PROJECT THIRST

Discounted Cash Flow Valuation Analysis

ABC Inc. I Water Treatment & Recycling I Illustrative Case Study

Analyst:	Jeff Schuler
Data Coverage:	2023A – 2030E (3 years actuals, 5 years projections)
Valuation Method:	Discounted Cash Flow (Unlevered FCF, Gordon Growth Terminal Value)
Base Case Discount Rate:	10.0% (provided in case study)
Estimated WACC:	~12–14% (CAPM + estimated capital structure)
Data Source:	Fictional case study data — all company information is illustrative only

INVESTMENT CONCLUSION

RECOMMENDATION: DO NOT INVEST

Finding	Detail
Implied Enterprise Value	$31.0M (base case: 10% discount rate, 2.5% perpetuity growth)
Implied Equity Value	~$16.4M at 10% base case rate; turns negative at estimated WACC (~11–12%)
5-Year IRR	Negative; requires 10–11 years to turn positive under current assumptions
Free Cash Flow	Projected negative across all five projection years (2026E–2030E)
Root Cause	Very high CAPEX requirements absorb all operating cash flow despite strong revenue growth
Conclusion	Negative FCF, negative IRR, and no recoverable equity value do not support investment at any implied equity valuation under the base case scenario

1. COMPANY & SITUATION OVERVIEW

Company Background

ABC Inc. is a water treatment and recycling company operating in a capital-intensive, infrastructure-driven industry. The company operates multiple treatment facilities using an evolving mix of fixed-site processing and mobile treatment technology (hub-and-spoke model). Management's strategy centers on geographic expansion, new facility construction, and leveraging proprietary treatment processes to improve unit economics over time.

Case Study Context

This analysis was constructed from scratch using fictional financial data and company information provided as part of an interview case study exercise. All revenue figures, cost structures, balance sheet items, and management projections are entirely illustrative. Year labels have been updated from the original 2012A–2019E range to 2023A–2030E for presentation clarity, representing the same 3-actual / 5-projection structure.

Key Observations from Historical Financials (2023A–2025A)

- Revenue grew from $9.5M net in 2023A to $12.3M net in 2025A — positive trajectory but growth was uneven year-over-year.
- EBITDA improved significantly as a percent of revenue: management reports EBITDA margin expanding from 16.7% in 2023A to 27.4% by 2025A, driven by top-line growth and cost structure improvements.
- CAPEX has been very high relative to revenue in the historical period: 84.6%, 39.3%, and 48.5% of revenue in 2023A, 2024A, and 2025A respectively — reflecting the capital-intensive nature of building out treatment capacity.
- The company carries significant debt on its balance sheet (~$18.6M), resulting in meaningful interest expense that pressures net income.
- Free cash flow has been negative throughout the historical period due to the magnitude of CAPEX relative to operating cash generation.

1B. BUSINESS QUALITY ASSESSMENT

The following qualitative assessment summarizes key competitive strengths and risk factors identified through review of company materials. These factors inform the investment recommendation and provide important context beyond what the financial model alone captures.

Competitive Strengths

- **Patented technology & first-mover advantage.** Proprietary evaporation technology and a unique permitting/construction process create meaningful barriers to replication. Being first into a geographic area allows the company to occupy scarce sites and effectively lock out competitors who cannot match proximity-based cost advantages.
- **"Blue chip" anchor tenant base with contracted revenue.** Approximately 82% of revenue is derived from 10 large producers; 41.5% of revenue comes from long-term take-or-pay contracts, providing a degree of stability that partially offsets growth-stage risk. Management owns approximately 6% of the company, aligning incentives with investors.
- **Regulatory tailwinds.** The business model is more cost-efficient and regulation-friendly than alternatives such as injection wells. Industry regulations increasingly favor water recycling, and expected long-term natural gas demand supports continued drilling activity.
- **Mobile scalability & attractive project returns.** Mobile frac water treatment units provide a lower-capital growth vector. Management projects a 24% ROIC on the Bradford and Greene County development opportunities, which if realized would materially strengthen the long-term cash flow profile.

