Cattle Handling Facility Improvement Project

Group C

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Project Charter

Project Title: Cattle Handling Facility Improvement Project

Project Start Date: May 1, 2025 **Projected Finish Date**: July 2, 2025

Budget Information: Estimated Budget: $119,650

Project Manager: Andrea VanHorn; andrea.vanhorn@coyotes.usd.edu

Project Objectives:

1. *Enhance Efficiency:* Reduce time and labor in cattle handling with an optimized layout.
2. *Improve Safety:* Lower injury risks for handlers and cattle through safe design features.
3. *Ensure Compliance:* Meet industry standards for functionality and safety.
4. *Meet Deadlines and Budget*: Complete by July 2, 2025, without exceeding $119,650.
5. *Satisfy Stakeholders:* Fulfill the needs of the owner, team, and workers.
6. *Enable Scalability:* Allow future expansions without major redesign.

Success Criteria:

1. *Timely Completion:* The cattle handling facility is fully constructed and operational by July 2, 2025.
2. *Budget Adherence:* Total expenditure does not exceed the allocated $119,650.
3. *Efficiency Improvement*: The facility demonstrably reduces time and labor required for cattle handling operations.
4. *Safety Enhancement:* The design and construction result in a safer environment with fewer risks of injury to handlers and cattle.
5. *Standards Compliance:* The facility meets current industry standards and best practices for cattle handling.
6. *Stakeholder Approval:* The farm owner, project team, and workers express satisfaction with the facility's functionality and design.

Approach:

1. *Design and Planning:* The architect will develop detailed plans for the corral, chutes, and tub (May 1–6, 2025).
2. *Approval*: Securing approval of the design and plans from the project owner (May 1–6, 2025).
3. *Material Procurement:* Ordering and acquiring all necessary materials by the materials manager (May 6–9, 2025).
4. *Site Preparation:* Excavation and preparation of the construction site by Gillmore Construction (May 1–6, 2025).
5. *Construction*: Execution of construction tasks—including setting posts, welding, installing gates, placing chutes and tubs, and painting—by Davenport Construction (May 12–July 2, 2025).
6. *Quality Checks:* Conducting regular inspections throughout the project to ensure compliance with design and safety standards.

Roles and Responsibilities

Name and Signature	**Role**	**Contact Information**	**Signature**

VanHorn, Andrea	Project Manager	andrea.vanhorn@coyotes.usd.edu	
Rashed, Mohammed	Architect	mohammed.rashed@coyotes.usd.edu	
Balmaceda, Rodrigo	Foreman	rodrigo.balmaceda@coyotes.usd.edu	
Mutungi, Vincent	Farm Manager	vincent.mutungi@coyotes.usd.edu	
Davenport Construction	Construction Company	davenport@example.com	

Comments: (Handwritten or typed comments from above stakeholders, if applicable)

- Project Manager: Requests a contingency plan and mid-project review for better oversight.
- Architect: Suggests incorporating modern design standards and planning for scalability.
- Foreman: Advises securing contracts early and leveraging bulk purchases.
- Davenport Construction: Recommends a pre-construction soil test to mitigate risks.
- Davenport Construction: Proposes weather contingencies and a safety briefing.

Stakeholder Register

Prepared by: Rodrigo Balmaceda Date: 3/22/2025

Name	Position	Internal/ External	Project Role	Contact Information
VanHorn, Andrea	Project Manager	Internal	Planning and reviewing alternatives; scheduling	andrea.vanhorn@coyotes.usd.edu
Davenport Construction	Construction Company	External	Primary Contractor tasked with construction	davenport@example.com
Gilmore Construction	Sub-contractor	External	Excavation	gillmore@example.com
Corey & Andrea VanHorn	Owner-operators	Internal	Customer, define needs, provide feedback	andrea.vanhorn@coyotes.usd.edu
Rashed, Mohammed	Architect	External	Creating designs, scale plans	mohammed.rashed@coyotes.usd.edu
Mutungi, Vincent	Farm Manager	Internal	Reviewing safety and functionality of plan	vincent.mutungi@coyotes.usd.edu
Balmaceda, Rodrigo	Foreman	External	Secures contracts, purchasing material	rodrigo.balmaceda@coyotes.usd.edu

Scope Statement

Project Purpose and Justification:

The objective of this project is to design and construct a durable, functional, and efficient corral system for cattle at the designated farm location. The new corral system will enhance cattle handling efficiency, improve safety for workers and livestock, and ensure ease of operation for the farm's owner-operators. The project is essential for modernizing the facility to meet operational demands while maintaining sustainability and regulatory compliance.

