CONTENTS

COMPASS INTERNATIONAL INC.

Square Foot / Square Meter Estimating Background, Data & Forecasting Methods

"The path forward to the future success of a new pharmaceutical / hi-tech manufacturing facility is effective Engineering, Procurement, Construction and possibly Validation activities (EPC&V). The successful meshing together of these activities, should result in a positive outcome. The secret of success in producing accurate cost estimates - is front-end planning and the development of the project scope that the end-user requires to produce the "future" product, a scope of work (that spells out the intent of the project and the work that is to be accomplished) that the end-user can afford (one of the main reasons for this publication) and produces the required product quality, together with a completion date that meets the business goals of the end-user".

The impact of Covid-19, the Ukraine-Russia conflict, sky-high inflation and energy prices on Hi-Tech / Manufacturing Facilities (and the decisions to build new / revamped facilities) is still to be determined as we transition into 2023. As we look into the future as of late 2022 the issues to be faced in 2023 and beyond, include a myriad of topics (that have construction cost consequences), that will need to be considered and planned for. The High-Tech manufacturing / production industry as the engineering / construction professionals know it in 2023 will have changed dramatically in the next twenty years. Emerging economies such as China, India, Brazil and South Korea, to name but a few, will continue to forge ahead in developing their R & D and manufacturing bases. There is an increasing anxiety in some of the more developed nations as to how this will all play out and what impact this manufacturing / economic "sea change" will have on the future employment, costs and engineering / construction activities in Western Europe, North America and around the world. Hopefully this publication, and its future updates, will assist the reader in navigating and understanding the dynamics and the associated construction related costs, specific to Hi-Tech, Pharmaceutical facilities.

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THE GENERAL FORECAST FOR 2023 AND BEYOND:

(Specific to the Hi -Tech Industry and to the construction of these facilities).

- It is a fact of life that the North American and Western European pharmaceutical / biological manufacturing industry and the engineering and construction sector that supports it is facing uncertain times as we transition into 2023 and beyond. Puerto Rico's pharmaceutical facilities suffered a major blow when Hurricane Maria hit the island in mid September 2017. Some of these facilities were offline for 2 to 4 months. Healthcare cost are increasing, the

FACILITY TYPE	TOTAL INSTALLED $ COST PER GROSS SF - LOW VALUE	TOTAL INSTALLED $ COST PER GROSS SF - HIGH VALUE	TOTAL INSTALLED $ COST PER GROSS M2 - LOW VALUE	TOTAL INSTALLED $ COST PER GROSS M2 - HIGH VALUE
CONTINUED				
Toner / Ink production facility 58,800 SF including production equipment	78	166	843	1,782
Toxicology R&D facility	215	412	2,314	4,432
Unclassified clean area - less than 1,500 SF (ISO 9)	118	282	1,271	3,033
Unclassified clean area - greater than 1,500 SF (ISO 9)	96	238	1,028	2,562
University new biomedical / cancer BSL - 3 research facility	385	803	4,142	8,643
University new dental / medical building with BSL-2 / BSL-3 areas	446	762	4,799	8,201
University new Genomics R&D facility	198	386	2,128	4,152
University new teaching facility	157	326	1,685	3,504
Vaccine R&D - Counter Bio -Terrorism BSL -3 facility	429	734	4,621	7,896
Animal R&D testing colony facility	227	565	2,440	6,081
Weapons research & development / testing / dismantling facility (ISO 6,7 and 8 c/w other non classified areas)	325	561	3,501	6,037

General Notes: The above values include or exclude the following.

- Includes: All constriction work
- Includes: Utilities / Support equipment and systems
- Includes: Preliminaries / General Conditions
- Excludes: Land purchase
- Excludes: Site work outside the building footprint (Parking Areas, Roads, major utility buildings, water treatment plants)
- Excludes: Furniture and Fixtures
- Excludes: Move in costs
- Excludes: Bench top equipment
- Excludes: Computers / telephone service