Key Risks & Vulnerabilities

- **100% oil & gas sector concentration.** The entire revenue base depends on continued fracking and drilling activity. A commodity price downturn, regulatory shift, or industry work stoppage would directly and immediately impair revenue with no diversification offset.
- **Concentrated customer base with domino-effect risk.** Ten customers represent 82% of revenue; loss of a single anchor tenant could reduce revenue by 4–13%. Critically, the recycling and disposal segments are interdependent — a decline in anchor tenant take-or-pay volume disrupts inbound/outbound water balances and negatively impacts the higher-margin disposal segment, creating a potential domino effect across the business.
- **Limited pricing power.** Customer savings are primarily driven by reduced transport costs (proximity), not by proprietary technology that competitors cannot replicate. A competitor relocating near customers could erode the core value proposition. Large customers also hold leverage to exert downward pricing pressure, constraining the margin expansion outlook.
- **Environmental & permitting execution risk.** The company assumes environmental liability risk (spillage, leakage) associated with its oil and gas customers' produced water. More physical infrastructure means greater litigation exposure. Growth also depends on successfully obtaining permits and bonding for new construction; delays could materially set back the CAPEX schedule and postpone projected cash flow improvements.
- **EBITDA margin plateau concern.** Management's projected EBITDA CAGR is disproportionately weighted to earlier projection years, with margins appearing to flatten in later years. This raises questions about the durability of growth used in the terminal value calculation, and limits the analyst's confidence in the perpetuity assumptions.

2. FINANCIAL PROJECTIONS (2026E – 2030E)

Revenue & EBITDA Summary

Management projects a 30% compound annual revenue growth rate driven by new facility openings, mobile technology expansion, and volume growth from new and existing customers. EBITDA is projected to grow at an even faster pace (~49.6% CAGR) as the improved cost structure and operating leverage take effect.

Metric	2023A	2024A	2025A	2026E	2027E	2028E	2029E	2030E
Gross Revenue ($K)	11,500	15,300	14,900	19,100	29,400	42,700	55,510	72,163
Net Revenue ($K)	9,500	11,500	12,300	15,853	24,402	35,441	46,073	59,895
Y/Y Rev Growth	—	33.0%	-2.6%	28.2%	53.9%	45.2%	30.0%	30.0%
Mgmt EBITDA ($K)	1,600	3,300	4,800	5,200	9,800	14,300	18,614	24,212
EBITDA Margin	16.7%	21.6%	32.2%	27.2%	33.3%	33.5%	33.5%	33.5%

Note: 2028E–2030E revenue extrapolated using management CAGR assumptions. EBITDA figures are management base case (unadjusted for non-recurring items).

Key Income Statement Drivers

The income statement model uses percentage-of-revenue assumptions for COGS and SG&A;, anchored to management guidance and historical actuals where available:

Line Item	2023A	2025A	Projection Years	Source / Note
Sludge Disposal (% Gross Rev)	17.6%	9.0%	9.0%	Improving cost structure per management (PDF pg. 41)
Treatment Chemicals (% Gross Rev)	14.8%	3.3%	3.3%	Stabilized at 2025A level
Direct Labor (% Gross Rev)	9.7%	11.6%	11.6%	Adequate staffing per management
Admin Payroll (% Gross Rev)	4.1%	7.0%	7.0%	Mgmt SG&A; margin PDF pg. 40
Discounts & Credits (% Gross Rev)	17.4%	17.4%	17.0%	Mgmt historical IS PDF pg. 39
Tax Rate	39.1%	39.1%	39.1%	2025A US corporate rate applied uniformly

CAPEX & Depreciation Outlook

Capital expenditure is the most critical driver of cash flow in this model. Historical CAPEX has been extremely high — in some years exceeding 80% of revenue — as the company constructed its initial treatment infrastructure. Management projects CAPEX to decline significantly going forward due to improved efficiencies and the shift toward lower-cost mobile treatment technology.

Year	Total CAPEX ($K)	CAPEX % of Rev	Total Depreciation ($K)
2023A	9,700	84.6%	~218
2024A	6,000	39.3%	~370
2025A	7,200	48.5%	~538
2026E	8,800	46.1%	~700
2027E	~26,580	~75.4%	~1,200
2028E	6,000	~11.5%	~1,600
2029E	6,000	~9.0%	~1,900
2030E	6,000	~7.0%	~2,100

Depreciation uses straight-line method: 40-yr life for facilities, 15-yr for equipment, 3-yr for repairs. 2027E CAPEX spike reflects Blossburg, Burgettstown, Greene County, and Bradford County projects per management.

3. DCF METHODOLOGY & KEY ASSUMPTIONS

Valuation Framework

The valuation uses an unlevered free cash flow approach, discounting projected FCFs at the base case discount rate of 10.0% (as provided in the case study) to arrive at enterprise value. Equity value is then derived by adding cash and subtracting total debt from enterprise value. A Gordon Growth (perpetuity) model is used to estimate terminal value. For reference, an estimated WACC of ~12–14% was also calculated (see table below) and is reflected in the higher-rate scenarios of the sensitivity analysis.