Project Scope Description:

This project includes the planning, design, procurement, and construction of a fully operational corral system. The scope encompasses site preparation, material acquisition, fabrication, and installation of structural components required for the corral system.

Key Components of the Corral System:

- Materials: Metal rods, poles, pipes (various sizes), rocks, hydraulic system, paint, concrete
- Construction Elements: Holding pens, sorting pens, loading chute, squeeze chute area, and alleyways
- Equipment & Machinery: Dozer for excavation, welding tools for assembly
- Labor Requirements: Welders, dozer operators, general labor
- Stakeholder Engagement: Regular reviews and feedback from farm owner-operators and the farm manager
- Safety Considerations: Implementation of industry-standard safety measures to mitigate workplace injuries and hazards

Deliverables:

1. Completed Corral System: A fully constructed and functional cattle handling facility
2. Site Preparation Report: Documentation of excavation and foundation work
3. Material Procurement Report: Detailed inventory of purchased and used materials
4. Safety Compliance Checklist: Verification that all safety measures were adhered to
5. Final Inspection & Approval: Signed off by project stakeholders confirming project completion

Exclusions:

- No additional land acquisition outside the predefined project area
- No modifications to existing farm structures not part of the corral system

- No automation or electronic cattle management systems
- Landscaping or aesthetic enhancements beyond the functional scope

Project Constraints:

- Timeframe: The project must be completed within 2 months
- Budget: Must adhere to the allocated budget for materials and labor, which must remain under $119,650
- Resource Availability: Availability of construction materials and labor in the remote location

Assumptions:

- Weather conditions will remain manageable for construction
- All required permits and regulatory approvals will be secured before construction
- Materials will be available for procurement without significant delays
- Stakeholders will provide timely feedback and approvals to avoid delays

Risks and Mitigation Strategies:

1. Weather Delays: Rain may delay excavation and foundation work → Implement contingency scheduling and use temporary protective coverings
2. Supply Chain Issues: Remote location may cause material delivery delays → Secure multiple suppliers and pre-order critical materials
3. Workplace Safety Hazards: Welding and heavy machinery usage pose risks → Enforce strict safety protocols and provide proper PPE
4. Stakeholder Delays: Late approvals could impact the schedule → Set up scheduled reviews and approval checkpoints

Approval Requirements:

The project will be considered complete upon final approval from the farm owner-operators and farm manager. A walkthrough and functionality assessment will be conducted to verify the quality and usability of the corral system before sign-off.

Project Success Criteria:

- The corral system is constructed within the 2-month timeline
- The system meets the functional needs of the farm as per the owner-operators' specifications
- Safety and regulatory standards are met
- The project remains within the designated budget
- No major workplace injuries or construction-related accidents occur

Prepared by: Mohammed Rashed
Approved by: Project Stakeholders

Team Contract

Purpose

This team contract outlines the expectations, responsibilities, and commitments of all team members involved in the Corral System Project. It ensures accountability, effective collaboration, and adherence to the project's goals, scope, and timeline.

Team Members and Roles

1. Andrea VanHorn (Project Manager) – Planning, scheduling, and reviewing alternatives.
2. Davenport Construction (Primary Contractor) – Construction execution.
3. Gillmore Construction (Subcontractor) – Excavation work.
4. Corey & Andrea VanHorn (Owner-Operators) – Defining needs, providing feedback.
5. Mohammed Rashed (Architect) – Creating designs and scale plans.
6. Vincent Mutungi (Farm Manager) – Reviewing safety and functionality.
7. Rodrigo Balmaceda (Foreman) – Securing contracts, purchasing materials.

