It's all in the details

How to develop useful detail drawings for exterior building envelope systems

By Jim Mounts

The following article focuses on how much information is deemed sufficient when developing details for exterior building envelope systems such as glazing, architectural metal and masonry wall systems. Discussion areas are applicable to any commercial building project with typical and custom design conditions. This article also discusses how a range of users—from the architect to the installer—are served by the drawings from the design, production and finished installation perspective.

But first, what is a detail? In the building cladding industry, a detail is a drawing that shows the location of various conditions, with dimensions and notes for fit and finish of the final product. This includes sizes of components, exact fabrication instructions, structural elements, installation clearances and adjustment tolerances. The detail also identifies the sequence of installation with perimeter seals, control layers (air and water management), flashing and other adjacent materials involved in the given condition.

On the building product manufacturing side, detailing started with the sales, estimating or shop personnel taking off parts and pieces from the architectural drawings. This gave way to a detailing department, where individuals with engineering, math or drawing skills would provide drawings and order lists of materials to meet the needs of manufacturing and field installation operations. Higher production volume and more complex building projects required more specialization in coordinating the details. This created a market for outside services in design, consulting and drafting. Depending on a company's charter, it might utilize full-time in-house staff or a subcontractor for design detailing support.

The purpose of the details is to define the product aesthetically and dimensionally, and to identify the installation and coordination of work between interfacing trades in accordance with the specifications and contract documents. Detailing also contributes to a firm's bottom line: managing cost, maintaining profitability, staying on schedule and managing risk. Like a balancing act, the details must satisfy contractual responsibilities, as well as support the subcontractor's own interests in implementing the work. The details must stand up to the scrutiny of many people, including the architect, contractor, project manager, engineer, consultant, building official, manufacturing floor, procurement team, assembly crew, quality control, testing professional, field installer, and interfacing tradesmen, all of whom have specific but different needs. Some will critique the details to the letter of the specifications to ensure compliance; others will rely upon the details and explicit information to coordinate the work between several trades.

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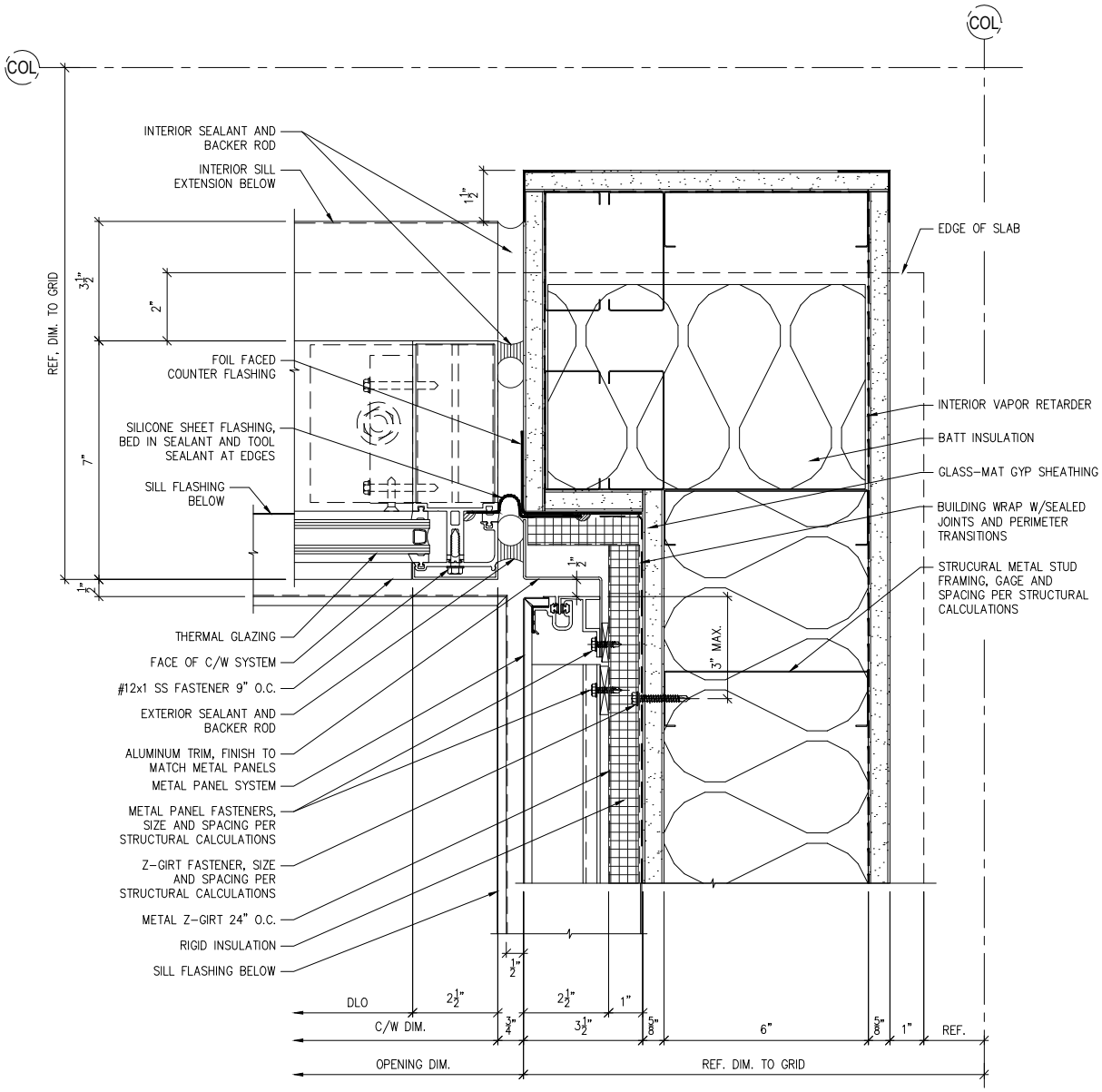
Detail development: What to do

