 Processes and Procedures

Replace all filtration media immediately prior to occupancy.

If the air handling units are utilized during construction, all the air filtration media should be replaced. If the air handling units are not used during construction, clean filters meeting the contract specifications should be installed prior to startup, testing, and balancing.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
<table>
<thead>
<tr>
<th>#</th>
<th>Filter Manufacturer</th>
<th>Filter Identification (Model Number)</th>
<th>Filter MERV Rating</th>
<th>Location of Installed Filter</th>
<th>Date of Final Filter Installation</th>
<th>Indication that the Filter Replaced Prior to Occupancy² (Days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>4</td>
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<td>5</td>
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</tr>
</tbody>
</table>

1 - Record how many days prior to official Owner occupancy?

*Table 2 – Filtration Media Replacement*
3.2 End of Project Summary

At the end of construction, submit documentation of the project's replacement of all filter media in tabular format (refer to Table 2 – Filtration Media Replacement).

Insert your End of Project Summary here.
4 Temporary Construction Ventilation (3.04)

4.1 Processes and Procedures

Provide a detailed narrative describing the project’s temporary construction ventilation.

Considering temporary construction ventilation, refer to the following items that should be included in the specifications and Construction Air Quality Management Plan:

1) Maintain sufficient temporary ventilation of areas where materials are being used that emit VOCs.
2) Maintain ventilation continuously during installation, and until emissions dissipate after installation. If continuous ventilation is not possible via building’s HVAC system(s) then ventilation shall be supplied via open windows and temporary fans, sufficient to provide no less than three air changes per hour.
3) Period after installation shall be sufficient to dissipate odors and elevated concentrations of VOCs. Where no specific period is stated in the Specifications, a time period of 72 hours shall be used.
4) Ventilate areas directly to outside. Ventilation to other enclosed areas is not acceptable.

Using Table 3 – Temporary Construction Ventilation, provide required details for all VOC emitting materials intended to be used during construction.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
4.2 End of Project Summary

At the end of construction, include a brief summary of the project's temporary construction ventilation, include captioned photos to highlight the Construction Air Quality Management Plan practices, and provide information regarding special considerations, notes, or additional comments.

Insert your End of Project Summary here.
5 Protect HVAC System (3.05)

5.1 Processes and Procedures

Provide a detailed narrative describing the mechanisms by which HVAC system equipment and distribution systems (ducts and pipes) will be protected from accumulating dirt and debris during construction. This applies to all HVAC systems which are put into service during construction.

Considering how to protect the HVAC system, refer to the following items that should be included in the specifications and Construction Air Quality Management Plan:

1) During dust-producing activities (e.g., drywall installation and finishing), turn ventilation system off and protect openings in supply and return HVAC system from dust infiltration.
2) Provide temporary ventilation as required.
3) Seal ducts during transportation, delivery, and construction to prevent accumulation of construction dust and construction debris inside ducts.

Provide a detailed narrative describing the mechanisms by which HVAC system equipment and distribution systems (ducts and pipes) will be protected from accumulating dirt and debris during construction. This applies to all HVAC systems, not just HVAC system which is put into service during construction. In addition, document the temporary construction ventilation with Table 3 below.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

5.2 End of Project Summary

At the end of construction, include a brief summary of the project’s means of protecting the HVAC system, include captioned photos to highlight the Construction Air Quality Management Plan practices, and provide information regarding special considerations, notes, or additional comments.

Insert your End of Project Summary here.
6 Offsite Product Preconditioning (3.06)

6.1 Processes and Procedures

Provide a detailed narrative describing the project’s means of offsite product preconditioning, including a description of the offsite ventilation systems (e.g., type, air changes per hour, temperature control, etc.).

Considering offsite product preconditioning, refer to the following items that should be included in the specifications and Construction Air Quality Management Plan:

1) All products which have odors and significant VOC emissions shall be preconditioned off-site prior to delivery to the Project site. Allow products to off-gas in a dry, well-ventilated space for 14 calendar days to allow for reasonable dissipation of odors and emissions.
2) Condition products without containers and packaging to maximize off-gassing of VOCs
3) Condition products in ventilated warehouse or other building. Comply with substitution requirements for consideration of other locations.