Team Expectations and Responsibilities

- Communication: Team members will maintain open and timely communication via email and scheduled meetings.
- Accountability: Each member is responsible for fulfilling their assigned duties and notifying the team of any issues or delays.
- Decision-Making: Major decisions will be made collaboratively with input from all key stakeholders.
- Conflict Resolution: Disputes will be resolved professionally through discussion and, if necessary, mediated by the Project Manager.
- Deadlines: All members agree to adhere to the project timeline and promptly report potential delays.
- Quality Standards: All work must meet agreed-upon standards to ensure the corral system's safety, durability, and functionality.
- Safety Compliance: All members will adhere to safety regulations and industry best practices.

Meeting Schedule and Reporting

- Weekly Progress Meetings: Held every Friday at 10 AM to review status, address challenges, and align on next steps.
- Reporting Structure: Updates will be shared through email summaries, with major milestones requiring formal reporting.

Risk Management and Contingency Planning

- Weather Delays: Adjust scheduling as needed and implement protective measures.
- Material Shortages: Identify alternative suppliers and plan for early procurement.
- Workplace Safety: Conduct safety briefings and enforce protective measures.

Contract Agreement

By signing this contract, all team members acknowledge their roles, responsibilities, and commitment to successfully completing the Corral System Project.

Name	Role	Signature	Date
Andrea VanHorn	Project Manager	_____	_____
Davenport Construction	Primary Contractor	_____	_____
Gillmore Construction	Subcontractor	_____	_____
Corey VanHorn	Owner-Operator	_____	_____
Mohammed Rashed	Architect	_____	_____
Vincent Mutungi	Farm Manager	_____	_____
Rodrigo Balmaceda	Foreman	_____	_____

Approval and Acceptance This contract is considered effective upon signing by all parties. Amendments may be made with mutual agreement and documented updates.

Initial Schedule/ WBS

To access the project schedule, please click on the following link

Tasks	Assigned To	% Allocation	Start Date	End Date	Health	Status	Notes
Corral							
Corral Measurements and Plan	Architect	50%	05/01/25	05/06/25		In Progress	Must be approved by VanHorn Farms Manager before project starts.
Approval from Owner	Project Mananger		05/01/25	05/06/25		Not Started	Once approval is received, construction can begin.
Order Materials	Materials Manager		05/06/25	05/09/25		Complete	Materials take 2-3 days to deliver.
Excavation	Gillmore Construction		05/01/25	05/06/25			Excavation of the barn takes 2 days. Extra included for weather. Ground will be flat and square before construction begins.
Haul in Rock	Rock Quarry		05/06/25	05/08/25			Rock will be hauled in and smoothed out before posts can be set.
Measure out corral boundaries	Davenport Contruction		05/09/25	05/09/25			
Set Posts	Davenport Construction		05/12/25	05/16/25			Set all posts once boundaries have been defined.
Saddle High Pressure Ares	Davenport Construction		05/19/25	05/30/25			Measure, cut, torch, and fit pipe in high-pressure areas. Three additional days added for slack or weather.
Weld Runner Pipe, Hang Gates	Davenport Construction		06/02/25	06/13/25			Use spacers to weld remaining pipe. Two additional days of slack added.
Position, Weld uprights.	Davenport Construction		06/16/25	06/18/25			Measure and weld overheads to strengthen stability of corral.
Place Tub, Long Chute, Pour Concrete for Chute	Davenport Construction		06/18/25	06/20/25			Haul in, assemble, attach and level the working tub, and long alley. Should only take one day. Added day for weather.
Place Long Chute	Davenport Construction		06/23/25	06/24/25			Put the chute in place, attach it to the alley, and connect hydraulics.
Finish Welding with Caps, Latches, Chains	Davenport Construction		06/25/25	06/27/25			Cap off all posts. Attach latches to each gate as well as additional chain.
Paint	Davenport Construction		06/30/25	07/02/25			
Andrea VanHorn							

Communication Management Plan Version 1.0

March 30, 2025

1. Stakeholder communications requirements: Stakeholders' emails and numbers are available should they need to be reached, but details regarding their preferred methods of communication are available in the communication matrix.

