



The Manufacturing Plant Layout Checklist

40 Questions to Answer Before You Add, Move, or Replace Equipment

A plant layout project can affect production capacity, labor efficiency, material flow, safety, maintenance, utilities, and future expansion for years to come.

Before equipment is purchased or relocated, manufacturers should evaluate more than floor space. The surrounding production process, infrastructure, access requirements, material movement, and long-term operating goals all influence whether a new layout will actually improve performance.

Use this checklist to identify potential constraints, uncover missing information, and prepare for a plant layout study or facility redesign.

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How to Use This Checklist

The checklist is organized into ten sections that follow the natural sequence of a plant layout study — beginning with production goals and ending with future expansion. Each section contains a short list of questions to review with your operations, engineering, and maintenance teams.

Work through the questions and mark each box once your team can answer it with confidence. Any item you cannot answer clearly is not a failure — it simply identifies information that should be gathered before layout decisions are made. Accompanying each section is a discussion note highlighting what experienced facility planners look for and why it matters.

Bring your completed checklist to your next planning meeting, or share it with an engineering partner to accelerate the scoping process.

1. Production Goals and Capacity

- ☐ What specific business or production problem are we trying to solve?
- ☐ What production rate must the facility support today?
- ☐ What production rate should it support in three to five years?
- ☐ Are there known bottlenecks limiting current throughput?
- ☐ Will the project change product mix, batch sizes, or production sequencing?

Questions to discuss internally

A layout project should begin with measurable objectives. Moving equipment without defining the desired production outcome can improve one area while creating problems elsewhere.

Possible project goals may include:

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| ■ Increasing throughput | ■ Eliminating congestion | ■ Increasing storage capacity |
| ■ Adding a new production line | ■ Improving safety | ■ Preparing for automation |
| ■ Reducing labor requirements | ■ Installing new equipment | ■ Supporting future expansion |

2. Existing Facility Conditions

- ☐ Do we have accurate and current building drawings?
- ☐ Have existing equipment locations been field verified?
- ☐ Are structural columns, walls, mezzanines, and floor elevations documented?
- ☐ Are ceiling heights and overhead obstructions known?
- ☐ Are equipment foundations and floor-loading limits documented?

Why this matters

Existing facilities frequently change over time without corresponding drawing updates. Equipment may have been relocated, walls added, utilities rerouted, or storage areas converted. Incorrect existing-condition information can cause layout conflicts later in the project.

3. Manufacturing Process Flow

- ☐ Is the complete manufacturing sequence documented?
- ☐ Does material move logically from receiving through production and shipping?
- ☐ Are products or materials routinely moving backward through the facility?
- ☐ Are there unnecessary transfers between departments or work centers?
- ☐ Are quality inspections, rework, and scrap handling included in the process flow?

Look for unnecessary movement

Efficient plant layouts generally reduce:

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| ■ Backtracking | ■ Long travel distances | ■ Conflicting traffic |
| ■ Rehandling | ■ Excessive staging | ■ Unnecessary transfers |

4. Material Handling

- ☐ How are materials moved between each production step?
- ☐ Are forklifts being used where conveyors or another handling method may be more efficient?
- ☐ Are forklift and pedestrian routes separated where practical?
- ☐ Are aisle widths adequate for the material-handling equipment being used?
- ☐ Are there recurring congestion points?

Consider the full material journey

Material handling should be planned as part of the layout rather than added after equipment locations are selected. Evaluate the movement of:

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| ■ Raw materials | ■ Packaging | ■ Maintenance materials |
| ■ Components | ■ Finished goods | |
| ■ Work in process | ■ Scrap and waste | |

5. Equipment Requirements

- ☐ Do we have current equipment drawings and dimensions?
- ☐ Have infeed and outfeed requirements been included in the layout?
- ☐ Is adequate operator working space provided?
- ☐ Is there enough room for maintenance and component removal?
- ☐ Can equipment be moved into and out of the facility when required?

Equipment footprint is only the starting point

An equipment layout that fits dimensionally may still be difficult to operate or maintain. Additional space may be required for:

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| ■ Guards | ■ Tool changes | ■ Material loading |
| ■ Controls | ■ Lift equipment | ■ Operator work zones |
| ■ Service doors | ■ Replacement components | ■ Emergency access |

6. Storage and Staging

- ☐ Is there enough raw-material storage for normal production?
- ☐ Is work-in-process staging intentionally located?
- ☐ Is finished-goods storage adequate for expected production volume?
- ☐ Are aisles currently being used for temporary storage?
- ☐ Are scrap, waste, rework, and quarantine materials assigned dedicated areas?

