

Financial Feasibility Analysis in Land Development: A Case Study of an Industrial Layout in Ballari, Karnataka

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Abstract - Land development projects require rigorous financial appraisal before capital is committed, since returns depend simultaneously on land acquisition cost, statutory approval expenses, infrastructure development cost, financing cost and prevailing market sale rates. This paper presents a financial feasibility study of a proposed industrial layout located at Ballari (Rural) taluk, Karnataka, developed over a total extent of 12.88 acres. A detailed engineering cost estimate was prepared for road works, RCC drains, compound wall, water supply, park development, electrical works and other allied infrastructure in accordance with the Karnataka Public Works Department Schedule of Rates (PWD DSR 2022). Revenue was estimated using a site-wise plot classification (corner sites, road-facing sites and odd-shaped sites) and prevailing per-square-foot sale rates. The total estimated development cost was found to be ₹7,47,67,331.44, against a land purchase cost of ₹10,80,00,000.00, statutory government fee of ₹3,99,70,710.00 and financing (interest) cost of ₹3,84,26,976.00, while the total projected income from plot sales is ₹32,02,24,800.00. The analysis indicates a net profit of approximately ₹5.91 crore, confirming that the proposed layout is financially viable, subject to prevailing market conditions, regulatory approvals and construction-phase risk factors.

Key Words: Financial feasibility, land development, layout planning, cost estimation, net profit analysis, real estate appraisal.

1. INTRODUCTION

Land development is the process of converting raw or agricultural land into serviced plots suitable for residential, commercial or industrial use through the provision of roads, drainage, water supply, electrical infrastructure and other civic amenities. The financial feasibility of such a project is governed by the interplay between land acquisition cost, development (infrastructure) cost, statutory government fees, financing cost and the market value realisable from the sale of developed plots. Given the capital-intensive nature of land development and the long gestation period between land acquisition and final plot sale, a systematic financial feasibility assessment is essential to safeguard the interests of developers, financial institutions and prospective buyers.

The present study undertakes a comprehensive financial feasibility assessment of a proposed industrial layout at Ballari, Karnataka. The specific objectives of the study are: (i) to review the statutory and procedural framework governing

land registration, joint-venture arrangements and layout approval in Karnataka; (ii) to prepare a detailed engineering cost estimate for the layout infrastructure; (iii) to estimate the total revenue realisable from the sale of developed plots based on a site-wise classification; and (iv) to determine the net profit and assess the overall financial viability of the project.

2. STUDY AREA

The study area is a proposed industrial layout located at Ballari (Rural) taluk, Survey Nos. 166/1 and 166/A, near MG Road, Allipur/Allum Bhavan, Ballari district, Karnataka, India, covering a total extent of 12.88 acres. The site lies in proximity to existing urban development along the Ballari–Hospet corridor and is bounded by internal and peripheral roads of varying width (9 m, 12 m and 18 m). Field visits conducted during the study (recorded at approximately 15.13° N, 76.90°–76.96° E) confirmed that primary infrastructure works — internal roads, RCC drains and water supply pipelines — were under active construction at the time of investigation.



Fig -1: Layout plan of the proposed industrial layout showing internal road network, plot subdivision and park/open-space allocation

3. LITERATURE REVIEW

Land registration is the statutory process through which ownership and rights over a property are formally documented, typically comprising property search, title verification, registration with the competent authority and issuance of official title documents [1]. Prospective buyers and developers are required to verify a range of documents prior to purchase, including the sale deed, encumbrance certificate, khata certificate, title deed, building approval plan, completion and occupancy certificates, and applicable no-objection certificates; compliance with the Real Estate (Regulation and Development) Act, 2016 (RERA) is mandatory for registered projects in India [1].

Layout development is further governed by zoning regulations that classify land into residential, commercial, industrial and mixed-use zones, together with building codes addressing structural safety, fire safety, accessibility and energy efficiency [1], [10]. In Karnataka, industrial and residential layouts require Non-Agricultural (NA) land-use conversion from the office of the Deputy Commissioner, followed by layout approval from the appropriate Urban Development Authority, involving technical scrutiny of the layout plan, road network, setbacks and open-space provision [9].

Joint-venture arrangements — equity joint ventures, non-equity joint ventures, limited-partnership joint ventures, joint development agreements and revenue-sharing arrangements — are widely employed in land development to share risk, pool capital and combine the complementary expertise of landowners, developers and investors [7], [8]. Financial appraisal of land-development projects in the literature typically employs revenue and cost estimation, gross and net profit margin computation, return on investment (ROI) analysis, sensitivity analysis and discounted cash-flow (DCF) techniques such as net present value (NPV) and internal rate of return (IRR) to evaluate project viability under varying market and cost assumptions [7], [8]. Engineering cost estimates for road works, drainage and allied civil infrastructure are conventionally prepared with reference to the applicable Schedule of Rates and material specifications, such as the Karnataka PWD DSR and the relevant Indian Standard (IS) and ASTM specifications for aggregates and masonry units [2]–[6].