Typical Breakout of Cost as an Overall % of Laboratory Facility

COST % BY CONSTRUCTION CATEGORY FOR A NEW LABORATORY / R&D FACILITY

CATEGORY	% RANGE	% AVERAGE
CIVIL / ARCHITECTURAL TRADES		
General Conditions / Preliminaries	4.00 - 6.00	4.90
Excavation / Site Work / Piling / Caissons	1.50 - 3.50	2.90
Concrete Foundations / SOG / Elevated Flatwork	2.00 - 3.50	3.00
Superstructure (Load bearing walls / Structural Steel)	6.50 - 9.50	8.60
Exterior Closure (Curtain walls, Pre-cast Concrete, Facing bricks, Dryvit or a combination of all - note exterior doors are in this value)	5.50 - 8.50	7.80
Roofing system	1.00 - 2.50	1.50
Interior Construction (Drywall, Flooring, Ceilings, Internal Doors, Painting, Carpet, Floor finishes)	8.50 - 13.50	12.30
Elevators	0.50 - 1.50	0.80
Sub Total Civil / Architectural Trades		**41.80**
MECHANICAL / ELECTRICAL TRADES		
Plumbing / any process related piping	7.50 - 12.50	10.50
Fire Protection	1.00 - 2.50	1.90
HVAC (AHU & Ductwork)	17.00 - 25.00	21.40
Electrical Systems	9.50 - 13.50	11.40
Building Automation / Security / CCTV / Card Readers	1.75 - 3.75	2.80
Sub Total Mechanical / Electrical Trades		**48.00**
OTHER COSTS		
Equipment (Minor)	0.50 - 2.00	1.30
Casework / Fume Hoods / Cold Boxes	5.50 - 10.50	8.90
Sub Total Other Costs		**10.20**
TOTAL		**100.00**

Excludes

- Major site works outside the footprint of the building / facility, including roads and parking areas
- Land purchase
- A / E and CM costs including Owner engineering activities etc
- Demolition / asbestos / lead paint removal
- Any major production equipment
- Note: site indirect costs (construction equipment, supervision etc pro-rated into above percentage values).

The following cost models / facility benchmarks are based on completed or substantially completed projects, additional cost models are to be found in Section 2 of this publication.

- see following pages

(A) Typical Cost distribution by major Construction Category specific to R&D– Pilot Plant Facility (designed to ISO Class 7 - 10,000 - 4,400 SF and ISO Class 8 – 100,000 - 76,500 SF)

- 121,500 SF / 11,290 M2 on 2 Floors 2008 Cost of $424 SF / $4,564 M2
- see chart following.

50.0 University Research Center

7 FLOORS PLUS 2 BASEMENT AREAS, 14 FT STORY HEIGHT, 277,770 SQUARE FEET (DESIGNED TO BSL2 & 3 REQUIREMENTS)

EXTERIOR	COST PER SQUARE FOOT - M2
Brick, concrete block back-up steel frame	$1,000 - $10,760
Pre cast panels, steel frame	$1,040 - $11,190
Metal and Glass or Stone Curtain wall	$1,100 - $11,835

Building / Facility Type: University Research Center

DATA TABLE

CSI DIVISION	DESCRIPTION	% RANGE OF COST	REMARKS
1	General Requirements	5.50 – 10.50	Gen Conditions / Preliminaries
2	Site Construction	8.50 – 12.50	
3	Concrete	5.00 – 7.50	
4	Masonry	3.50 – 5.50	
5	Metals	3.00 – 6.50	
6	Wood & Plastics	11.50 – 16.50	
7	Thermal & Moisture Protection	7.50 – 9.50	
8	Doors & Windows	4.50 – 6.50	
9	Finishes	10.50 – 18.50	
10	Specialties	1.50 – 2.50	
11	Equipment	0.50 – 1.50	
12	Furnishings	0.50 – 2.50	
13	Special Construction	0.50 – 2.50	
14	Conveying Systems	2.00 – 5.50	
15	Mechanical	40.00– 70.00	
16	Electrical	10.00 – 17.50	
	Total Percentage	100.00	
	A / E Fees	7.50 – 14.00	Percentage of Construction Cost
	CM Fees	5.00 – 7.50	Percentage of Construction Cost

EXCLUDES: *New utilities outside building footprint, parking areas, roads, gatehouses, fencing, landscaping, and demolition of existing facilities:*

- The estimate / take off should recognize any vents, drains and waste piping systems (that are usually field run), couplings, expansion joints, thermo welds, weldolets, jumpers and strainers etc that are need and to what level of magnitude.
- Establish scope / and quantity of steam tracing required and estimate accordingly (spiral or straight run tubing).
- Ensure that existing systems are drained and safe prior to new tie-ins to piping systems.
- The estimate / take off should recognize any breaking up of paved areas, excavation, planking & strutting, stone bedding materials, thrust blocks, backfilling and any off site disposal, road crossings and the reinstatement of road or paved areas.