The most common details need to show all of the routine features, such as: typical aesthetic characteristics, framing system components, fasteners, accessories, basic dimensions, instruction notes and the interface relationship of the surrounding condition. This is the type of information that fully describes the product and the typical installation. Dimensions that clearly identify work points are critical. These details will show the product aesthetics and the dimensional information for producing and installing the product; they also cover a majority of the project. Unique conditions need to be clearly shown as well: for example, special product functions, different spatial relationships to the structure, connections, tolerances and installation sequences between adjacent materials.

Principles such as the product design, structural integrity and compliance with the performance specifications (e.g. for air/water/thermal resistance performance) should occur through collaboration within the project team as the detailing progresses. The details must accurately illustrate and reflect all of the decisions that have been made to this point. By the end of the process, the detail drawings need to stand on their own merit.

Verification of uncertain issues or conditions in the contract documents also is a valuable part of any detail solution. By focusing on the special features of these conditions and minimizing repetitive information, the detailer can create drawings that are more clearly and visibly understood.

There are different methods for developing a detail. One method involves a checklist. The list might consist of a standard set of general items to be included on all details or a highly defined list that covers many possibilities. A list can help the detailer identify items that apply to all kinds of details.



1 PLAN DETAIL @ JAMB
Scale: Arch Ref:

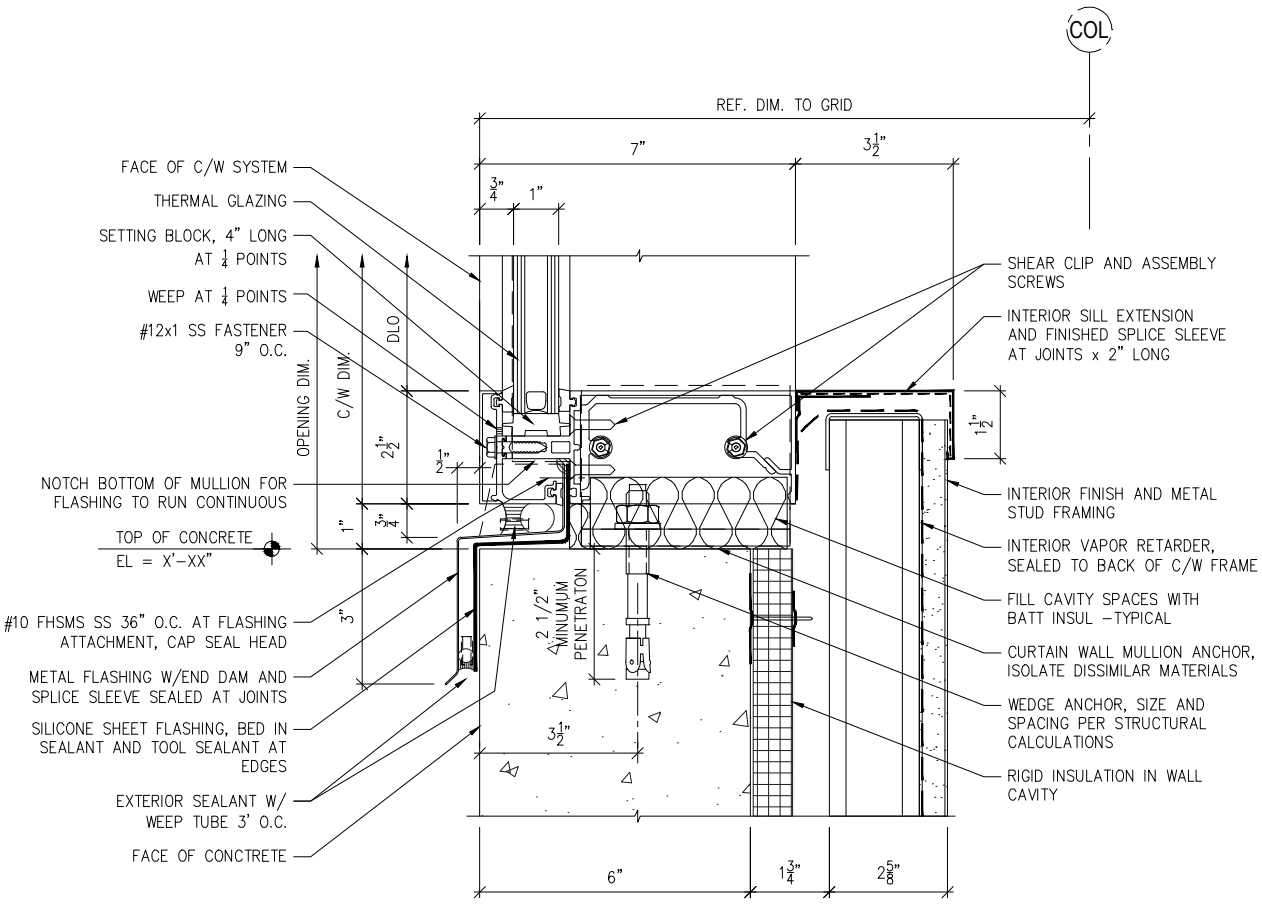
Above, a conventional pressure wall glazing system and metal panel system with materials identified at the perimeter seal and building wrap control layers. Note the silicone sheet that continues the building envelope to the glazing system. This detail provides sufficient information for the responsible subcontractors to coordinate their work and complete the building envelope.