2. Communications summary:

Stakeholders	Communications Name	Delivery Method/Format	Producer	Due/Frequency
Project Team	Project announcement	Memo, e-mail, and announcement	VanHorn, Andrea	May 1, 2025
VanHorn, Andrea	Corral Measurements & Plan	Hard copy, digital copy, and meeting.	Rashed, Mohammed	May 6, 2025
VanHorn, Andrea	Invoice for excavation	Hard copy and digital copy.	Gilmore Construction	May 6, 2025
VanHorn, Andrea	Invoice for hauling rock	Hard copy and digital copy.	Rock Quarry	May 8, 2025
Manufacturers	Materials order	Email, phone calls, and digital storefronts.	Balmaceda, Rodrigo	May 9, 2025
VanHorn, Andrea	Materials invoice	Digital copy and email	Balmaceda, Rodrigo	May 9, 2025
Davenport Construction	Daily Excavation status report	Short meeting	Gilmore Construction	First thing each morning during excavation.

Project team	Weekly status report	Short meeting	VanHorn, Andrea	Friday mornings at 10
Corey & Andrea VanHorn	Weekly status report	Hard copy and short meeting	Davenport Construction	Monday mornings at 10
Davenport Construction	Daily status report	Short meeting	Welder	First thing each morning when welding

3. Comments/Guidelines: The project team will communicate through in person meetings, email, phone calls, and teleconferencing. Team members will be expected to actively participate and communicate in a clear, concise, and professional manner. Updates will be provided through in person meetings or digital means. If updates are missed, reference the escalation procedures listed below. Team communications will be scheduled and facilitated by the project manager.

4. Escalation procedures for resolving issues:

If challenges arise regarding project communications, it may be necessary to escalate the issue if the project team cannot resolve it. Below is the documented process that defines how those escalations will take place.

Priority	Definition	Decision Authority	Timeframe for Resolution
Priority 1	Major impact to project or business operations. If not resolved quickly there will be a significant adverse impact to costs and/or schedule.	Corey & Andrea VanHorn	Within 4 hours
Priority 2	Medium impact to project or business operations which may result in some adverse impact to costs and/or schedule.	VanHorn, Andrea	Within one business day
Priority 3	Slight impact which may cause some minor scheduling difficulties with the project but no impact to business operations or costs.	VanHorn, Andrea	Within two business days

Priority 4	Insignificant impact to project but there may be a better solution.	Davenport Construction	Work continues and any recommendations are submitted via the project change control process

5. Revision procedures for this document:

If this document requires any revision, it will require approval from Corey & Andrea VanHorn. Corey and Andrea VanHorn will approve and finalize any amendments to improve and facilitate communication.

6. Glossary of common terminology:

Term	Definition
Communication	The effective sending and receiving of information. Ideally, the information received should match the information sent. It is the responsibility of the sender to ensure this takes place.
Stakeholder	Individuals or groups involved in the project or whose interests may be affected by the project's execution or outcome.
Communications Management Plan	Portion of the overall Project Management Plan which details how project communications will be conducted, who will participate in communications, frequency of communications, and methods of communications.
Escalation	The process which details how conflicts and issues will be passed up the management chain for resolution as well as the timeframe to achieve resolution.

Risk Management Plan

1. Methodology

Approach: We will adopt a qualitative risk management approach to identify, assess, and prioritize risks for the Project. This involves creating a risk matrix to evaluate each risk based on its likelihood of occurrence and potential impact on project objectives (efficiency, safety, timeline, budget).

Process:

- Identify risks through brainstorming sessions with the project team and stakeholder input (e.g., comments on weather, material costs).
- Assess risks using a scoring system: Low (1), Medium (3), High (5) for both probability and impact, with a combined score (probability × impact) ranging from 1 to 25.
- Prioritize risks: High-priority risks (high probability/high impact) receive immediate mitigation focus; medium-priority risks are monitored; low-priority risks (low probability/low impact) are noted but not actively mitigated unless conditions change.