BIOTECH / PHARMACEUTICAL PROCESS FACILITY PIPING:

The piping related to a Biotech / Pharmaceutical Process Facility is typically a big piece of the overall pie. The cost of this work typically runs between 25% - 50% of the total installed cost of the completed facility, so care and attention needs to be taken in scoping out and estimating this element of the project. This topic can be somewhat complex, due to the fact that there are so many systems to consider. The only way to estimate this scope is to break it down into smaller pieces. Some of the systems that will be encountered are listed below:

- Process piping
- HVAC piping
- Service piping for Manufacturing / Process Equipment
- Vacuum systems
- Compressed air systems
- Reverse Osmosis piping (RO)
- Water systems
- Water for injection piping (WFI)
- De-ionized water piping (DI)
- Laboratory gases
- Cryogenic storage systems
- Sanitary treatment
- Drainage system
- Clean in place systems (CIP)
- Steam in place systems (SIP)
- Gases (CO2, nitrogen, argon, natural gas and perhaps more) needed to be quantified.

These and many other systems too numerous to mention need to be "scoped out" and estimated. Biotech / Pharmaceutical process facility type piping must be fabricated and installed to high quality standards. The quality of these piping systems is vital for the future production, safety, quality, and future profitability of any biotech / pharmaceutical company.

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Issues that need to be considered in estimating this type of work includes: materials to be used. There are numerous materials that could be selected that have cost consequences associated with them, some of the most commonly used materials are aluminum, brass, carbon steel, stainless steel, cast iron, copper (some of these are corrosion resistant materials), CPVC, polypropylene pipe, and double wall materials – jacketed piping. Additional items to bear in mind are various cleanouts / clover leaf fittings, gas piping, glass pipe applications, PVC applications, fiberglass reinforced pipe (FRP), various pipe liners, fittings, valves, shock absorbers, hangars and various wrappings. There are two distinct types of piping in Biotech facilities, (1) piping that comes into direct contact with the finished product, many times referred to as "clean piping" more often than not SS 304 and 316, and (2) piping that does not come into direct contact with the finished product, many times referred to as "non clean piping". These piping systems can be copper, carbon steel, plastic and a host of other "less" expensive materials. Pharmaceutical piping systems and manufacturing / production equipment usually makes use of stainless steels applications, stainless steel 304, 304 L, 316, and

SS Welding - Man-hours

BUTT-WELD FITTINGS 304 AND 316 SS SCHEDULE 40

DIAMETER	TEE	180° ELBOW	90° ELBOW	45° ELBOW	CONCENTRIC REDUCER
1/2"	2.45	1.25	1.25	1.25	1.20
3/4"	3.25	2.25	2.25	2.25	1.75
1"	4.25	3.00	3.00	3.00	2.60
1 1/2"	6.35	4.25	4.25	4.25	4.00
2"	8.00	6.00	6.00	6.00	5.20
3"	10.50	7.00	7.00	7.00	6.00
4"	12.50	8.00	8.00	8.00	7.00

SS Welding - Man-hours

BUTT-WELD FITTINGS 304 AND 316 SS SCHEDULE 80

DIAMETER	TEE	180° ELBOW	90° ELBOW	45° ELBOW	CONCENTRIC REDUCER
1/2"	2.74	1.40	1.40	1.40	1.33
3/4"	3.64	2.52	2.52	2.52	1.94
1"	4.76	3.36	3.36	3.36	2.89
1 1/2"	7.11	4.76	4.76	4.76	4.44
2"	8.96	6.72	6.72	6.72	5.77
3"	11.76	7.84	7.84	7.84	6.66
4"	14.00	8.96	8.96	8.96	7.77
6"	17.92	13.44	13.44	13.44	8.88