Using Table 4 – Offsite Product Preconditioning, document the pre-conditioning details for all products with significant VOC emission and other odor off-gassing properties to be installed during construction.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
### Table 4 – Offsite Product Preconditioning

<table>
<thead>
<tr>
<th>#</th>
<th>Description of Significant VOC Emitting &amp; Other Odor Off-Gassing Products</th>
<th>Estimated Date of Shipment from Manufacturer</th>
<th>Location to which each Product will be Shipped for Preconditioning</th>
<th>Space Requirements¹</th>
<th>Provisions for Unpacking for Preconditioning</th>
<th>Duration of Preconditioning Period</th>
<th>Provisions for Re-packing for Delivery to Project Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</table>

¹ – For example, the floor space, volume, etc. required for preconditioning
6.2 End of Project Summary

At the end of construction, include a brief summary of the project’s offsite product preconditioning; include descriptions of offsite products, means of preconditioning and locations, captioned photos to highlight the Construction Air Quality Management Plan practices, and provide information regarding special considerations, notes, or additional comments.

Insert your End of Project Summary here.
7 Remove Moisture Damaged Materials (3.07)

7.1 Processes and Procedures

Provide a detailed narrative describing the project’s process for identifying (regular inspections), removing, and disposing of moisture damaged materials and replacement procedures. Narrative should include the name of the responsible party for this activity. Considering the removal of moisture damaged materials, refer to the following items that should be included in the specifications and Construction Air Quality Management Plan:

1) Materials with evidence of moisture damage, including stains, are not acceptable. This includes both stored and installed materials. Immediately remove all such materials from the site and properly dispose.

2) Take special care to prevent accumulation of moisture on installed materials and within packaging during delivery, storage, and handling to prevent development of molds and mildew on packaging and on products.

3) Immediately remove from site and properly dispose of materials showing signs of mold and/or signs of mildew, including materials with moisture stains.

4) Replace moldy materials with new, undamaged materials.

Provide a detailed narrative describing the project’s process for identifying (regular inspections), removing, and disposing of moisture damaged materials and replacement procedures. Narrative should include the name of the responsible party for this activity.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

7.2 End of Project Summary

At the end of construction, using Table 5– Moisture Damaged Materials, include a brief summary of the project’s moisture damaged materials, replacement occurrences, preventive and corrective procedures, include captioned photos to highlight the Construction Air Quality Management Plan practices, and provide information regarding special considerations, notes, or additional comments.

Insert your End of Project Summary here.
<table>
<thead>
<tr>
<th>#</th>
<th>Description of Moisture Damaged Materials&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Date of Identification</th>
<th>Cause of Moisture Damage</th>
<th>Date of Removal</th>
<th>Description of Disposal Method&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Actions taken to Prevent Similar Moisture Damage in the Future</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

1 – Include photos  
2 – For example, recycling landfill, etc.

*Table 5– Moisture Damaged Materials*
8 Protect Porous Materials (3.08)

8.1 Processes and Procedures

Provide a detailed narrative describing the project’s means to protect porous materials.

Where odorous and/or high VOC emitting products are applied on-site, apply prior to installation of porous and fibrous materials. Where this is not possible, protect porous materials with polyethylene vapor retarders.

Provide a detailed narrative describing the project’s means to protect porous materials. Using Table 6 – Porous Material document the following information:

1) Inventory of all VOC-emitting or odor-emitting materials and where they are to be used
2) Inventory of all porous and fibrous materials and where they are to be used
3) Highlight locations where both categories of materials are to be used in the same location
4) Describe means of preventing the absorption of VOCs and/or odors by the porous and fibrous materials in each of these locations.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

8.2 End of Project Summary

At the end of construction, include a brief summary of the project’s means of protecting porous materials, include captioned photos to highlight the Construction Air Quality Management Plan practices, and provide information regarding special considerations, notes, or additional comments.

Insert your End of Project Summary here.
<table>
<thead>
<tr>
<th>Location</th>
<th>VOC-Emitting or Odor-Emitting Materials</th>
<th>Porous &amp; Fibrous Materials</th>
<th>Description of Absorption Prevention(^1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room 100</td>
<td>1)</td>
<td>1)</td>
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<td>Room 101</td>
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</table>

1 - Description of means to prevent absorption of VOC and/or odors by porous & fibrous materials in each of these locations.

