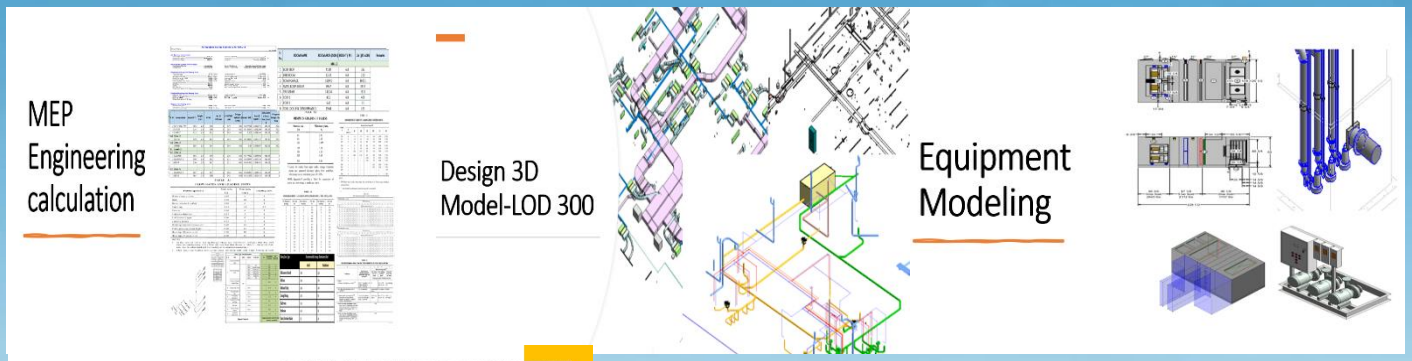
Year 2024-25

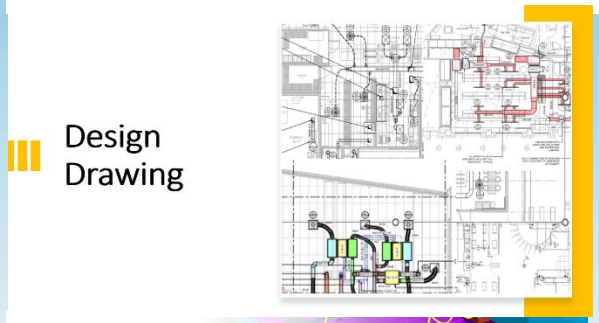
Pre – Construction Services

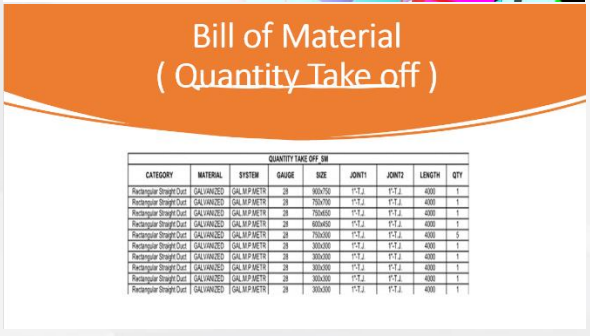
For

MEP SYSTEMS

(MECHANICAL, PLUMBING & ELECTRICAL)







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About us

DESIGN AND DRAWING SOLUTION offers Pre - construction documents for MEP systems. Our MEP team is having good knowledge of Australia & New Zealand MEP engineering designs & Pre construction document process & codes and guidelines.
Mechanical – AS1668.2 – 2012, AS 4254.2-2012, ASHRAE, SMACNA
| Plumbing – AS3500, IPC
| Electrical – NFPA, NEC

We are familiar with Australia & New Zealand standard practice and requirement of MEP design for all type of buildings, Industrial warehouses & Infrastructure construction i, e. from Interior Fit outs, single family apartment, high rise apartment, commercial office buildings, hotels, restaurant, hospitals, School, College including infrastructure construction like Airport, metro stains etc.

Using our BIM and 2D CAD outsourcing services, our clients have numerous advantages i.e. including time and cost savings which are realized during the design phase and more importantly, during the installation and build stages of construction projects. We are certified Autodesk users and started in Mumbai, India from early 2018 and having our representative in US as well as channel Partner.

