Required Backgrounds for Fire Sprinkler System Design using HydraCAD for Revit

To ensure an accurate, coordinated, and code-compliant fire sprinkler system design, the following background files are required. Providing complete and correct files at the start of the project will prevent delays, rework, and additional costs.

Preferred Background Files (Revit)

Revit models are strongly preferred for all BIM-based projects. The following files shall be provided:

- Architectural (.rvt)
- Structural (.rvt)
- Mechanical, Electrical, and Plumbing – MEP (.rvt)

Note: If the project was originally designed in Revit (Architectural, Structural, and/or MEP) and the Revit models are not provided, resulting in the use of standard 2D DWG files—additional effort may be required to reconstruct the building geometry, consolidate zone-based drawings, clean up backgrounds, and link multiple files into Revit. Any additional costs associated with this effort will be evaluated on a case-by-case basis based on project size and complexity.

AutoCAD Background Files (DWG)

When Revit files are not available, complete AutoCAD backgrounds may be accepted. All DWG files must include all external references (X-refs), bound or provided, and shall be coordinated and current.

Required DWG files include:

1. Site utility plan showing fire service lead-in, hydrant locations, pipe sizes and materials, and city main size and material.
2. Floor plans with all room names clearly identified.
3. Reflected ceiling plans showing lighting fixtures, diffusers, ceiling types, and ceiling heights.
4. Structural plans.
5. Full building sections and stair sections where applicable.
6. Mechanical / HVAC plans.
7. Electrical lighting plans, including unit lighting if not shown on the reflected ceiling plans.

General Requirements

Incomplete, uncoordinated, or missing background information may result in additional design time, schedule impacts, and added fees. All provided backgrounds must reflect the latest architectural and engineering revisions at the time of submission.

Background Requirements: Composite Floor Plans and Reflected Ceiling Plans

3D Fire Design, LLC does not assemble composite floor plans or reflected ceiling plans (RCPs) from unit-plan DWG files and external references (xrefs). If the backgrounds we receive are individual unit plans or xrefs that have not been put together into complete per-level drawings, we ask that the architect of record, or the party holding the architectural files, provide finished, assembled backgrounds before fire sprinkler design starts. There are three reasons for this policy.

1. Our production platform is Revit, not AutoCAD

Our design, BIM coordination and hydraulic workflow runs in Autodesk Revit. We link architectural backgrounds into the model; we don't produce them. Rebuilding a building from xrefs means placing, mirroring, rotating and aligning each unit plan in its correct position on every level, and managing nested references, coordinate systems, insertion points and layer standards. That is specialized AutoCAD drafting work, and it isn't a service our firm is set up or staffed to provide at a professional standard.

2. It adds a lot of time and cost without adding value to the design

Assembling plans from scattered xrefs takes a lot of labor, especially on multifamily, hospitality and other repetitive-unit buildings where dozens of units must be placed and oriented one at a time across several levels. That work adds no value to the fire protection design. It would delay the project and add cost to the owner and contractor, and the result would only reproduce information the design team already has in its own files.

3. We cannot take responsibility for architectural documents

We are fire sprinkler designers, not architects. Building an architectural floor plan or RCP means deciding how units are placed, which way they face, where walls, ceilings and soffits go, and how the parts of the building relate to each other. Those decisions belong to the architect of record. If we built these backgrounds ourselves, our sprinkler layout, head spacing, obstruction checks, ceiling heights and hydraulic calculations would all rest on drawings the architect never prepared or verified. One misplaced or wrongly mirrored unit could carry errors through the whole design, and through installation. To protect the project and keep responsibilities clear, we only work from backgrounds issued by the responsible design professional.

What we need to begin design

- Complete, assembled floor plans and RCPs for each level, as DWG files with all xrefs bound or included and correctly placed, or
- The architectural Revit model(s), which we prefer.

If only unit-plan xrefs are available, we suggest asking the architect's CAD/BIM team to produce the composite per-level drawings. They can do it quickly and accurately because they hold the source files and the design intent. Once we receive complete backgrounds, we will link them into Revit by level and go ahead with the fire sprinkler design.