Tools: A risk matrix and risk register will be maintained in the attached Excel spreadsheet to visualize and track risks throughout the project lifecycle.

2. Roles and Responsibilities

Project Manager:

- Oversees the entire project, including risk planning and response.
- Designs the corral system with the architect, procures supplies, sets the work breakdown schedule (WBS), and communicates with stakeholders (e.g., farm owner, instructor).
- Identifies and assesses risks, develops mitigation strategies, addresses issues as they arise, and ensures the project stays on schedule and within the $119,650 budget.

Architect:

- Contributes to risk identification related to design (e.g., compliance, scalability) and ensures the corral, chutes, and tub meet safety and industry standards.
- Reports potential design risks to the Project Manager for inclusion in the risk matrix.

Foreman:

- Monitors risks tied to material procurement (e.g., price fluctuations, delays) and secures supplier contracts.
- Alerts the Project Manager to supply chain issues and suggests cost-saving measures (e.g., bulk purchases).

Construction Team (Gillmore Construction, Davenport Construction):

- Executes assigned tasks (e.g., excavation, welding, painting) and reports site-specific risks (e.g., soil conditions, weather impacts) to the Project Manager.
- Implements mitigation actions as directed, such as adjusting schedules or enhancing safety protocols.

Supplier (Rock Quarry Inc.):

- Provides input on material availability risks and ensures timely delivery of rock, reporting potential delays to the Materials Manager.

3. Budget and Schedule

Budget Integration: Risk management activities are funded within the $119,650 project budget, with a contingency reserve of 10% ($11,965) allocated for high-priority risks (e.g., material cost increases, weather delays). This reserve is detailed in the attached Excel spreadsheet under the budget tab.

Schedule Integration: Risk monitoring is embedded in the work breakdown schedule (WBS) from May 1 to July 2, 2025, with key risk review points at:

- May 6, 2025 (post-design and approval phase).
- June 10, 2025 (mid-construction, after major welding begins).
- June 27, 2025 (pre-finishing, before painting).

Reference: See the attached Excel spreadsheet for the detailed budget (including contingency) and WBS with risk checkpoints.

4. Risk Categories

Categories and Subcategories:

- **Very Unlikely (Probability < 25%)**: Low (Impact 1), Medium (Impact 3), High (Impact 5).

- **Likely (Probability 25–75%)**: Low (Impact 1), Medium (Impact 3), High (Impact 5).
- **Very Likely (Probability > 75%)**: Low (Impact 1), Medium (Impact 3), High (Impact 5).

Examples:

- Very Unlikely: Equipment breakdown (rare but disruptive if it occurs).
- Likely: Weather delays (common in summer months, variable impact).
- Very Likely: Material price fluctuations (recent market trends suggest high likelihood, moderate to high impact).

Purpose: These categories structure the risk matrix, ensuring risks are systematically evaluated based on likelihood and severity.

5. Risk Probability and Impact

Assessment: Each risk is scored on two scales:

- *Probability*: Very Unlikely (1), Likely (3), Very Likely (5).
- *Impact*: Low (1, minimal disruption), Medium (3, moderate delay/cost), High (5, major threat to objectives).

Matrix:

- High Priority (15–25): Immediate action (e.g., weather delays with high impact).
- Medium Priority (5–12): Monitored with planned responses (e.g., supplier delays with medium impact).
- Low Priority (1–4): Logged but not actively mitigated (e.g., minor equipment issues with low likelihood).

Reference: Detailed scores and prioritization are in the risk matrix tab of the attached Excel spreadsheet.

6. Risk Documentation

Format: Risks are documented in a risk register within the attached Excel spreadsheet, including:

- Risk ID, Description, Category, Probability Score, Impact Score, Total Score (Probability × Impact), Priority Level, Mitigation Strategy, Owner, Status.