*Table 6 – Porous Materials*
9 Building Flush-out Period (3.09)

9.1 Processes and Procedures

Provide a detailed narrative describing the project’s pre-occupancy flush-out procedures.

Comply with a pre-occupancy building flush-out as described in LEED NC Version 2.2 which states, "After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14,000 cu. ft. of outdoor air per square feet of floor area while maintaining an internal temperature of at least 60°F and relative humidity no higher than 60%.

(Source: LEED NC Version 2.2, October 2005, Credit EQ 3.2 First part of Option 1, page 323.) Note: Schedule the completion of interior finish materials and occupancy accordingly to accommodate the flush out period.

Provide a detailed narrative describing the project’s pre-occupancy flush-out procedures.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

9.2 End of Project Summary

At the end of construction, include a brief summary of the building flush-out period, include data regarding temperature, airflow, and duration of flush-out and provide information regarding special considerations, notes, or additional comments.

Insert your End of Project Summary here.
10 Appendix

10.1 Design & Construction Commissioning Matrix – Activities & Responsibilities
DESIGN & CONSTRUCTION PHASE
COMMISSIONING PLAN
CONSTRUCTION WASTE MANAGEMENT PLAN
TEMPLATE

Based upon B3 Minnesota Sustainable Building Guidelines—VERSION 2.1

Notes to the reader have been added to this document within numerous “text boxes” such as this. These “text boxes” contain references to supporting documentation, suggestions, and/or instructions pertaining to the Commissioning Process’ Construction Waste Management Plan. They are intended to be deleted once the template is customized for a particular project.
TABLE OF CONTENTS

1 Introduction ........................................................................................................................................................................... 3
2 Construction Waste Management Specification (5.01) ........................................................................................................ 4
3 Debris Diversion (5.03) .......................................................................................................................................................... 5
4 Recycle Packaging (5.04) ...................................................................................................................................................... 6
5 APPENDIX ........................................................................................................................................................................... 7
  5.1 Design & Construction Commissioning Matrix – Activities & Responsibilities ......................................................... 7
  5.2 Worksheet M-2 Construction Waste Recycling Economics ........................................................................................... 7
  5.3 Worksheet M-3 Packaging Waste Recycling Economics ............................................................................................... 7
1 Introduction

The intent of the Construction Waste Management Plan is to minimize use of resources and negative environmental impacts through careful reduction and management of wastes generated during the construction process and building occupancy.

The Construction Waste Management Plan outlines:
1) Construction Waste Management Specification
2) Construction Waste Management Plan
3) Debris Packaging
4) Recycle Packaging

Please note that portions of this template are adapted from LEED Version 2.0.

The number designations in parentheses (e.g. 5.01, 5.02, 5.03, etc.) are references to other MSBG documents. For example in Appendix 5.1, the Construction Waste Management tasks are referenced by these number designations.

Insert project customized introduction.
2 Construction Waste Management Specification (5.01)

2.1 Processes and Procedures

Provide a detailed specification describing the required activities and performance metrics for construction phase waste management in the bid documents. The specification should include the required performance criteria:

1) Construction Waste: Minimize waste generated from construction, renovation and demolition of buildings through detailing and specifications.

2) Construction Waste: Divert at least 75% (by weight) construction, demolition, and land clearing debris from landfill disposal.

3) Operations Waste: Reduce and recycle at least 50% of the waste generated during building operation. Provide dedicated recycling areas, processing and holding space, and reverse distribution space in the building.

If applicable, the specification should include the recommended performance criteria:

4) Construction Waste: Reuse, recycle and/or salvage an additional 15% (90% total by weight) of the construction, demolition, and land clearing waste.

5) Packaging Waste: Reduce and recycle packaging waste associated with the construction process, and encourage manufacturers to ship their product using reusable, recyclable, returnable, or recycled content packaging. Reuse or return 50% of all packaging material, by weight, to suppliers or manufacturers.

6) Packaging Waste: Return an additional 25% (75% total by weight) of all packaging material to suppliers or manufacturers.

For additional details, please refer to Guideline M.3 Waste Reduction and Management (http://www.msbg.umn.edu/m_3.html) and Appendix M-1 Suggested Implementation of All Material and Waste Guidelines (http://www.msbg.umn.edu/downloads_v2_0/6Materials_App-M-1.pdf).