DESIGN AND DRAWING SOLUTION
ONE STOP BIM | CAD | MEP ENGINEERING SOLUTIONS

6+ Years' Experience | **300+** Completed Projects | **150+** Customer world wide

Building Types includes

- Interior Fit out for Commercial / Residential
- Bungalows /Residential Apartments
- High Rise Residential building
- Commercial IT / Banks
- Hotels
- Institutional Buildings like school, Libraries, Auditoriums
- Hospital
- Entertainment Zones, Malls and Multiplexe
- Data Centre
- Industrial ware house

MEP Engineering Calculation

- Thermal Load Calculation
- Duct Pipe Sizing
- Ventilation Calculation
- Hydraulic Drainage & Water
- Pump Head Calculation
- Electrical Detail Engineering

Pre – Construction BIM Services

- Design 3D model (LOD -300)
- Design drawing
- BIM Co-ordination
- Qty Take off

CAD Services

- CAD Design Drawing
- Quantity Take Off

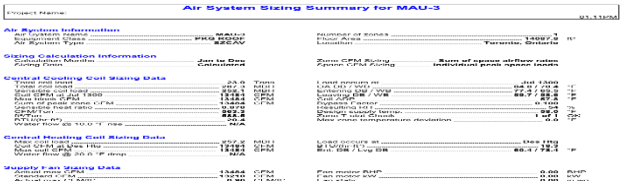
MEP Engineering calculation

Thermal Load calculation

As per the international standard like ASHRAE guidelines, we do thermal load calculation through HAP which we use to provide for our existing client for the mechanical system design assistance.

Basic Consideration or important factors are as follows.

1. Building North & Location for Outdoor design
2. Indoor Design Condition
3. U values for building envelope
4. Ventilation requirement and light



Duct Sizing & Flow measurement

As per the ASHRAE Standards, our engineering team use to calculate the duct size a per constant velocity method.

Standard Recommendation are as follows

Recommended Velocity

Supply Duct & Return Duct:

500 – 750 FPM

Exhaust Duct:

Shall be greater 500FM

Upto 1500 fmp

R No	Area name	Area(SFT)	Height (M)	CFM	No Of Diffuser	CFM/Diff user	Design Velocity (FPM)	Area (SFT)	Area (SQMT)	Calculated Duct Size (mm)	Proposed Design Duct Size
2	KITCHEN / PTY	303	2.7	536	3	179	600	0.297778	0.027675	187.76	200.00
3	ENTRY	324	2.7	606	3	202	600	0.336667	0.031289	199.65	200.00
4	FAMILY	413	2.7	732	4	183	600	0.305	0.028346	190.02	200.00
A2	Zone 2										
1	GUEST	149	2.7	263	1	263	600	0.438333	0.040737	227.80	250.00
A3	Zone 3										
1	GAMES	285	2.7	504	1	504	600	0.84	0.078067	315.35	350.00
B	Level - 2										
B1	Zone 4										
1	MASTER	383	2.7	679	3	226	600	0.377222	0.035058	211.33	250
2	RUMPUP 1	390	2.7	692	3	231	600	0.384444	0.035729	213.34	250
3	BED 4	136	2.7	242	2	121	600	0.201667	0.018742	154.52	200
B2	Zone 5										
1	RUMPUP 2	207	2.7	367	2	184	600	0.305833	0.028423	190.28	200
2	BED 2	164	2.7	290	2	145	601	0.241265	0.022422	169.01	200
3	BED 3	162	2.7	287	2	144	602	0.238372	0.022154	167.99	200

Pipe Sizing

As per ASHRAE standard, we use to calculate pipe size based on the constant velocity standard.

Recommended Velocity for Piping

Branch Pip 0.5 m/se

Branch Header 0.7

-1 m/sec

Main Header 1- 2 m/sec

Based on the flow and standard recommended velocity, we use to calculate pipe size.

Ventilation Calculation

To calculate ventilation airflow, we use to follow recommended air changes per hour as per ASHRAE guidelines and based on the air changes, we calculate the ventilation airflow for proposed Zone.

Sr. No.	ROOM NAME	ROOM AREA (SQM)	HEIGHT (M)	L/s (@5 ACH)	Remarks
	MAU 2				
1	BODY SHOP	41.02	6.8	387	
2	LUBE ROOM	23.32	6.8	220	
3	REPAIR GARAGE	1699.5	6.8	16051	
4	SMALL EQUIP. REPAIR	395.7	6.8	3737	
5	TIRE REPAIR	141.04	6.8	1332	
6	CORR 1	43.2	6.8	408	
7	CORR 2	5.65	6.8	53	
8	TOOL LOCKUP & CONSUMMABLES	19.64	6.8	185	

Hydraulic Engineering -Drainage, Water & Vent

We use to do Plumbing hydraulic calculation based on the hydraulic fixture values as per code and equivalent water flow based on the hydraulic codes like ASPE and IPC.

