Product Requirements Document (PRD)

Fibre Deployment Management Tool

Company: Mooya Wireless
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1. Executive Summary

The Fibre Deployment Management Tool is a comprehensive web-based payroll and project management system designed specifically for Mooya Wireless's fibre deployment operations. The system streamlines the management of local labour, daily work tracking, and fortnightly payroll processing for civil workers engaged in trenching and related activities.

Purpose

To provide an efficient, transparent, and auditable system for managing temporary workers on fibre deployment projects, ensuring accurate payment calculations based on daily work output and maintaining comprehensive records for compliance and operational oversight.

Target Users

- **Super Admin:** System administrator with full access (kholofelo@mooya.co.za)
- **Project Managers:** Oversee projects, set rates, approve payments
- **Supervisors:** Onsite personnel who manage labourers and record daily work
- **Project Administrators:** Handle corrections and data quality
- **Local Labourers:** Temporary workers who view their work records and payment status

2. System Overview

2.1 Core Functionality

The system provides end-to-end management of temporary labour for fibre deployment projects, from worker onboarding through payment processing. It tracks daily work output in trenching meters (open and close categories), calculates payments based on project-specific rates, and generates payment files for banking integration.

2.2 Key Features

1. **Project Management:** Create and configure projects with location, budget, and rate structures

2. **User Management:** Role-based access control with six distinct user roles

3. **Employee Onboarding:** Comprehensive worker profiles with documentation

4. **Rate Configuration:** Flexible pay rate system for different worker types and tasks

5. **Daily Work Tracking:** Record trenching meters completed by each worker

6. **Automated Calculations:** Real-time payment calculations based on work output

7. **Fortnightly Payroll:** Structured payment cycles with approval workflow

8. **Audit Trail:** Complete history of corrections and approvals

9. **Banking Integration:** CSV export matching banking upload requirements

10. **Notifications:** Real-time updates for workers on daily progress

3. User Roles and Permissions

3.1 Super Admin (kholofelo@mooya.co.za)

Responsibilities: - Manage all system users and assign roles - Create and configure employee types - Oversee all projects and operations - Access all system features without restriction

Permissions: - Full CRUD access to all entities - User role assignment - System configuration - Access to all projects and data

3.2 Admin

Responsibilities: - Manage users within assigned scope - Configure employee types - Oversee multiple projects

Permissions: - User management (except Super Admin role assignment) - Employee type management - Access to all projects - System configuration

3.3 Project Manager

Responsibilities: - Create and manage projects - Assign supervisors to projects - Configure pay rates for employee types - Review and approve payment requests - Approve corrections submitted by Project Administrators

Permissions: - Create projects - Assign supervisors - Set and modify pay rates - View all project data - Approve/reject payment requests - Approve/reject correction requests - Generate payment files

3.4 Supervisor

Responsibilities: - Add local labourers to assigned projects - Record daily work output (trenching meters) - Submit payment requests to Project Managers - Monitor worker performance

Permissions: - Add/edit labourers in assigned projects - Record daily work logs - View payment status for assigned project - Submit payment requests - View worker profiles and history

3.5 Project Administrator

Responsibilities: - Identify and correct data entry errors - Maintain data quality - Submit corrections for approval

Permissions: - View all project data - Submit correction requests (requires PM approval) - View audit trail - Cannot directly modify payment data

3.6 Local Labourer (User)

Responsibilities: - View personal work records - Track payment status - Receive daily work notifications

Permissions: - View personal dashboard - View own work history - View payment status - Receive notifications

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4. Detailed Feature Requirements

4.1 Authentication and Access Control

Requirement ID: AUTH-001
Priority: Critical

Description:
The system must restrict access to authorized Mooya Wireless personnel only, using email domain validation.

Acceptance Criteria: - Only users with @mooya.co.za or @mooyawireless.co.za email addresses can access the system - Google SSO integration for authentication - kholofelo@mooya.co.za automatically assigned Super Admin role - New users default to "User" role until upgraded by Super Admin - Session management with secure token handling - Automatic logout after period of inactivity

Technical Requirements: - OAuth 2.0 implementation - JWT token-based sessions - Domain whitelist validation - Role-based access control (RBAC)

4.2 Project Management

Requirement ID: PROJ-001
Priority: Critical

Description:
Project Managers must be able to create and configure fibre deployment projects with all necessary parameters.