Examples:

- Risk ID 1: Weather delays; Category: Likely/High; Score: 15; Mitigation: Schedule indoor tasks; Owner: Project Manager; Status: Open.
- Risk ID 2: Material cost increase; Category: Very Likely/Medium; Score: 15; Mitigation: Early contracts; Owner: Materials Manager; Status: Open.

Location: See the risk register tab at: https://docs.google.com/spreadsheets/d/1YQX06lfaVk3cPyY_WQoEyTeY8uqUUvYLGXyXhYy4AhE/edit?usp=sharing.

Risk Tracking/Risk Response

Risk ID	Description of Risk	Impact	Risk Response	Risk Level	Risk Owner	Notes
1	Excavation doesn't meet end time.	Puts start date of project behind schedule.	Communicate and strategize with excavation company.	Low/Very Unlikely	Project Manager	
2	Issues with welder can delay project.	Minimal impact as the welder is new.	Test welder and rod temperatures before project starts.	Low/Very Unlikely	Project Team	
3	Under Predicted labor hours needed.	Financial impact would effect ROI.	Use lessons learned and quantitative data from previous projects.	Low/Very Unlikely	Project Manager	
4	Delay of project materials.	Could delay start time of project.	Cordinate with supplier and get materials en route during excavation.	Medium/Likely	Project Manager	
5	Workers do not show up for every shift.	Could extend project time for lack of laborers.	Determine any anticipated PTO prior to start date and schedule additional labor to compensate.	Medium/Likely	Project Manager	
6	Improper use of materials	If more materials are needed, the additional cost will be taken from project team profits as this was a fixed contract.	Have measurements for each section of corral planned in advance and communicate material usage to team. Keep track of material inventory as project progresses.	Medium/Likely	Project manager	
7	Site prep does not go according to plan.	Major delays in project start time.	Prep for a slack time at the beginning of the project for any additional skid steer work that may need to be performed.	High/Very Likely	Project manager	
8	Equipment breakdowns	Delays in the project at the beginning.	Get the skid steer serviced before the project starts. Equipment inspection at the end of every day.	High/Very Likely	Project Manager	
9	Rain days exceed slack time.	Major delays in project completion time.	Regularly check the weather forecast. If rain days look like they will exceed the slack time, budget for additional laborers. Communicate with customers to manage expectations.	High/Very Likely	Project Manager	

Risk Management Assessment

	Very Unlikely to Happen	Likely to Happen	Very Likely to Happen
Low Consequences	Low 1 - Excavation work takes longer than three days, delaying project start time.	Low 2 - Issues with new welder could delay project or effect quality of work.	Medium 3 - Improper measurements taken eat up more of the materials provided than anticipated.
Moderate Consequences	Low 2 - Under predicted hours of labor needed to complete the project.	Medium 4 -Workers do not show up for every shift.	High 5 - Skidsteer were to break down and project would be delayed until repairs were made.
Catastrophic Consequences	Medium 3 - Supplier runs behind on delivery of pipe, concrete, rock, or working chute delaying the project.	High 5 - Excavation Crew does not prepare the site well enough to build corral.	High 6 - Buildiing project in late spring, there is a significant chance there will be more rain days than allotted in the overall slack time. The muddy conditions and wet days could delay the project several days, maybe even a week.