Drainage Pipe Sizing

Individual fixtures connections are available based on the type of fixture and list as follows.

And maximum no of fixture to be connected as per the standards.

In standard practice we use 2, 3 & 4 inch of pipe sizes to cover the sewer drainage systems in small buildings.

For Highrise buildings, we use to referrer maximum no of fixture to connected on each stack to be followed.

Slope

As per standard practice and guidelines slopes as follows.

TABLE 5.2

MINIMUM GRADES OF DRAINS

Nominal size DN	Minimum grade, %
65	2.50
80	1.65
100	1.65*
125	1.25
150	1.00
225	0.65
300	0.40

* Except for drains from septic tanks, sewage treatment plants and unvented discharge pipes from tundishes, which may have a minimum grade of 1.00%.

NOTE: Appendix B provides a Table for conversion of grades as a percentage to grades as a ratio.

TABLE 3.1

MAXIMUM FIXTURE UNIT LOADING FOR VENTED DRAINS

Grade, %	Nominal size of drain, DN						
	65 (Note 1)	80	100	125	150	225	300
5.00	60	215	515	1 450	2 920	11 900	26 900
3.35	36	140	345	1 040	2 200	9 490	21 800
2.50	25	100	255	815	1 790	8 060	18 700
2.00	×	76	205	665	1 510	7 090	16 600
1.65	×	61	165	560	1 310	6 370	15 000
1.45	×	(50)	(140)	485	1 160	5 810	13 900
1.25	×	(42)	(120)	425	1 040	5 360	12 900
1.10	×	×	×	(380)	955	4 970	12 100
1.00	×	×	×	(340)	855	4 500	11 400
0.85	×	×	×	×	(725)	3 850	10 300
0.65	×	×	×	×	(595)	3 250	9 000
0.50	×	×	×	×	×	×	7 720
0.40	×	×	×	×	×	×	6 780

NOTES:

1 DN 65 drains may be used as branch drains only, provided that no soil fixtures (except urinals) are connected thereto.

2 '×' indicates that the combination of nominal size and grade is not permitted.

3 Figures in brackets are the maximum fixture unit loadings for drains laid at reduced grades as permitted by Clause 3.4.2.

Vent Pipe Sizing

Individual fixtures vent connection to be developed based on the available and on the type of fixture and list as required.

And header connections to be followed as per standard table.

Water Supply

To calculate water supply pipe sizing, we use to follow standard fixture consideration inline with code and guidelines and equivalent flow to work out sizes.

For individual circuit, we use to follow standard fixture sizes.

TABLE 3.1
FLOW RATES AND LOADING UNITS

Fixture/appliance	Flow rate, L/s	Flow rate, L/min	Loading units
Water closet cistern	0.10	6	2
Bath	0.30	18	8
Basin (standard outlet)	0.10	6	1
Spray tap	0.03	18	0.5
Shower	0.10	6	2
Sink (standard tap)	0.12	7	3
Sink (aerated tap)	0.10	6	2
Laundry trough	0.12	7	3
Washing/machine/dishwasher	0.20	12	3
Mains pressure water heater	0.20	12	8
Hose tap (20 nom. size)	0.30	18	8
Hose tap (15 nom. size)	0.20	12	4

NOTES:
1 In the case of valves and appliances where test information indicates that they will function satisfactorily with a flow rate less than that shown in Table 3.1, the tested flow rate may be substituted and the loading units adjusted accordingly.
2 Flow rates and loading units given above are taken with cold water flowing at each individual outlet.

To work out the sizes for branch and header piping networks as per standard piping length, head loss and the table provided below.