Free Cash Flow Bridge

Unlevered FCF is constructed as follows:

EBIT (Operating Income, from Income Statement)
× (1 – Tax Rate) → NOPAT (Net Operating Profit After Tax)
– Increase in Working Capital (~13% of incremental revenue)
= Cash NOPAT
+ Depreciation (non-cash add-back)
– Capital Expenditure
= Unlevered Free Cash Flow

WACC & Discount Rate

Component	Value	Source / Note
Risk-Free Rate	2.54%	10-year US Treasury (coupon), 2025A
Market Risk Premium	~11.15%	S&P 500 trailing return less risk-free rate
Beta (estimated)	1.4x	Private company — assumed high volatility, ~oil & gas industry correlation
CAPM Cost of Equity	~18.2%	= Rf + β × (Rm – Rf)
Cost of Debt	9.0%	Estimated — private company, high rate expected
% Debt in Capital Structure	53%	Estimated from 2026E balance sheet
% Equity in Capital Structure	47%	= 1 – % Debt
Tax Rate	39.1%	2025A corporate rate
WACC (Estimated)	~12–14%	= Kd × (1–t) × %Debt + Ke × %Equity
Case Study Discount Rate	10.0%	Provided; used as base case in sensitivity analysis

The analyst's WACC estimate of ~12–14% exceeds the 10% case study rate, reflecting the higher risk profile of a private, capital-intensive company with limited operating history and significant leverage. Sensitivity analysis covers both perspectives.

Terminal Value

Terminal value uses the Gordon Growth perpetuity model: TV = FCF_{perp} / (WACC – g). Key perpetuity assumptions:

Input	Value	Rationale
Nominal Perpetuity Growth Rate (g)	2.5%	Below long-run US GDP growth (~2–4% real) — conservative floor; should not exceed GDP growth for mature companies
Real Perpetuity Growth Rate	~0.88%	= g – inflation (~1.62% 2025A rate)
Nominal ROI	19.0%	Range: WACC + 2% to 2× WACC — used to derive plowback ratio
Plowback Ratio (K)	~13%	= g / ROI = 2.5% / 19.0% — proportion of cash NOPAT reinvested for growth
Terminal EBIT Margin	20%	Analyst assumption for steady-state operations

4. VALUATION RESULTS

DCF Summary (Base Case: 10% Discount Rate)

Metric	Value
Sum of PV of Free Cash Flows (2026E–2030E)	Negative (FCF negative in all projection years)
Terminal Value	~$70.3M (= Perp FCF / (WACC – g); sensitive to spread)
PV of Terminal Value	~$43.6M (discounted 5 years at 10%)
Enterprise Value (Base Case)	~$31.0M
(+) Cash	~$4.0M
(–) Total Debt	(~$18.6M)
Implied Equity Value	**~$16.4M at 10% rate; negative at WACC (~11–12%)**

IRR Analysis

Using the implied equity value as the initial investment and the five projected PV cash flows as returns, the 5-year IRR is **negative**. Extending the analysis to 10–11 years under the same assumptions would be required for IRR to turn positive — and this assumes no further optimization of CAPEX, working capital, or other cash flow drivers.

Sensitivity Analysis Summary

Enterprise value is highly sensitive to the discount rate and perpetuity growth rate assumptions due to the model's dependence on terminal value (the present value FCFs are negative).

Table 1 — EV Sensitivity: Discount Rate vs. Perpetuity Growth Rate [Buyer / Bear View]

g \ Rate	8.0%	9.0%	10.0%	11.0%	12.0%
0.5%	$26.4M	$24.6M	$23.0M	$21.4M	$20.0M
1.5%	$30.3M	$28.4M	$26.6M	$24.8M	$23.2M
2.5% ★	$35.1M	**$33.0M**	$30.9M	$29.0M	$27.2M
3.5%	$41.1M	$38.7M	$36.4M	$34.3M	$32.2M
4.5%	$48.9M	$46.1M	$43.5M	$41.0M	$38.7M

★ = Base case (10% discount rate, 2.5% perpetuity growth). Units: $M.