Acceptance Criteria: - Create project with name, location, and budget - Assign up to 2 Project Managers per project - Assign multiple Supervisors to project - Configure employee types available for project - Set status (Active, Completed, On Hold) - View project dashboard with statistics - Edit project details (by assigned PMs only)

Data Fields: - Project Name (required, text, max 255 characters) - Location (optional, text, max 500 characters) - Budget (optional, decimal, ZAR currency) - Start Date (auto-generated on creation) - End Date (optional) - Status (enum: Active, Completed, On Hold) - Created By (auto-populated) - Project Managers (1-2 users with PM role) - Supervisors (multiple users with Supervisor role)

4.3 Employee Type Management

Requirement ID: EMP-001
Priority: High

Description:
Super Admin and Admin users must be able to define different types of temporary workers with specific roles.

Acceptance Criteria: - Create employee types (e.g., Civil Worker - Trenching, Flagman) - Add description for each type - View list of all employee types - Edit employee type details - Cannot delete employee type if in use

Pre-defined Types: - Civil Worker (Trenching) - Flagman - General Labourer - Equipment Operator

Data Fields: - Name (required, text, max 255 characters) - Description (optional, text) - Created Date (auto-generated) - Active Status (boolean)

4.4 Pay Rate Configuration

Requirement ID: RATE-001
Priority: Critical

Description:
Project Managers must configure pay rates for different employee types and work categories within each project.

Acceptance Criteria: - Set rates per employee type per project - Define rates for "Open Trenching" (per meter) - Define rates for "Close Trenching" (per meter) - Add custom rate items (e.g., daily allowance, transport) - Rates in ZAR currency with 2 decimal precision - Rate history tracking (when rates change) - View current and historical rates

Data Fields: - Project ID (foreign key) - Employee Type ID (foreign key) - Rate Category (enum: Open Trenching, Close Trenching, Custom) - Rate Amount (decimal, ZAR) - Unit (enum: per meter, per day, fixed) - Effective Date (date) - Created By (user ID)

Business Rules: - Rates can be updated but not deleted - Historical rates preserved for audit purposes - Rate changes apply to work recorded after effective date - Previous work retains original rates

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4.5 Labourer Onboarding

Requirement ID: LAB-001
Priority: Critical

Description:
Supervisors must be able to add local labourers to their assigned projects with complete profile information.

Acceptance Criteria: - Add labourer with required personal information - Upload profile photo (required) - Upload ID document photo (optional) - Upload proof of banking document photo (optional) - Auto-calculate age from date of birth - Auto-determine gender from ID number (South African ID format) - Validate ID/Passport number format - Validate banking details - Assign employee type - Associate with specific project

Required Data Fields: - First Name (text, max 100 characters) - Surname (text, max 100 characters) - ID Number or Passport Number (text, validated format) - Date of Birth (date, used to calculate age) - Gender (auto-calculated from SA ID or manual entry) - Contact Number (text, validated phone format) - Email Address (optional, text, validated email format) - Employee Type (dropdown, from project's available types) - Profile Photo (image upload, required, max 5MB)

Banking Details (Required): - Bank Name (dropdown, South African banks) - Account Number (text, validated format) - Account Type (enum: Cheque, Savings) - Branch

Code (text, validated format) - Proof of Banking Document (image upload, optional, max 5MB)

Optional Data Fields: - Physical Address (text, max 500 characters) - ID Document Photo (image upload, max 5MB)

Validation Rules: - South African ID number: 13 digits, valid format with checksum - Passport number: alphanumeric, 6-9 characters - Contact number: South African format (+27 or 0) - Age must be 18 or older - All required fields must be completed before saving

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4.6 Daily Work Logging

Requirement ID: WORK-001
Priority: Critical

Description:
Supervisors must record daily work output for each labourer in their project using a simple daily sheet interface.

Acceptance Criteria: - View list of all labourers in project - Enter meters for "Open Trenching" per labourer - Enter meters for "Close Trenching" per labourer - Save daily sheet for specific date - Edit daily sheet for current day only - View historical daily sheets (read-only) - Automatic calculation of daily earnings - Send notification to labourer upon submission

Data Fields: - Date (date, defaults to today) - Project ID (foreign key) - Labourer ID (foreign key) - Open Trenching Meters (decimal, 2 decimal places) - Close Trenching Meters (decimal, 2 decimal places) - Additional Items (optional, custom rate items) - Total Daily Earnings (calculated, read-only) - Recorded By (user ID, auto-populated) - Recorded At (timestamp, auto-generated)

Business Rules: - Can only record work for current or past dates - Cannot record future dates - One entry per labourer per date - Supervisor can only edit today's entries - Historical entries require correction request - Zero meters allowed (for absent workers) - Negative meters not allowed

Calculations: - Daily Earnings = (Open Meters × Open Rate) + (Close Meters × Close Rate) + Additional Items - Rates fetched from project configuration - Real-time calculation as meters entered

4.7 Labourer Dashboard

Requirement ID: DASH-001
Priority: High

Description:
Local labourers must have access to a personal dashboard showing their work history and payment status.