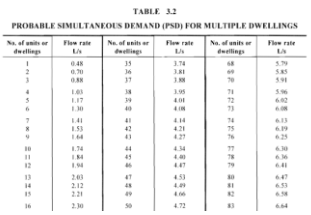


TABLE 3.2
PROBABLE SIMULTANEOUS DEMAND (PSD) FOR MULTIPLE DWELLINGS

No. of units or dwellings	Flow rate L/s	No. of units or dwellings	Flow rate L/s	No. of units or dwellings	Flow rate L/s
1	0.48	35	3.74	68	5.79
2	0.70	36	3.81	69	5.85
3	0.88	37	3.88	70	5.91
4	1.03	38	3.95	71	5.96
5	1.17	39	4.01	72	6.02
6	1.30	40	4.08	73	6.08
7	1.41	41	4.14	74	6.13
8	1.53	42	4.21	75	6.19
9	1.64	43	4.27	76	6.25
10	1.74	44	4.34	77	6.30
11	1.84	45	4.40	78	6.36
12	1.94	46	4.47	79	6.41
13	2.03	47	4.53	80	6.47
14	2.12	48	4.49	81	6.53
15	2.21	49	4.66	82	6.58
16	2.30	50	4.72	83	6.64

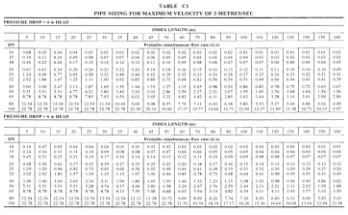
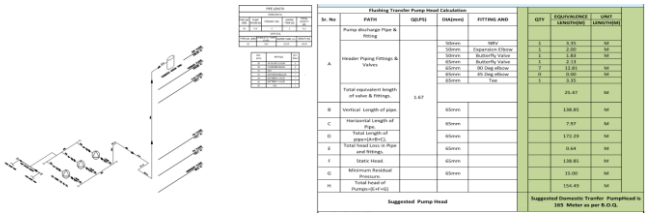


TABLE C1
PIPE SIZING FOR MAXIMUM VELOCITY OF 3 METRES/SEC

Pump Head Calculation

We do the pump head calculation through detail piping route to evaluate horizontal and vertical distance with all required fitting.

And as per the code, we do summarize piping and fitting losses to complete the pump head calculation.




Electrical Detail Engineering
(Circuiting and Cable sizing)

General Points

Supply voltage

Single Phase 240 v

Three Phase 400 v

Lighting & Power Loads

Based on the standard practice, electrical load can be worked out the main loads are as follows .

- Lighting
- General Power
- Other small Power like IT, and small power
- Equipment load like HVAC, Plumbing and Fire.

Lighting Design and control

We provide lighting points based on the lux required or as per samples or interior requirement. Control switch will provided as required and standard practice and samples.

Electrical Circuit Desing & Cable Sizing Lighting Circuit

Based on the demand factor, electrical demand load will be calculated to worked out the breaker sizes and cable size as required and standard practice.

Power Circuit :

Based on the available power socket locations as provided by the interior architect and samples and standard requirement , demand load will be calculated to calculate breaker and cable sizes.

Room/Zone Type	Recommended Average Illuminance (lux)	
	Initial	Maintained
Kitchen workbench	300	240
Kitchen	200	160
Kitchen/Living	200	160
Living/Dining	100	80
Bathroom	100	80
Bedroom	100	80
Entry/Corridor/Stairs	50	40

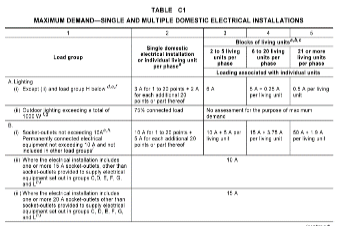
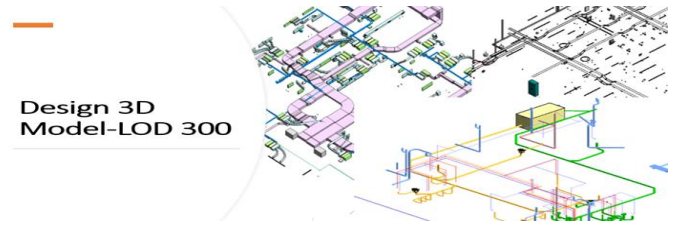
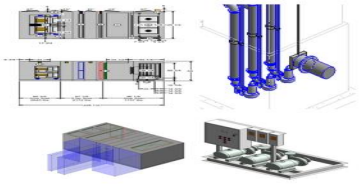


TABLE C1
MAXIMUM DEMAND—SINGLE AND MULTIPLE DOMESTIC ELECTRICAL INSTALLATIONS


Design 3D
Model-LOD 300

We are specializing in the virtual construction of 3D models of Mechanical, Hydraulic & Electrical systems i.e. duct, pipe, cable tray with fitting including all valves & accessories with all associated equipment's and fixtures.