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
3 Debris Diversion (5.03)

3.1 Processes and Procedures

The goal of debris diversion is to divert construction, demolition, and land cleaning debris away from landfills.

The construction, demolition, and land clearing debris should be documented using Worksheet M-2 Construction Waste Recycling Economics (see Appendix 5.2). Worksheet M-2 Construction Waste Recycling Economics documents the following:

1) A description of diverted / recycled materials,
2) Where these materials were diverted or recycled,
3) The quantity of diverted / recycled materials (in tons or cubic yards),
4) A description of landfill material,
5) The landfill hauler or the landfill location,
6) The quantity of the landfill waste.


Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

3.2 End of Project Summary

The M-2 worksheet should be started during demolition and continuously updated throughout the construction process. At the end of construction, the M-2 worksheet represents a project history of the construction, demolition, and land clearing debris. This project history demonstrates that the required and recommended performance criteria are satisfied at the end of construction.

Insert your End of Project Summary here.
4 Recycle Packaging (5.04)

4.1 Processes and Procedures

The goal is to recycle materials and equipment packaging generated during construction.

The recycled materials and equipment should be documented using Worksheet M-3 Packaging Waste Recycling Economics (Appendix 5.3) The M-3 worksheet includes:

1) A description of the packaging and operations waste diverted / recycled materials,
2) Where these materials were diverted or recycled,
3) The quantity of packaging and operations waste diverted / recycled materials (in tons or cubic yards)
4) A description of landfill material,
5) The landfill hauler or the landfill location,
6) The quantity of the landfill waste.

Please refer to Guideline M.3 Waste Reduction and Management. Guideline M.3 Waste Reduction and Management includes a link to Worksheet M-3 Packaging Waste Recycling Economics (Appendix 5.3) which applies to Packaging and Operations Waste.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

4.2 End of Project Summary

The M-3 worksheet should be started during demolition and continuously updated throughout the construction process. At the end of construction, the M-3 worksheet represents a project history of the packing recycling. This project history demonstrates that the required and recommended performance criteria are satisfied at the end of construction.

Insert your End of Project Summary here
5 APPENDIX

5.1 Design & Construction Commissioning Matrix – Activities & Responsibilities

5.2 Worksheet M-2 Construction Waste Recycling Economics

5.3 Worksheet M-3 Packaging Waste Recycling Economics
DESIGN & CONSTRUCTION PHASE
COMMISSIONING PLAN
CORRECTIVE PERIOD AIR QUALITY MANAGEMENT PLAN
TEMPLATE

Based upon B3 Minnesota Sustainable Building Guidelines—VERSION 2.1

Notes to the reader have been added to this document within numerous “text boxes” such as this. These “text boxes” contain references to supporting documentation, suggestions, and/or instructions pertaining to the Commissioning Process’ Correction Period Air Quality Plan. They are intended to be deleted once the template is customized for a particular project.
# TABLE OF CONTENTS

1 Introduction............................................................................................................................................................................... 3
2 Correction Period Air Quality Management Specification (4.01)...................................................................................... 4
3 Three Month Building Air Quality Evaluation & Modifications (4.02)............................................................................. 5
4 Six-Month Building Air Quality Evaluation & Modifications (4.03).................................................................................... 8
5 Ten-Month Building Air Quality Evaluation & Modifications (4.04).................................................................................. 11
6 Appendix................................................................................................................................................................................... 14

6.1 Design & Construction Commissioning Matrix – Activities & Responsibilities.......................................................... 14
1 Introduction

The Correction Period Air Quality Management Plan is part of the Design and Construction Commissioning Plan and shall involve periodic indoor air quality testing. The intent of the Construction Air Quality Management Plan is to evaluate the building air quality three months, six months, and ten months after occupancy with testing that verifies that the ventilation system is better than or within design guidelines.

Please refer to the Design & Construction Commissioning Matrix - Activities & Responsibilities (refer to Appendix 6.1). This matrix outlines when the Correction Period Air Quality Management tasks should occur.

The number designations in parentheses (e.g. 4.01, 4.02, 4.03, etc.) are references to other MSBG documents. For example in Appendix 6.1, the Correction Period Air Quality Management tasks are referenced by these number designations.