Process Piping

DATA TABLE

DIAMETER	$ MATERIAL COST PER LF	$ M-H COST PER LF	$ COST PER LF	$ MATERIAL COST PER M	$ M-H COST PER M	$ COST PER M
Alloy 20 schedule 40 Complicated / Intricate (ISBL - Inside Facility) Piping - Numerous changes in direction						
2" / 50 mm	132.82	127.97	260.78	435.64	419.73	855.36
4" / 100 mm	423.35	227.31	650.66	1,388.58	745.57	2,134.15
6" / 150 mm	837.97	331.69	1,169.66	2,748.55	1,087.94	3,836.49
Add 4.5% - 7.5% to labor & material costs for hangars, bolts, gaskets & testing						
Alloy 20 schedule 40Staight run / OSBL Piping - Less Welding						
2" / 50 mm	57.45	62.38	119.83	188.43	204.60	393.03
4" / 100 mm	196.38	111.95	308.33	644.13	367.20	1,011.33
6" / 150 mm	388.75	1,636.07	2,024.82	1,275.10	5,366.31	6,641.41
Add 4.5% - 7.5% to labor & material costs for hangars, bolts, gaskets & testing						
Aluminum schedule 40 Complicated / Intricate (ISBL - Inside Facility) Piping - Numerous changes in direction						
2" / 50 mm	32.33	110.14	142.47	106.03	361.27	467.29
4" / 100 mm	70.84	203.05	273.89	232.35	666.01	898.36
6" / 150 mm	133.23	297.88	431.11	437.01	977.03	1,414.04
Add 4.5% - 7.5% to labor & material costs for hangars, bolts, gaskets & testing						

Piping
CONTINUED

DIAMETER	$ MATERIAL COST PER LF	$ M-H COST PER LF	$ COST PER LF	$ MATERIAL COST PER M	$ M-H COST PER M	$ COST PER M
FRP - Furan Straight run / OSBL Piping						
2" / 50 mm	56.37	24.31	80.68	184.89	79.74	264.63
3" / 75 mm	70.94	33.76	104.70	232.68	110.74	343.42
4" / 100 mm	85.11	43.40	128.51	279.17	142.35	421.52
6" / 150 mm	108.76	72.33	181.08	356.72	237.24	593.96
8" / 200 mm	163.92	106.09	270.01	537.64	347.98	885.62
10" / 250 mm	211.20	130.20	341.40	692.73	427.06	1,119.79
12" / 300 mm	264.79	159.14	423.94	868.52	522.00	1,390.52
Add 4.5% - 7.5% to labor & material costs for hangars, bolts, gaskets & testing						
FRP - Epoxy - Double Walled Pipe Complicated / Intricate (ISBL - Inside Facility) Piping - Numerous changes in direction						
1" dia. inside a 3" dia.	185.57	125.89	311.45	608.66	412.91	1,021.57
2" dia. inside a 4" dia.	268.59	217.88	486.47	880.97	714.64	1,595.61
3" dia. inside a 6" dia.	294.63	363.13	657.77	966.40	1,191.08	2,157.48
4" dia. inside a 8" dia.	356.49	469.67	826.16	1,169.29	1,540.51	2,709.80
6" dia. inside a 10" dia.	444.39	648.81	1,093.20	1,457.60	2,128.09	3,585.69
Add 4.5% - 7.5% to labor & material costs for hangars, bolts, gaskets & testing						
FRP - Epoxy - Double Walled Pipe Straight run / OSBL Piping						
1" dia. inside a 3" dia.	69.98	53.27	123.25	229.53	174.72	404.25
2" dia. inside a 4" dia.	96.01	62.94	158.96	314.92	206.46	521.38
3" dia. inside a 6" dia.	122.05	111.36	233.40	400.31	365.25	765.57
4" dia. inside a 8" dia.	151.33	160.36	311.69	496.36	526.00	1,022.36
6" dia. inside a 10" dia.	249.79	229.84	479.63	819.31	753.89	1,573.20
Add 4.5% - 7.5% to labor & material costs for hangars, bolts, gaskets & testing						

The following is a listing of various material adjustment values (specific to piping) calibrated against carbon steel A 53, A 36, A 515 and A 285C. These adjustments could be utilized to determine various OOM budget variables between differing material specifications (a word of warning this is reasonable for the material content however the installation / welding activities should separately evaluated, welding of stainless steel and other exotic materials may require 10-35% more man hours than the welding / installation of carbon steel piping systems). This material uplift is dependent upon size of order, for large orders use the lower uplift. See chart next page.

The following chart indicates budget-pricing (material only for various types of Stainless steel tubing / piping) conforming to ASTM 269 and ASTM 270 0.065 wall thickness:

Note: for large orders discounts of 5% -35% are available on the following prices.

See chart next page.