4. DATA AND METHODOLOGY

4.1 Data Collection

Primary data were collected through field reconnaissance visits to the project site, during which the status of ongoing road, drainage and water-supply works was recorded using GPS-tagged photography. Secondary data comprised the approved layout plan, site-wise plot schedule, typical road cross-sections (9 m, 12 m and 18 m carriageway with footpath and drain) and the applicable Schedule of Rates (PWD DSR 2022) used for preparing the detailed engineering estimate.



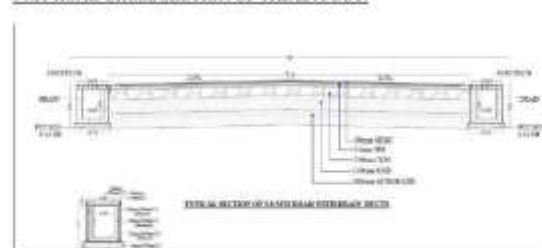
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Fig -2: Field visit photographs of the project site — (a) the site team at the layout boundary, (b) inspection of the paved internal road and precast slab drain covers, and (c) inspection of an excavated water-supply connection pit

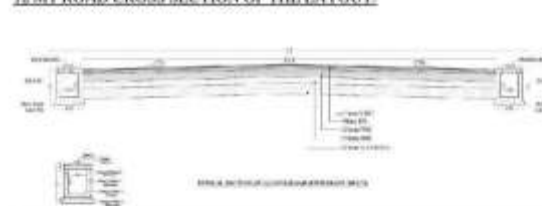
4.2 Infrastructure Design Standards

The internal road network comprises three carriageway categories — 9 m, 12 m and 18 m right-of-way — each designed with a cambered wet-mix macadam (WMM) and M30-grade dowel-jointed cement-concrete pavement over a dry lean concrete (DLC) sub-base, with side drains and footpaths as shown in Fig. 3. The pavement crust for all three categories comprises, from bottom to top, a 500 mm compacted subgrade, 150–200 mm granular sub-base (GSB), 250 mm water-bound macadam (WM), 50 mm bituminous macadam (BM)/DLC and a 30 mm surface course, in accordance with PWD DSR 2022 specifications [2].

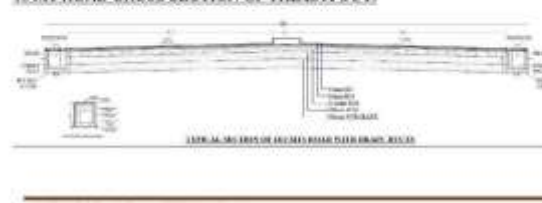
9 MT ROAD CROSS SECTION OF THE LAYOUT:



12 MT ROAD CROSS SECTION OF THE LAYOUT:



18 MT ROAD CROSS SECTION OF THE LAYOUT:



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Fig -3: Typical road cross-sections adopted for the layout — (a) 9 m road, (b) 12 m road and (c) 18 m road, each with footpath, side drain and pavement crust details

4.3 Cost Estimation

A detailed quantity-surveying exercise was carried out for the road work (excavation, sub-grade preparation, WMM, DLC sub-base and cement-concrete pavement), RCC side drains

(excavation, PCC bedding, M25 reinforced concrete walls, TMT reinforcement and precast perforated drain covers) and the compound wall (footing, columns, plinth beam, solid concrete block masonry, plastering, white-washing and MS grill), together with provisions for the overhead tank, sewage treatment plant, naala development, park development, electrical works and a security room/entrance arch. Direct costs were computed by multiplying measured quantities by the applicable PWD DSR 2022 unit rates, and 18% GST was added to each sub-estimate to arrive at the abstract cost estimate.

4.4 Revenue Estimation and Profit Analysis

Plots were classified into corner sites, road-facing sites and irregular (odd) sites, each assigned a differential sale rate per square foot based on frontage, orientation (Vastu-compliant north-east/south-east facing commanding a premium) and road width. The total income was obtained by summing the product of plot area and applicable rate across all 105 plots. Net profit was computed as: Net Profit = Total Income – (Development Cost + Land Purchase Cost + Government Fee + Interest Cost), where the government fee was estimated at ₹195 per square foot of saleable area and the interest cost was computed at 12% per annum on the aggregate outlay for a one-year construction/holding period. The resulting land-use distribution (residential, park and open space, civic amenities and roads) was checked against the minimum percentage stipulated under the applicable Karnataka layout regulations.

5. RESULTS AND DISCUSSION

Table -1: Abstract cost estimate for layout infrastructure development

Sl.No.	Description	Amount (₹)
1	Compound wall detailed estimate	97,19,003.92
2	Road work detailed estimate	1,94,67,425.24
3	RCC drain detailed estimate	77,20,218.44
4	Underground drain detailed estimate	30,14,136.54
5	Water pipeline detailed estimate	4,22,267.72
6	Park development detailed estimate	1,05,24,279.58
7	Electrical estimate	1,00,00,000.00
8	Provision for 1.0 lakh litre OHT	15,00,000.00
9	Provision for naala development	20,00,000.00
10	Provision for 1 MLD STP unit	30,00,000.00
11	Security room and entrance arch	30,00,000.00
	Sub-total	7,03,67,331.44
12	Miscellaneous assets	44,00,000.00
	Grand total	7,47,67,331.44

Table 1 shows that road work forms the single largest component of development cost (₹1,94,67,425.24, about 26% of the grand total), followed by park development (₹1,05,24,279.58) and electrical works (₹1,00,00,000.00). The overall development cost, inclusive of a miscellaneous-asset provision of ₹44,00,000.00, is ₹7,47,67,331.44.