Watch for hidden space requirements

One of the most common plant layout problems is underestimating staging. When staging areas are not planned, manufacturers often lose production space to temporary pallets, carts, racks, and work in process.

7. Utilities and Infrastructure

- ☐ Is adequate electrical capacity available for the proposed equipment?
- ☐ Are compressed air, process water, gas, or other utilities available where needed?
- ☐ Does the project require changes to dust collection or ventilation?
- ☐ Are fire-protection systems affected by the new layout?
- ☐ Is additional utility capacity needed for future expansion?

Utility requirements may determine equipment location

Moving equipment can become significantly more expensive when utility modifications are identified late. Evaluate requirements for:

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| ■ Electrical power | ■ Steam | ■ Dust collection |
| ■ Compressed air | ■ Hydraulic systems | ■ Fire protection |
| ■ Process water | ■ Data and controls | |
| ■ Natural gas | ■ Ventilation | |

8. Safety and Access

- ☐ Are emergency exits and egress paths protected?
- ☐ Are pedestrian routes separated from vehicle traffic where possible?
- ☐ Are required machine-guarding areas included?
- ☐ Is there safe access for maintenance personnel?
- ☐ Have combustible dust, fire, ventilation, and other process hazards been considered?

Safety should influence the layout early

Correcting these issues after installation can be expensive and disruptive. Safety considerations may affect:

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| ■ Equipment spacing | ■ Barriers | ■ Dust collection |
| ■ Aisle locations | ■ Platforms | ■ Operator positions |
| ■ Exits | ■ Fire protection | ■ Material-handling routes |

9. Maintenance and Reliability

- ☐ Can maintenance teams access all major equipment components?
- ☐ Can motors, bearings, rollers, and other components be removed without relocating other equipment?
- ☐ Are lifting points or crane access available where needed?
- ☐ Are utility isolation points accessible?
- ☐ Is there a practical path for replacing major equipment in the future?

Design for downtime before downtime happens

A layout should support maintenance as well as production. Restricted service access can increase:

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| ■ Repair time | ■ Shutdown duration | ■ Equipment replacement cost |
| ■ Labor requirements | ■ Safety risk | |

10. Future Expansion

- ☐ Is there room for additional equipment or production lines?
- ☐ Could utility mains be extended easily?
- ☐ Will today's equipment placement block tomorrow's expansion?
- ☐ Are receiving, shipping, and storage areas capable of supporting higher volume?
- ☐ Have likely automation or modernization projects been considered?

Avoid designing only for today's requirements

Even when future equipment is not fully defined, manufacturers can preserve flexibility by planning:

- Expansion zones
- Equipment access routes
- Additional production lines
- Utility connection points
- Building additions
- Increased storage

Plant Layout Warning Signs

If several of the following conditions exist in your facility, a plant layout study may be worthwhile:

- Materials regularly backtrack through the plant
- Shipping and receiving areas create bottlenecks
- Forklift congestion affects production
- New equipment has been added without an overall facility plan
- Aisles are routinely used for storage
- Storage has expanded into production areas
- Work in process accumulates between operations
- Pedestrian and vehicle traffic frequently conflict
- Employees spend significant time transporting materials
- Utility limitations affect equipment placement
- Production equipment cannot operate at full capacity
- Expansion options are becoming increasingly limited
- Maintenance access is restricted

What to Gather Before a Plant Layout Study

Having the following information available can help accelerate the planning process:

- Current facility drawings
- Storage requirements
- Equipment lists
- Utility information
- Equipment vendor drawings
- Shipping and receiving volumes
- Production volumes
- Planned equipment purchases
- Process-flow diagrams
- Known production bottlenecks
- Product dimensions and weights
- Future capacity projections
- Current staffing levels
- Project budget and schedule objectives
- Shift schedules

Do not delay a project simply because all of this information is not available. Existing-condition surveys and engineering assessments can help fill in missing data.

What a Plant Layout Study Can Provide

A plant layout study can help manufacturers evaluate alternatives before committing capital to construction or equipment relocation. Depending on the project, deliverables may include:

- Existing-condition drawings
- Storage and staging recommendations
- Material-flow analysis
- Utility requirements
- Bottleneck identification
- Expansion concepts

- Equipment arrangement concepts
- Alternative plant layouts
- Implementation phasing
- Preliminary engineering recommendations

The objective is to identify the layout that best supports production, safety, maintenance, capital investment, and future growth.

Before You Move Equipment, Evaluate the Entire System

The best equipment location is not always the location with the most available floor space. Every major layout decision should account for production flow, material handling, utilities, maintenance, safety, storage, construction requirements, and future expansion.

If you are planning a new production line, facility expansion, equipment modernization project, or plant layout redesign, Crow Engineering can help you evaluate the options and develop a practical engineering plan.

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