We produce 3D Models based on contract drawings, technical specifications, and manufacturer details to client standards


Equipment
Modeling

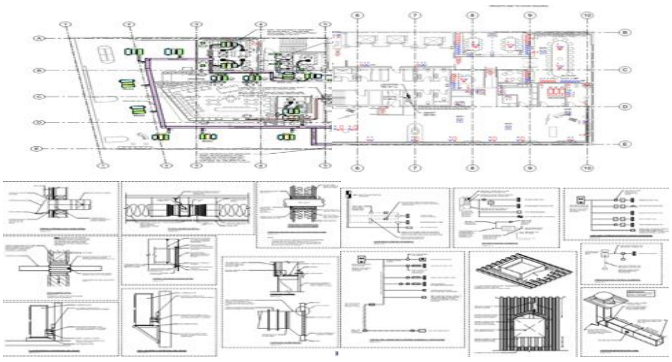
From the manufacturer's 2D drawings and in line with MEP schedules, we create a 3D model of all the MEP equipment such as PUMPS, AHU, RTU, CU, FCU, VAV, pumps, chiller fans, DG, panels, etc.

Design Drawing

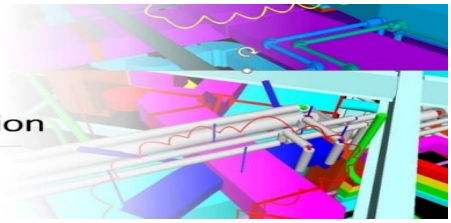
Based on the mark-ups, reference drawing, we produce the design drawing for MEP system and work out the detail branch duct, pipe sizes as per the schematic and produce the complete design drawings /Tender Drawing or Construction drawing.

Design drawing set will have following list of drawing

1. Legend, Notes & Specification
2. Floor Plans
3. Schematic / Isometric
4. Detail Sheet
5. Schedule

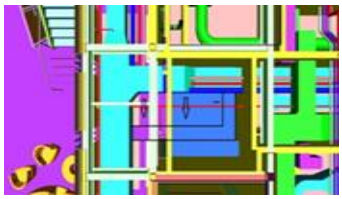


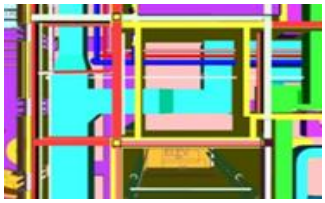
BIM Co- ordination



We generate a coordinated BIM model after resolving the clashes among all disciplines – Architectural, Structural, Concrete, Mechanical, Electrical, Plumbing, Fire Protection, etc.

Clashes are resolved through video conference discussion regarding the 3D clash snapshot and multiple fix options such as rerouting utilities, changing elevations, and resizing. Value engineering is also utilized to improve system efficiency, reduce costs, and provide for more efficient construction and maintenance.





Bill of Material (Quantity Take off)

Utilizing the BIM model, we can generate accurate quantities of all materials incorporated into the model. These quantities are automatically updated with any changes in the BIM model. Quantity Take-Off (QTO) reports can be formatted in MS Excel and exported to a database for detailed analysis.

Quantities can be generated for a specific time or project area (4D/5D) to help manage material procurement and save inventory costs. It is an automated procedure on the MEP model is 100% accurate as per the design.

CAD Design Drawing & Qty take Off

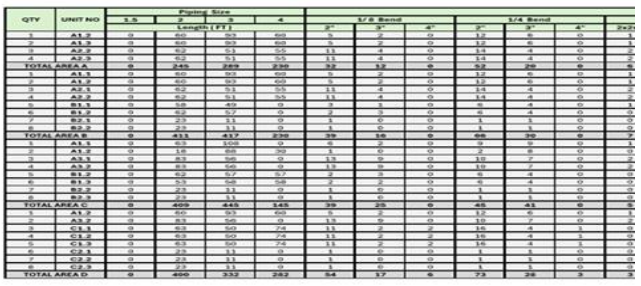
Still many clients are using AutoCAD to produce design drawings in CAD. Based on the mark-ups, reference drawing, we produce the design drawing for MEP system and work out the detail branch duct, pipe sizes as per the schematic and produce the complete design drawings /Tender Drawing or Construction drawing in CAD.