Table 9

ONCOLOGY R& D LABORATORY PRODUCTION FACILITY

SCOPE ITEM	% OF PROJECT	$ / SF	$ / M2	LABOR / MATERIAL SPLIT
Gen Conditions / Preliminaries	6.5	34.00	365.79	L = 35% / M = 65%
Site work / Civil / Foundations	5.5	28.77	309.51	L = 37% / M = 63%
Structural / building enclosure / roof / windows / ext doors	5.6	29.29	315.14	L = 40% / M = 60%
Architectural finishes internal walls / floors/ ceilings / int doors	13.5	70.61	759.71	L = 57% / M = 33%
Pharmaceutical support items i.e. pass thru, airlocks etc	0.5	2.62	28.14	L = 20% / M = 80%
Process / Manufacturing Equipment (P/ME)	3.4	17.78	191.33	L = 5% / M = 95%
Utility / Support equipment (U/SE)	6.6	34.52	371.41	L = 40% / M = 60%
Install equipment & hook up services (P/ME & U/SE)	0.8	4.18	45.02	L = 55% / M = 45%
Process pipe / services (SS 304 / 316)	9.4	49.16	528.98	L = 55% / M = 45%
Utilities piping (CI, CU, PVC, CS) including o/s building footprint	5.6	29.29	315.14	L = 55% / M = 45%
HVAC & AHU' s / Ductwork	13.4	70.08	754.08	L = 55% / M = 45%
Plumbing	2.7	14.12	151.94	L = 55% / M = 45%
Fire protection	1.4	7.32	78.78	L = 60% / M = 40%
Facility Electric	6.6	34.52	371.41	L = 60% / M = 40%
BMS / Security	1.2	6.28	67.53	L = 55% / M = 45%
Miscellaneous items and vendor assistance	0.4	2.09	22.51	L = 50% / M = 50%
Detailed Design	10.2	53.35	574.00	L = 95% / M = 5%
CM services	5.6	29.29	315.14	L = 90% / M = 10%
Validation	1.1	5.75	61.90	L = 95% / M = 5%
Total	**100**	**523**	**5627.48**	

Table 10

COSMETIC PRODUCTION

#	SCOPE OF WORK ITEM	% OF PROJECT	$ / SF	$ / M2
1	Preliminaries / General Conditions	7.22%	21.44	230.73
2	Site work / Civil / Piling / Foundations	7.15%	21.24	228.49
3	Structural / building enclosure / curtain wall / roof / windows / ext doors	7.05%	20.94	225.30
4	Facility architectural finishes internal walls / floors/ ceilings / internal doors	7.35%	21.83	234.89
5	Manufacturing support items i.e. tanks / agitators / conveyors etc	2.18%	6.47	69.67
6	Production / Manufacturing / Packaging Equipment	9.80%	29.11	313.18
7	Utility / Support equipment	7.30%	21.68	233.29
8	Install equipment & hook up services	2.05%	6.09	65.51
9	Process pipe / services (CS, SS 304 / 316)	6.23%	18.50	199.09
10	HVAC & AHU' s / Ductwork	8.26%	24.53	263.97
11	General Plumbing	2.23%	6.62	71.26
12	Service / utilities piping including o/s building footprint	4.20%	12.47	134.22
13	Fire protection	1.50%	4.46	47.94
14	Facility Electric	6.36%	18.89	203.25
15	Instrumentation / BMS / Security	3.40%	10.10	108.65
16	Miscellaneous items and vendor stat up support	2.26%	6.71	72.22
17	Engineering / Detailed Design	9.34%	27.74	298.48
18	CM services	6.12%	18.18	195.58
	Total Installed Cost	**100.00%**	**297.00**	**3,195.72**

