

## Virtual Design and Construction (VDC) Functions

<p>*Interactions: As a project develops, functions may be added or deleted, and interactions might vary based on capabilities of the parties and whether or not a specific consultant is on board for a particular function. In an IPD setting functions of parties are often blurred - i.e., any party might use or support any function. The notations here refer to the most prevalent interactions.</p> <p><b>Lead:</b> Primary author. Note that some functions have multiple leads - this can be different leads for different aspects (e.g., 2D Drawing Generation) or a collaboration (e.g., Design Decision Support).</p> <p><b>Support:</b> Provide input to the Lead.</p> <p><b>Use:</b> Extract output from the model for input to one's own work.</p>		Phase								Interaction with Model* L=Lead, S=Support, U=Use				
		Conceptualization	Criteria Design	Detailed Design	Implementation Docs	Final Buyout	Agency Review	Construction	Closeout	Owner	Architect	Engineers	GC	Subcontractors
<b>1</b>	<b>Visualization</b>													
1.1	Design decision support									S	L/U	L/U	S	S
1.2	Rendering									U	L/U			
1.3	2D Drawing generation										L/U	L/U	U	L/U
<b>2</b>	<b>Space or Program Planning</b>													
2.1	Programming									S	L			
2.2	Safety and security									S	L/U			
2.3	Disaster planning									S	L			
2.4	Code compliance, ADA compliance										L/U			
2.5	Operation simulation									S/U	L/U	S		S
<b>3</b>	<b>Analysis</b>													
3.1	Structural analysis										S	L/U		S
3.2	Sun path and climate studies										L/U	L/U		
3.3	Comfort studies									U	L/U	L/U		
3.4	Ventilation (natural and artificial)										S/U	L/U		
3.5	HVAC sizing and configuration										S/U	L/U		L/U
3.6	CFD (computational fluid dynamics)										S/U	L/U		U
3.7	Lighting (natural and artificial)									S	S/U	L/U		
3.8	Energy consumption										S/U	L/U		S
3.9	Fire safety, smoke modeling, fire evacuation										S/U	L/U		
3.10	Acoustics									S	S/U	L/U		
3.11	Code review										L			
<b>4</b>	<b>Sustainability Measures</b>													
4.1	Design for credits (LEED, other)									S	S/U	S	L	S
4.2	Design for carbon footprint									S	S/U	S	L	S
4.3	Design for renewable energy									S	L/U	L/U	S	S
4.4	Sustainability metric tracking										U		L	S
<b>5</b>	<b>4D Scheduling</b>													
5.1	Sequencing									U	S	S	L	S
5.2	Logistics planning												L	S/U
5.3	Detailed location-based schedule development									U	S	S	L	S
5.4	Location-based schedule tracking / control									U			L	S
5.5	Schedule animation									U			L	S

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6	Cost Estimating													
6.1	Value Engineering								S/U	S/U	S/U	L	S/U	
6.2	Target Value Design (TVD)								S/U	L/U	S	L	S	
6.3	Detailed estimating								U	S	S	L	S	
7	Construction Coordination													
7.1	Prefabrication									S	S	SU	L	
7.2	Constructability review									U	S	L	S	
7.3	Building system coordination											L	S/U	
7.4	Automated fabrication									S/U	S/U	S/U	L/U	
7.5	Shop drawing generation									S/U		U	L/U	
7.6	Permit submittals									L/U	S	S	S	
7.7	Laser scanning									U		L/U	U	
7.8	Laser survey - precision measurement									U		L/U	U	
7.9	Laser survey - precision layout									S	S	L/U	S/U	
7.10	Record model									U		L	S	
7.11	As-built model								U	U		L	S	
8	Closeout													
8.1	Punch list									S/U		L/U	S/U	
9	Facilities management													
9.1	Space and asset management								S/U	L	S	S	S	
9.2	Maintenance management								S/U	L	S	S	S	
9.3	Remodeling/repurposing								S/U	L	S	S	S	
9.4	Wayfinding and mapping								S/U	L	S	S	S	
9.5	Energy Management / BAS integration								S/U	L	S	S	S	
9.6	Security								S/U	L	S	S	S	