Alternatively, the detailer can rely on visualization, keeping in mind every aspect of the product and its installation as if he or she were mentally constructing the materials shown in the detail. Experience and understanding of the project specifications and how materials fit together increase the ability of the detailer to communicate and describe the important features of a detail. The ability to visualize and see beyond the immediate plane of the section cut helps a detailer more clearly illustrate related objects and show meaningful features.

Whatever the process, a finished detail should be easy to understand with a reasonable amount of study. Any professional or tradesperson relying on the drawings should be able to clearly interpret the detail. If not, the detail might have missed the mark.

What not to do

Insufficiently developed details can result in costly misinterpretations and project delays. Understandably, the depth of information needed



2 SECTION DETAIL @ SILL
Scale: Arch Ref:

Above, a sill at a concrete wall with flashing requirements. This detail shows the placement of materials typically sketched in as "by others" such as flashing, insulation and interior vapor retarder. Note the same materials at the perimeter seal and building wrap control layers are carried all around the window perimeter to show how the building envelope is maintained.

to support highly custom products compared to standard products varies. In either case, however, coordination of the surrounding condition is important. An unanswered question in the detail leaves interpretation up to the worker in the shop or field. In the event a hasty and uninformed decision is made during field installation (e.g. on a weldment or fastener type), a potentially dangerous situation can result, with unwarranted risk.

Drawings that simply collate standard details and count prescribed parts are easy to spot. Although they do a good job identifying the product aesthetically and dimensionally, they fall short of defining the installation interface between trades. This presents itself as a lack of information in identifying adjacent materials and tying them together in an accessible sequence. Most commonly, this occurs between overlapping building membranes with flashing and perimeter sealant areas.

Detailing within the building cladding industry is a multifaceted challenge. It combines the artistry of technical drawing and design with the practicality necessary to meet requirements from a business point of view in terms of profit and risk. As a bridge of communication between a company's contract obligations and the finished product, a successful detail is one that stands on its own merit and is intuitively understood at a glance, without explanation.

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