Acceptance Criteria: - View all daily work records - See breakdown of open/close meters per day - View calculated earnings per day - See cumulative earnings for current pay period - View payment due date (fortnightly cycle) - View payment history (past payments) - Receive real-time notifications when work is logged - Mobile-responsive interface

Dashboard Components: 1. **Summary Cards:** - Current Period Earnings (ZAR) - Days Worked This Period - Next Payment Date - Total Meters This Period

1. **Work History Table:**

2. Date

3. Open Meters

4. Close Meters

5. Daily Earnings

6. Status (Pending, Approved, Paid)

7. **Payment History:**

8. Payment Date

9. Period Covered

10. Amount Paid

11. Payment Method

Notifications: - Daily work logged notification - Payment approved notification - Payment processed notification

4.8 Payment Period Management

Requirement ID: PAY-001
Priority: Critical

Description:
The system must manage fortnightly payment cycles with clear visibility of payment schedules and amounts.

Acceptance Criteria: - Automatic fortnightly payment period creation - View current payment period details - View all labourers in payment period - Calculate total amount per labourer - Calculate total amount for all labourers - Show payment period status (Open, Submitted, Approved, Paid) - Supervisor can submit period for approval - Project Manager can approve/reject period - Generate payment schedule report

Payment Period Data: - Period Start Date (date) - Period End Date (date, 14 days from start) - Project ID (foreign key) - Status (enum: Open, Submitted, Approved, Rejected, Paid) - Total Amount (calculated, ZAR) - Submitted By (user ID) - Submitted At (timestamp) - Approved By (user ID) - Approved At (timestamp) - Payment Date (date)

Business Rules: - Payment periods are 14 days (fortnightly) - Periods start on Monday - Cannot submit period with incomplete data - Cannot modify period after submission - Corrections require separate approval workflow - Payment file generated only after PM approval

4.9 Payment Request and Approval

Requirement ID: APPR-001
Priority: Critical

Description:
Supervisors submit payment requests for approval, and Project Managers review and approve them.

Acceptance Criteria: - Supervisor submits payment period for approval - System validates all work logs complete - Project Manager receives notification - PM views payment summary with breakdown - PM can approve or reject with reason - Rejection returns to Supervisor with feedback - Approval triggers payment file generation - Email notifications at each stage

Approval Workflow: 1. Supervisor clicks "Submit for Approval" 2. System validates data completeness 3. Status changes to "Submitted" 4. PM receives notification 5. PM reviews payment details 6. PM approves or rejects 7. If approved: Status → "Approved", generate payment file 8. If rejected: Status → "Open", Supervisor notified with reason

Validation Checks: - All labourers have at least one work entry - No pending correction requests - All rates configured - No data integrity errors

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4.10 Correction and Audit Trail

Requirement ID: AUDIT-001
Priority: High

Description:
Project Administrators can identify errors and submit corrections, which require Project Manager approval. All changes are tracked in an audit trail.

Acceptance Criteria: - Project Admin can flag incorrect entries - Submit correction request with details - Specify corrected values - Provide reason for correction - PM receives correction request notification - PM reviews original vs corrected values - PM approves or rejects correction - Approved corrections update records - All changes logged in audit trail - Audit trail shows: who, what, when, why

Correction Request Data: - Original Entry ID (foreign key) - Field Name (text) - Original Value (text) - Corrected Value (text) - Reason (text, required) - Requested By (user ID) - Requested At (timestamp) - Status (enum: Pending, Approved, Rejected) - Reviewed By (user ID) - Reviewed At (timestamp) - Review Notes (text)

Audit Trail Data: - Entity Type (enum: Project, Labourer, WorkLog, PayRate, etc.) - Entity ID (integer) - Action (enum: Create, Update, Delete) - Field Changed (text) - Old Value (text) - New Value (text) - Changed By (user ID) - Changed At (timestamp) - Reason (text) - Approved By (user ID, if applicable)

Business Rules: - Cannot correct paid periods - Corrections affect payment calculations - Approved corrections cannot be reversed (new correction required) - Audit trail immutable - All users can view audit trail for transparency

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4.11 Payment File Generation

Requirement ID: FILE-001
Priority: Critical

Description:
Generate CSV files formatted for banking system upload to process payments to labourers.