We have separate CAD team to produce this design drawing.

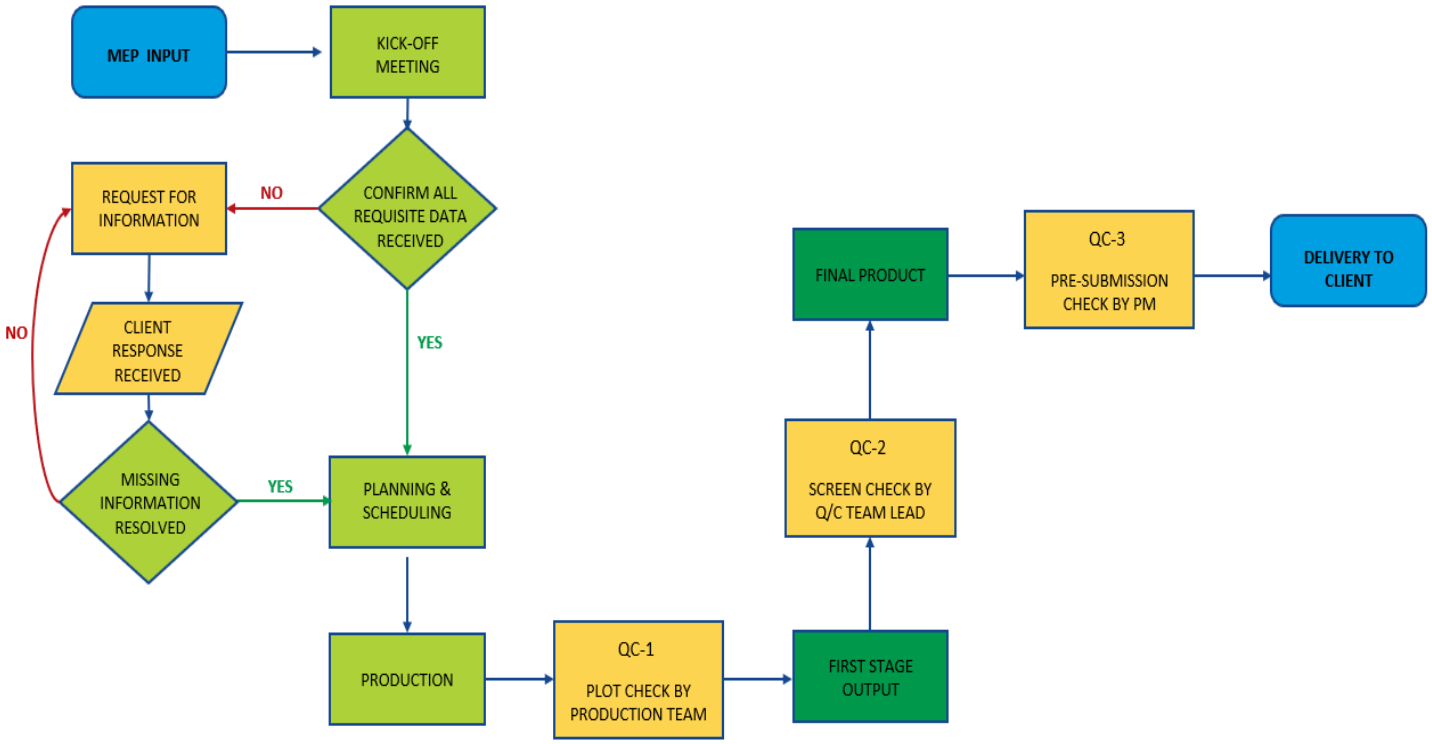
Qty Take Off:

We produce quantities of all materials for MEP systems. These quantities are generated from design drawing i.e. in PDF and CAD.

Quantity Take-Off (QTO) reports will in MS Excel for detailed analysis and estimation purpose.



Execution Process



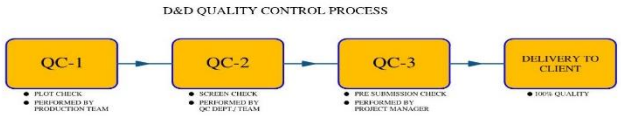
We use to implement our standard BIM/CAD execution process to deliver each and every project.

Stage 1: - We do kickoff meeting with our client for better understanding of the project to start.

Stage2: - We do project review, planning and prepare project specification checklist and delivery schedule and share with client.