Consider (recommended, not required), monitoring three months, six months, and ten months after occupancy of other pollutants on I.4 guideline list which are not pollutants that determine the ventilation rate. Concentrations should be in guideline range and below action value for each pollutant. Sample pollutant action levels are given in Appendix I-1.

Insert project customized introduction.
2 Correction Period Air Quality Management Specification (4.01)

2.1 Processes and Procedures

During the design phase, the team should determine which, if any, of the responsibilities associated with the Correction Period Air Quality Management Plan will be assigned to the bidding contractors. If the contractors will be responsible for any part of the correction period testing or modifications, the design team should prepare a Correction Period Air Quality Management Specification for the contract documents in order to obligate the contractors to follow the provisions of this Correction Period Air Quality Management Plan.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
3 Three Month Building Air Quality Evaluation & Modifications (4.02)

3.1 Processes and Procedures

Provide a detailed narrative describing the indoor air quality testing plan and strategies at an interval of three-months after occupancy. Outline specific occupied zones, document zone square footage, locations of specific pollutants, CO₂ concentrations at each zone, and concentration limits (refer to Table 1a - Three-Month Building Air Quality).

Three months into the Correction Period, measure the key factor that determines ventilation rate for building (major pollutant and/or CO₂) in all building occupied zones. “Occupied zones” shall be, at a minimum, one per air handling system. No single “occupied zone” shall be greater than 5,000 square feet. The testing plan shall take into account high occupancy spaces and the locations of specific pollutant sources and shall not necessarily depend on combined or average return air concentrations at each air handler.

- Record CO₂ concentrations in each zone.
- If CO₂ levels are above expected values, additional ventilation must be provided until concentrations fall below these levels.

Refer to LEED-NC Version 2.2 Reference Guide – Indoor Air Quality Credit 2 for greater detail.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
### Description of Occupied Zone

<table>
<thead>
<tr>
<th>#</th>
<th>Description of Occupied Zone</th>
<th>Zone Square Footage (ft²)</th>
<th>Locations of Specific Pollutants</th>
<th>CO₂ Concentration Limits (PPM)</th>
<th>3-Month Evaluation</th>
<th>6-Month Evaluation</th>
<th>10-Month Evaluation</th>
</tr>
</thead>
<tbody>
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</table>

*Table 1a – Three-Month Building Air Quality*
3.2 Three-Month Summary

At the conclusion of the three-month evaluation, compose a brief summary of the testing results (Table 1a) and system modifications that were necessary to achieve satisfactory concentration levels.

*Insert your summary here.*
4 Six-Month Building Air Quality Evaluation & Modifications (4.03)

4.1 Processes and Procedures

Six months into the Correction Period, repeat the Indoor Air Quality testing performed at three months and record findings in Table 1b (i.e., add more data to Table 1a). Make any necessary corrections until concentrations fall below action levels.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
<table>
<thead>
<tr>
<th>#</th>
<th>Description of Occupied Zone</th>
<th>Zone Square Footage (ft²)</th>
<th>Locations of Specific Pollutants</th>
<th>CO2 Concentration Limits (PPM)</th>
<th>3-Month Evaluation</th>
<th>6-Month Evaluation</th>
<th>10-Month Evaluation</th>
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*Table 1b – Six-Month Building Air Quality*
4.2 Six-Month Summary

At the conclusion of the six-month evaluation, compose a brief summary of the testing results (Table 1b) and system modifications that were necessary to achieve satisfactory concentration levels.

Insert your summary here.
5  Ten-Month Building Air Quality Evaluation & Modifications (4.04)

5.1 Processes and Procedures

Ten months into the Correction Period, repeat the Indoor Air Quality testing performed at three months and record findings in Table 1c (i.e., add more data to Table 1b). Make any necessary corrections until concentrations fall below action levels.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
<table>
<thead>
<tr>
<th>#</th>
<th>Description of Occupied Zone</th>
<th>Zone Square Footage (ft²)</th>
<th>Locations of Specific Pollutants</th>
<th>CO2 Concentration Limits (PPM)</th>
<th>3-Month Evaluation</th>
<th>6-Month Evaluation</th>
<th>10-Month Evaluation</th>
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<td>CO2 Concentration (PPM)</td>
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<td>CO2 Concentration (PPM)</td>
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<td>CO2 Concentration (PPM)</td>
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<td>CO2 Concentration (PPM)</td>
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</table>

*Table 1c – Ten-Month Building Air Quality*
5.2 Ten-Month Summary

At the conclusion of the ten-month evaluation, compose a brief summary of the testing results (Table 1c) and system modifications that were necessary to achieve satisfactory concentration levels.