CAPEX Cost Estimating Types / Engineering Deliverables Required

REF #	ENGINEERING DELIVERABLES / DETAILED DESIGN DATA	A	B	C	D	E
1	Approved written Scope Document / Scope of Work Statement.	1	2	3	6	6
2	Plant location	1	3			
3	Facility / Plant production target		1	3		
4	Milestone schedule dates / Bar chart listing Engineering / Procurement and Construction start and finish dates	1	2	3		
5	Detailed CPM / gnat chart schedule / Integrated project schedule			3	6	6
6	Permits (Environmental impact study / State / Local / Building)		4	4		
7	Approved Project Design Basis		3	3	6	6
8	Completion of similar project	5	5	5	5	5
9	Soil investigation / hydrology report /environnemental survey		1	2	3	
10	Preliminary plot plan	1	2	3		
11	Final plot plan			3	6	6
12	Preliminary equipment list	1				
13	Site visit by estimator (mandatory for C, D & E)			4	4	4
14	Product and manufacturing capacity / targets		1	2	3	6
15	Process flow diagrams PFD's / Block flow diagram		1	3	4	4
16	Approved Equipment List			3	6	6
17	Approved Equipment specifications			3	6	6
18	Approved Heat & Balance report			3	6	6
19	Preliminary engineering (P&I D's) flow diagrams		2	3	6	6
20	Final / Signed Off engineering (P&I D's) flow diagrams			3	6	6
21	Preliminary Major equipment (M.E.) list with sizes and materials specifications	1	2	3	6	6
22	Major Equipment (M.E.) detailed list with sizes and specifications			3	6	6
23	Approved equipment layout drawings			3	6	6
24	Final equipment layout drawings			3	6	6
25	Major S/C quotations			3	6	6
26	(M.E.) Major Equipment list with firm bids / prices and vendor assistance values			3	6	6
27	Use of refurbished equipment	1	2	3	6	6
28	Determine utility / offsite support requirements		1	3	6	6
29	Approved utility flow diagrams (UFD's)			3	6	6
30	Listing of utility equipment together with budget pricing		2	3	6	6
31	Final utility flow diagrams and Final Pricing from vendors		1	3	6	6
32	Building footprint sizes / Space needs / Room use		1	2	3	6
33	Building footprint sizes / elevations / sections and specifications / select ion of materials of construction		1	2	3	6
34	Demolition scope details		1	2	3	6
35	Preliminary foundation design		1	2	3	6
36	Preliminary structural steel design		1	2	3	6
37	Architectural elevations, details and finish schedule		1	2	3	6
38	AFC C/S/A drawings		1	2	3	6
39	25 – 40% engineering (P&I D's) flow diagrams Material of construction selected			2		
40	P& I D's flow diagrams 30% – 70% complete, pipe racks / hangars are conceptually designed (early conceptual take-off completed)				2	
41	P&I D's 80% approved – (computerized bills of quantity generated)			2	6	6
42	Process control / automation - I/C philosophy			3	6	6

- Time card / security
- Material management / logistic requirements

CLIMATIC CONDITIONS

- Installation tolerances (high / low temperatures)
- Temporary heating
- Snow removal
- Temporary protection of completed work
- Pumping of rainwater
- High water table

PROJECT DELIVERY ISSUES

- Fast Track Engineering / Procurement / Construction approach
- Overtime / shift work premiums
- Long lead delivery issues
- Expediting issues

FEDERAL / STATE REGULATORY ISSUES

- Building / Environmental permits
- Applicable Submissions
- OSHA issues
- Validation issues

OWNER / CLIENT INTERFACES

- Corporate Engineering / Plant Engineering involvement
- Utilization of client specifications / standards, or use industry standards
- Engineering involvement (major or minor role)
- Construction Management (major or minor role)
- Propensity for scope changes
- Owner provided equipment
- Ability of client to pay on time / Financial strength

VALUE ENGINEERING

- Conduct 1 – 3 day formal V.E. session when detailed design is 10% - 40% complete

RISK MITIGATION WORKSHOP

- Conduct 1 – 2 day formal risk mitigation session in first couple of months

CHECKLIST OF ESTIMATING REQUIREMENTS / ENGINEERING DELIVERABLES REQUIRED AT VARIOUS ESTIMATING MILESTONES

(1) SQUARE FOOT / CONCEPTUAL COST ESTIMATE: ACCURACY +/- 25% CONCEPTUAL STAGE: (5% to 15% of Detailed Design Completed)

The square foot / conceptual cost estimate is more often than not compiled prior to any final financial commitments made by the eventual owner / developer. The cost estimate is typically based on the least possible amount of engineering / design information. The square foot / conceptual cost estimate is a tool used for the following:

1. Funding requests
2. Obtaining permits
3. Planning
4. Initial financing
5. Cost management
6. Cash flow forecasting
7. Costing and appraisal of alternative schemes / building configurations Typical Data Points required:
1. Scope of Work Statement / Project Criteria
2. Location of building / facility
3. Category of Construction i.e. Warehouse, Hospital etc.
4. Footprint of proposed facility, number of floors
5. Statement of soil / ground conditions
6. Project Milestones

(2) SCHEMATIC ESTIMATE COST ESTIMATE: ACCURACY +/- 20% SCHEMATIC STAGE: (15% to 25% of Detailed Design Completed)

The schematic cost estimate is compiled from early concept drawings and early specifications. Required design / engineering deliverables include.

1. Scope of Work Statement / Project Approach