Acceptance Criteria: - Generate CSV file per payment period - One file per project or consolidated - Include all approved labourers - Match banking upload format requirements - Include validation checks - Download file securely - Log file generation in audit trail

CSV File Format:

```
Account Number,Account Type,Branch Code,Amount,Reference,Beneficiary Name
1234567890,Savings,250655,1500.00,PAY-PROJ001-20251025,John Doe
```

CSV Fields: - Account Number (from labourer profile) - Account Type (Cheque/Savings) - Branch Code (from labourer profile) - Amount (calculated total for period, 2 decimal places) - Reference (format: PAY-[PROJECT]-[DATE]) - Beneficiary Name (First Name + Surname)

File Naming Convention:

```
PAYMENT_[PROJECT_NAME]_[PERIOD_END_DATE].csv
Example: PAYMENT_BPM605_20251025.csv
```

Validation: - All amounts positive - All banking details present - No duplicate account numbers in same file - Total amount matches payment period total - File encoding: UTF-8 - Line endings: Windows (CRLF)

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5. Non-Functional Requirements

5.1 Performance

- Page load time: < 2 seconds

- API response time: < 500ms for 95% of requests

- Support 100 concurrent users

- Handle 1000+ labourers per project

- Database query optimization for large datasets

5.2 Security

- HTTPS encryption for all communications

- Secure password storage (hashed and salted)

- JWT tokens with expiration

- Role-based access control enforcement

- SQL injection prevention

- XSS attack prevention

- CSRF protection

- Regular security audits

- Data backup every 24 hours

- Disaster recovery plan

5.3 Usability

- Responsive design (mobile, tablet, desktop)

- Intuitive navigation

- Clear error messages

- Inline help text

- Consistent UI/UX across all pages

- Accessibility compliance (WCAG 2.1 Level AA)

- Support for low-bandwidth connections

5.4 Reliability

- 99.5% uptime SLA

- Automatic failover

- Database replication

- Regular backups

- Error logging and monitoring

- Graceful degradation

5.5 Scalability

- Horizontal scaling capability

- Database sharding support

- CDN for static assets

- Caching strategy

- Load balancing

5.6 Compliance

- POPIA (Protection of Personal Information Act) compliance

- Data retention policies

- Right to access personal data

- Right to correction

- Right to deletion (where applicable)

- Audit trail for compliance reporting

6. Technical Architecture

6.1 Technology Stack

Frontend: - React 19 - TypeScript - Tailwind CSS 4 - tRPC for type-safe API calls - Wouter for routing

Backend: - Node.js - Express 4 - tRPC 11 - TypeScript

Database: - MySQL/TiDB - Drizzle ORM

Authentication: - OAuth 2.0 - JWT tokens

File Storage: - S3-compatible storage for images and documents

Hosting: - Web application hosting platform - SSL/TLS certificates - CDN integration

6.2 Database Schema

Key Tables: - users - projects - projectManagers - projectSupervisors - employeeTypes - payRates - labourers - dailyWorkLogs - paymentPeriods - correctionRequests - auditTrail

6.3 API Design

- RESTful API principles
- tRPC procedures for type safety
- JSON data format
- Error handling with standard HTTP codes
- Rate limiting
- API versioning

7. User Interface Requirements

7.1 Design Principles

- Clean, professional appearance
- Mooya Wireless branding (purple/orange color scheme)
- Clear visual hierarchy
- Consistent spacing and typography
- Accessible color contrast
- Mobile-first responsive design

7.2 Key Pages

1. **Dashboard (Home)**

2. Summary statistics

3. Quick actions

4. Recent activity

5. **User Management** (Super Admin only)

6. User list with roles

7. Add/edit users

8. Role assignment

9. **Projects**

10. Project list

11. Create project form

12. Project details page

13. Rate configuration

14. **Labourers**

15. Labourer list per project

16. Add labourer form with photo uploads

17. Labourer profile page

18. **Daily Logs**

19. Daily sheet interface

20. Date selector

21. Labourer list with input fields

22. Save and submit

23. **Payments**

24. Payment period list

25. Period details with breakdown

26. Approval interface

27. CSV download

28. **Audit Trail**

29. Filterable log of all changes

30. Search functionality

31. Export capability

7.3 Navigation

- Sidebar navigation for main sections
- Breadcrumb navigation for deep pages
- Role-based menu items
- User profile dropdown
- Logout option

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8. Implementation Phases

Phase 1: Foundation (Weeks 1-2)