*Insert your summary here.*
6 Appendix

6.1 Design & Construction Commissioning Matrix – Activities & Responsibilities
DESIGN & CONSTRUCTION PHASE
COMMISSIONING PLAN
CORRECTIVE PERIOD USER COMFORT &
SATISFACTION ASSESSMENT PLAN TEMPLATE

Based upon B3 Minnesota Sustainable Building Guidelines—VERSION 2.1

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# TABLE OF CONTENTS

1. Introduction................................................................................................................................................................. 3
2. Correction Period User Comfort & Satisfaction Assessment Specification (6.01).................................................. 4
3. Three-Month Occupant Survey (6.02)............................................................................................................................. 5
4. Ten-Month Occupant Survey (6.03)............................................................................................................................... 6
5. Appendix ............................................................................................................................................................................. 7
   5.1 Design & Construction Commissioning Matrix – Activities & Responsibilities ........................................... 7
1 Introduction

The Correction Period User Comfort & Satisfaction Assessment Plan is part of the Design and Construction Commissioning Plan and shall involve periodic occupant surveys. The intent is to assess comfort and satisfaction via occupant surveys three months and ten months after occupancy. A similar survey during the move-in process is recommended.

Issues for assessment include the following areas outlined in the MSBG IEQ Guidelines:
1) Air Quality (I.4)
2) Thermal Comfort (I.5)
3) Access to Daylight, Quality of lighting, View space and window access (I.8, I.9, and I.10)
4) Vibrations, Acoustics and Noise (I.11, I.12)
5) Personal Control of IEQ conditions and impacts (I.13)
6) Opportunities and encouragement for healthful physical activity (I.14)

Please refer to the Design & Construction Commissioning Matrix - Activities & Responsibilities (refer to Appendix 5.1). This matrix outlines when the Correction Period User Comfort & Satisfaction Assessment tasks should occur.

The number designations in parentheses (e.g. 6.01, 6.02, 6.03, etc.) are references to other MSBG documents. For example in Appendix 5.1, the Correction Period User Comfort & Satisfaction Assessment tasks are referenced by these number designations.

Insert project customized introduction.
2 Correction Period User Comfort & Satisfaction Assessment Specification (6.01)

2.1 Processes and Procedures

During the design phase, the team should determine which, if any, of the responsibilities associated with the Correction Period User Comfort & Satisfaction Assessment Plan will be assigned to the bidding contractors. If the contractors will be responsible for any part of the survey or assessment, the design team should prepare a Correction Period Comfort & Satisfaction Assessment Specification for the contract documents in order to obligate the contractors to follow the provisions of this Correction Period Comfort & Satisfaction Assessment Plan.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.
3 Three-Month Occupant Survey (6.02)

3.1 Processes and Procedures

Three months into the Correction Period conduct the first User Comfort & Satisfaction Survey as defined in the Assessment Plan.

Distribute, collect, analyze, compose a brief summary of the three-month survey results, and compare the three-month results to the move-in survey results.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

Insert Customized Survey Questionnaire for this project.

3.1 Three Month Summary

Provide a summary report of Three Month Survey results and correction actions taken as a result.

Insert summary report here.
4  Ten-Month Occupant Survey (6.03)

4.1 Processes and Procedures

Ten months into the Correction Period conduct the second User Comfort & Satisfaction Survey as defined in the Assessment Plan. Use the same Survey Questionnaire used for the Three-Month Occupant Survey.

Distribute, collect, analyze, compose a brief summary of the ten-month survey results, and compare the ten-month results to the previous survey results.

Insert your Processes and Procedures along with assigned Roles and Responsibilities to ensure that these requirements will be achieved.

4.2 Ten Month Summary

Provide a summary report of Ten Month Survey results and correction actions taken as a result.

Insert summary report here.
5 Appendix

5.1 Design & Construction Commissioning Matrix – Activities & Responsibilities