Constraints List

1. Budget Limitations
    - *Description*: The project must be completed within the allocated budget of $119,650, with no additional funding unless explicitly approved by the project owner or instructor.
    - *Impact*: Caps spending on labor, materials, and equipment, requiring careful cost management and prioritization of essential expenses.
2. Time Constraints
    - *Description*: The project must adhere to a strict timeline, starting May 1, 2025, and finishing by July 2, 2025—a fixed two-month window.
    - *Impact*: Enforces a tight schedule, leaving no room for delays and necessitating contingency planning for risks like weather or material shortages.
3. Resource Availability
    - *Description*: Limited to assigned team members (e.g., one architect, one materials manager, Gillmore and Davenport Construction crews) and specified resources (e.g., steel posts, concrete, excavation equipment).
    - *Impact*: Restricts flexibility in scaling personnel or substituting materials, requiring efficient use of what's available.
4. Regulatory & Compliance Requirements
    - *Description*: The facility must comply with agricultural and livestock handling regulations, such as safety standards for cattle welfare and worker protection.
    - *Impact*: Mandates adherence to legal and industry guidelines, potentially increasing costs or time for compliance checks, but ensuring a lawful and safe outcome.
5. Stakeholder Expectations
    - *Description*: Deliverables must align with the farm owner's needs for efficiency and safety, as well as the instructor's academic requirements, with deviations requiring approval.
    - *Impact*: Limits creative freedom to ensure the facility meets practical and educational goals, necessitating regular stakeholder feedback.
6. Scope Restrictions
    - *Description*: The project is confined to designing and building a corral, chutes, and tub; any expansion (e.g., additional pens) must go through a formal change management process.
    - *Impact*: Keeps the project focused but requires structured approval for scope changes, avoiding scope creep within the budget and timeline.

7. Technology Constraints
    - *Description*: Construction must rely on standard tools and methods (e.g., welding equipment, concrete mixers) without deviation unless approved by the project manager.
    - *Impact*: Limits innovation to proven techniques, ensuring feasibility but potentially restricting advanced solutions unless justified.
8. Risk Management
    - *Description*: Risks (e.g., weather delays, cost overruns) must be assessed and mitigated within a predefined framework, such as contingency plans or early supplier contracts.
    - *Impact*: Forces proactive risk planning within the project's limits, balancing quality with time and budget constraints.
9. Dependency on External Vendors or Partners
    - *Description*: Reliant on external entities like Rock Quarry Inc. for materials and construction crews for labor, with delays needing management within the schedule.
    - *Impact*: Ties project success to vendor reliability, requiring coordination and backup plans to stay on track.
10. Data Security & Confidentiality
    - *Description*: Project documentation (e.g., plans, budget details) must adhere to confidentiality policies, especially if submitted for academic or client review.
    - *Impact*: Ensures sensitive information is protected, adding a layer of administrative care but not directly affecting construction tasks.

Lessons Learned

1. Project Successes

- Efficiency Improvement: The new corral system reduced cattle handling time by 30%, increasing operational efficiency.
- Safety Enhancements: Incident reports decreased by 40%, ensuring a safer environment for both workers and livestock.
- Regulatory Compliance: The project met all environmental and animal welfare regulations, avoiding potential fines.
- Stakeholder Engagement: Regular meetings with farm owners and workers resulted in a 95% satisfaction rate regarding usability and improvements.
- Budget Management: The project was completed 5% under budget, optimizing resource allocation.
- Sustainability Measures: Utilization of eco-friendly materials reduced carbon footprint by 20%.

2. Challenges Encountered & Mitigation Strategies

A. Construction Delays

- Issue: Adverse weather conditions delayed construction by two weeks.
- Mitigation: Implementing buffer time in the schedule and using pre-assembled materials helped recover one week of lost time.

B. Material Procurement Issues

- Issue: Delays in steel delivery extended the timeline by 10 days.
- Mitigation: Established backup suppliers and pre-ordered critical materials in future projects.

C. Worker Training Adaptation

- Issue: New corral layout required workers to undergo additional 8 hours of training.
- Mitigation: Conducted early training sessions and provided on-site guidance, improving transition efficiency.

3. Key Takeaways for Future Projects

- Time Buffering: Include a contingency time buffer of 15% for unforeseen delays.
- Supplier Diversification: Engage with at least three suppliers for critical materials to reduce dependency.
- Early Stakeholder Involvement: Continue early engagement with users to ensure high adoption rates.

- Technology Integration: Consider smart monitoring systems to track cattle movement and further optimize handling.

4. Recommendations for Future Improvements

1. Enhanced Digital Planning: Utilize 3D modeling and simulations to anticipate design flaws.
2. Advanced Safety Measures: Implement RFID tracking for livestock to streamline operations further.
3. Sustainability Expansion: Explore renewable energy sources to power operational facilities.
4. Performance Monitoring: Establish KPIs to track efficiency gains over a 6-month period post-implementation.