Stage3: - We allocate our dedicated Team lead with team member inline with the services to start the production activities as per delivery schedule.

Final Stage: - We follow QC process in the execution process before delivered to the client.
With the above process, we deliver the high-quality product to client.



Quality Check – 1
The model check is done comparing it with the original contract documents through Team Member.

Quality Check – 2
Team performs a more detailed comparison with specific checklist and project checklist the deliverables and main objective check the following Clashes (Old/New), Elevation, Routing, Fittings, etc. Construction point of view.

Quality Check – 3
The Project manager conducts the pre- shipment check before sending them to client.

Core Team

Irshad Ali Shaikh
CE0 – Co-Founder

Mr. Irshad Ali is the co-owner & founder of DESIGN AND DRAWING SOLUTION. He is having more than 15years of experience in Building services in construction Industry throughout AEC project execution process from Pre-construction, construction Processes like MEP engineering consulting, Designing, installation and handover process of the project.

He has completed BE in Mechanical Engineering from Pune University with Post Graduation in Project Management (PGPPM) from NICMAR Pune, India. In his small journey, he has successfully delivered the more than hundred BIM/CAD project for his satisfied client with the best quality and unique team effort.

He has experienced in all kinds of projects i.e., starting from Residential township, Commercial IT buildings and parks, Malls, High rise building, Hotel, Hospital & Institutional building. Including building Infrastructure projects like metro, airports, globally i.e. USA, Australia, New Zealand & India.

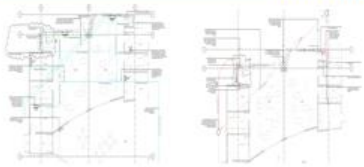
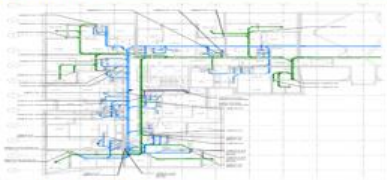
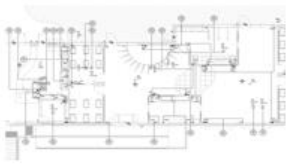
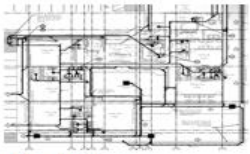
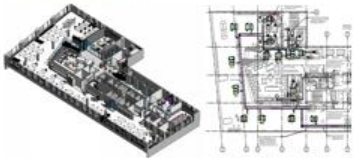
Karishma Bibi
Sales Head

She is the co-owner of DESIGN AND DRAWING SOLUTION and well experienced in offshore sales development initiatives. She is having a good knowledge of result-oriented sales development processes and customer retention. She is leading the complete sales team for B2B sales within the company and managing and monitoring the effectiveness of the entire sales cycle. She has implemented her interior design expertise to improve the technical expertise for client communication for offshore sales which helps her build a long-term relationship with new and existing clientele.

Rupam Mondal
Production Manager

He holds a Mechanical Engineering diploma form WBSCTE, India and having more than 7 years' experience in Building construction Industry for MEP engineering, Drafting, of 3D, 4D, 5D & 6D BIM service.
He is having expertise in MEP engineering calculation, with all Autodesk BIM/CAD tools like Revit, Fabrication, AutoCAD MEP, Navis works and AutoCAD and has complete knowledge of engineering and drafting services for all stages (Pre/post) of construction process.
He is working in DESIGNING AND DRAWING SOLUTION since from starting period of the company. With a short period of time, He has gained the managing process of the company, client communication, project management process and assisting with innovative (R & D) solution of new process, tools for new requirement of clients.

Project References

Mechanical & Plumbing		ELECTRICAL
		
St Mary's Hamilton 49 Hiller Lane, Hamilton Australia School	The Abbotsford stage 2 Bowen Hills Australia Appartment	Pimpama Childcare PIMPAMA QLD 4209 Australia School Building
		
Jimboomba childcare River street Australia School building	Kokowai Auckland New Zealand Appartment	Oakland Way Childcare PIMPAMA QLD 4209 Australia School Building
		
Accenture fit out Auckland New Zealand Restaurant	Favona Favona New Zealand Ware house	Logan Village 36-38 River St, QLD 4207 Australia School Building

Contact US

DESIGN AND DRAWING SOLUTION
ONE STOP BIM | CAD | MEP ENGINEERING SOLUTIONS

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