Table -2: Site-wise plot classification and projected revenue from plot sales

Category	Facing	Size (m)	Nos	Area (ft ²)	Rate (₹/ft ²)	Income (₹)
Corner sites	NW	12×15	3	6,000	1,700	1,02,00,000
Corner sites	NW	12×12	6	9,600	1,900	1,82,40,000
Corner sites	SE	15×15	1	2,500	2,000	50,00,000
Corner sites	SE	12×15	5	10,000	1,650	1,65,00,000
Corner sites	SE	12×12	6	9,600	1,750	1,68,00,000
Corner sites	SE	9×12	1	1,200	1,300	15,60,000
Road-side	NE	9×15	12	18,000	1,750	3,15,00,000
Road-side	NE	9×12	16	19,200	1,500	2,88,00,000
Road-side	SW	9×12	21	32,400	1,150	3,72,60,000
Odd sites	Uneven	—	34	96,478	1,600	15,43,64,800
Total			105	2,04,978		32,02,24,800

A total of 105 plots covering 2,04,978 ft² of saleable area were identified, yielding a projected total income of

₹32,02,24,800.00 (Table 2). Corner and road-facing sites, though fewer in number, command a premium rate of ₹1,300–₹2,000 per ft² owing to superior frontage and orientation, while the 34 odd-shaped plots — although priced comparatively lower at ₹1,600 per ft² — contribute the largest single share of income (₹15,43,64,800, about 48% of total income) on account of their combined large saleable area.

AREA IN PERCENTAGE



Fig -4: Land-use distribution of the proposed layout as a percentage of total site area

Table -3: Land-use distribution compared with minimum statutory requirements

Sl.No.	Land Use	Area (%)	Min. % per Govt. Norms
1	Residential	44.20	40–50
2	Park and open spaces	15.00	10–15
3	Civic amenities	10.00	8–10
4	Roads	30.80	20–30
	Total	100.00	—

As indicated in Fig. 4 and Table 3, the proposed land-use split of 44.20% residential, 15% park and open space, 10% civic amenities and 30.8% roads satisfies the minimum percentage prescribed for each category under the applicable Karnataka layout norms, confirming regulatory compliance of the layout plan.

TOTAL INCOME AMOUNT



Fig -5: Break-up of total income, development cost, land purchase cost, government fee and interest cost for the project

Table -4: Net profit computation for the proposed layout

Total Income (₹)	Dev. Cost (₹)	Land Cost (₹)	Govt. Fee (₹)	Interest (₹)	Net Profit (₹)
32,02,24,800.00	7,47,67,331.44	10,80,00,000.00	3,99,70,710.00	3,84,26,976.00	5,90,59,782.56

As summarised in Table 4 and Fig. 5, deducting the development cost (₹7,47,67,331.44), land purchase cost (₹10,80,00,000.00), government fee (₹3,99,70,710.00) and interest cost (₹3,84,26,976.00) from the total projected income (₹32,02,24,800.00) yields a net profit of ₹5,90,59,782.56. This corresponds to a return on total outlay (land, development, statutory fee and interest, aggregating ₹26,11,64,017.44) of approximately 22.6%, indicating that the project is financially attractive under the assumed one-year construction and sale

schedule. The result is nevertheless sensitive to fluctuations in plot sale rates, construction material costs and interest rates, and should be interpreted together with prevailing market demand, absorption rate for industrial plots in the Ballari region, and the risk of delays in statutory approvals (NA conversion and layout approval from the Urban Development Authority).

6. CONCLUSIONS

Based on the detailed engineering cost estimate and site-wise revenue analysis carried out for the proposed 12.88-acre industrial layout at Ballari, Karnataka, the following conclusions are drawn:

- The total development cost of the layout, comprising road work, RCC drains, compound wall, water supply, park development, electrical works and allied infrastructure, is estimated at ₹7,47,67,331.44.
- The projected total income from the sale of 105 plots (corner, road-facing and odd-shaped sites) covering 2,04,978 ft² of saleable area is ₹32,02,24,800.00.
- After accounting for land purchase cost (₹10,80,00,000.00), government fee (₹3,99,70,710.00) and interest cost (₹3,84,26,976.00), the project yields a net profit of ₹5,90,59,782.56, equivalent to a return of about 22.6% on total outlay.
- The proposed land-use distribution (44.20% residential, 15% park and open space, 10% civic amenities and 30.8% roads) satisfies the minimum statutory requirements prescribed for layout development in Karnataka.
- The study confirms that the project is financially feasible under the assumed cost and revenue assumptions; however, sensitivity to market fluctuations, construction cost escalation and regulatory approval timelines should be considered in subsequent investment decisions.

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