Table 2 — EV Sensitivity: Seller / Bull View (Lower Discount Rates)

A seller may argue for a lower discount rate reflecting lower perceived risk. Note: in this model the terminal value uses WACC in the denominator (fixed), so only the PV discounting changes across columns — this produces a narrower EV range ($24.7M–$42.9M) than an unconstrained sensitivity would suggest:

g \ Rate	6.0%	7.0%	8.0%	9.0%	10.0% ★
1.0%	$32.3M	$30.2M	$28.3M	$26.4M	$24.7M
1.5%	$34.5M	$32.4M	$30.3M	$28.4M	$26.6M
2.0%	$37.0M	$34.7M	$32.6M	$30.5M	$28.6M
2.5%	$39.8M	$37.4M	$35.1M	$33.0M	**$30.9M**
3.0%	$42.9M	$40.3M	$37.9M	$35.7M	$33.5M

Even at seller-favorable scenario shown (6% / 3.0% g), EV reaches ~$42.9M — implying equity of ~$28.3M after netting $18.6M debt. At the base case 10% rate, EV is ~$30.9M with equity of ~$16.4M. Values are highly sensitive to discount rate and negative FCF dynamics.

5. CONCLUSION & INVESTMENT RECOMMENDATION

Summary of Findings

Revenue Growth: Strong management projection of 30% CAGR is plausible given industry dynamics, new site pipeline, and mobile technology expansion.

EBITDA Trajectory: EBITDA margin expansion from 16.7% to 27%+ is supported by improving cost structure and management commentary — but depends on revenue growth materializing as projected.

CAPEX Burden: This is the central quantitative risk. CAPEX requirements are very high in the near term, producing negative FCF throughout all projection years. The pace of future CAPEX reduction is highly uncertain — revenue growth itself may require ongoing infrastructure build-out, making management's CAPEX decline assumptions difficult to validate.

Sector & Customer Concentration: 100% revenue exposure to oil and gas drilling activity, with 82% of revenue from just 10 customers. A commodity price downturn, drilling work stoppage, or loss of a single anchor tenant could trigger a domino effect across both the recycling and higher-margin disposal segments due to their volume interdependence.

Pricing Power Limitation: Customer cost savings are primarily proximity-driven, not technology-driven — a competitor could replicate the value proposition by relocating near customers. Large anchor tenants also possess leverage to exert downward pricing pressure, threatening the margin expansion thesis.

Debt Service: ~$18.6M in total debt combined with significant CAPEX leaves no room for equity value recovery. Interest expense further pressures earnings throughout the projection period.

Terminal Value Dependence: Enterprise value is almost entirely driven by terminal value — the PV of near-term FCFs is negative. This creates significant valuation sensitivity to the discount rate / perpetuity growth spread, and relies on EBITDA margins that appear to plateau in later projection years.

IRR: 5-year IRR is negative. A 10–11 year horizon would be required for any positive return, assuming no drilling work stoppages, no customer losses, and no permitting or construction delays — a high bar given the company's limited operating history and 100% sector concentration.

Investment Recommendation

Based on this analysis, the recommendation is **DO NOT INVEST** under the base case scenario. The combination of negative unlevered free cash flow across all projection years, negative IRR over a 5-year horizon, and no recoverable equity value after netting total debt does not support an investment thesis at current valuations.

The investment thesis would require a materially different set of circumstances to be viable — for example: a substantially lower purchase price (implying much lower equity / enterprise value), a significantly shorter CAPEX investment cycle, or a meaningful acceleration of revenue and EBITDA ahead of management projections. In the absence of any of these, the risk-adjusted return profile does not meet a reasonable investment threshold.

Analyst Notes & Limitations

- Negative cash balance (2027E–2029E): The ~$27M management-guided CAPEX spike in 2027E causes net cash flow to turn deeply negative for three years. In practice this would be funded via a revolver or bridge facility; no such instrument was modeled due to limited case study data. This is a known limitation, not a linkage error — the 3-statement model ties correctly and cash recovers to positive by 2030E.
- Other Long-Term Assets (Balance Sheet): Used as a balancing plug representing goodwill, intangibles, and other unspecified long-term assets not detailed in the case study data. Labeled as a plug in the model; consistent with standard practice when projecting from incomplete information.
- 2027E negative EBIT (-$2.6M): The large depreciation charge from the $27M CAPEX program exceeds gross profit in 2027E, driving negative EBIT. This is an intentional model output reflecting management's own CAPEX schedule per PDF pg. 45 — EBITDA remains positive at $9.8M confirming the business generates operating cash before the non-cash depreciation charge.
- All financial data is fictional, provided as a case study exercise. Not investment advice.
- WACC inputs (beta, cost of debt, capital structure) are analyst estimates for a private company with limited disclosed financial information. Full model, CAPEX schedule, and assumptions available in the accompanying Excel workbook.