- Authentication system
- User management
- Basic project creation
- Database setup

Phase 2: Core Features (Weeks 3-4)

- Employee type management
- Pay rate configuration
- Labourer onboarding

- Photo upload functionality

Phase 3: Work Tracking (Weeks 5-6)

- Daily work logging

- Labourer dashboard

- Notifications system

Phase 4: Payments (Weeks 7-8)

- Payment period management

- Approval workflow

- CSV file generation

Phase 5: Quality & Audit (Weeks 9-10)

- Correction requests

- Audit trail

- Reporting features

Phase 6: Testing & Launch (Weeks 11-12)

- User acceptance testing

- Bug fixes

- Performance optimization

- Production deployment

- User training

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9. Success Metrics

9.1 Operational Metrics

- Time to onboard new labourer: < 5 minutes

- Time to record daily work: < 2 minutes per labourer

- Payment processing time: < 1 hour from approval to file generation

- Error rate in payment calculations: < 0.1%

9.2 User Satisfaction

- System usability score: > 80%

- User adoption rate: > 90% within 1 month

- Support ticket volume: < 5 per week after training

9.3 Business Impact

- Reduction in payroll processing time: > 50%

- Reduction in payment errors: > 80%

- Improved transparency and worker satisfaction

- Complete audit trail for compliance

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10. Risks and Mitigation

10.1 Technical Risks

Risk: Data loss due to system failure
Mitigation: Daily backups, database replication, disaster recovery plan

Risk: Security breach
Mitigation: Regular security audits, penetration testing, secure coding practices

Risk: Performance degradation with scale
Mitigation: Load testing, optimization, scalable architecture

10.2 Operational Risks

Risk: User resistance to new system
Mitigation: Comprehensive training, user-friendly interface, support resources

Risk: Data migration errors
Mitigation: Thorough testing, validation checks, rollback plan

Risk: Incorrect payment calculations
Mitigation: Extensive testing, validation rules, audit trail, approval workflow

11. Support and Maintenance

11.1 Training

- User guides for each role

- Video tutorials

- In-person training sessions

- Help documentation within system

11.2 Support

- Email support: support@mooyawireless.co.za

- Response time: < 4 hours for critical issues

- Regular office hours for questions

- FAQ and knowledge base

11.3 Maintenance

- Regular software updates

- Security patches

- Feature enhancements based on feedback

- Monthly system health checks

12. Glossary

Trenching: The process of digging trenches for fibre optic cable installation

Open Trenching: Digging the initial trench

Close Trenching: Backfilling and closing the trench after cable installation

Fortnightly: Every two weeks (14 days)

Pay Period: A 14-day cycle for which work is aggregated and payments calculated

Labourer: Temporary worker engaged for fibre deployment activities

Employee Type: Classification of worker role (e.g., Civil Worker, Flagman)

Project Manager (PM): Mooya Wireless employee responsible for project oversight

Supervisor: Onsite Mooya Wireless employee managing daily operations

Audit Trail: Immutable log of all system changes and actions

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13. Appendices

Appendix A: User Stories

As a Project Manager, I want to: - Create projects and assign supervisors - Set pay rates for different worker types - Review and approve payment requests - Generate payment files for banking

As a Supervisor, I want to: - Add local labourers to my project - Record daily work output quickly - Submit payment requests - View payment status

As a Local Labourer, I want to: - View my daily work records - See how much I've earned - Know when I'll be paid - Receive notifications when work is logged

As a Super Admin, I want to: - Manage all users and their roles - Oversee all projects - Configure system settings - Access audit trails

Appendix B: Sample Workflows

Workflow 1: Onboarding a New Labourer 1. Supervisor logs in 2. Navigates to Labourers page 3. Clicks "Add Labourer" 4. Fills in personal details 5. Uploads profile

photo 6. Enters banking details 7. Uploads proof of banking (optional) 8. Selects employee type 9. Saves labourer profile 10. System confirms creation

Workflow 2: Recording Daily Work 1. Supervisor logs in 2. Navigates to Daily Logs 3. Selects date (defaults to today) 4. Views list of all labourers 5. Enters open trenching meters for each 6. Enters close trenching meters for each 7. Reviews calculated daily earnings 8. Saves daily sheet 9. System sends notifications to labourers

Workflow 3: Processing Fortnightly Payment 1. Payment period ends (14 days) 2. Supervisor reviews period data 3. Supervisor submits for approval 4. Project Manager receives notification 5. PM reviews payment breakdown 6. PM approves payment 7. System generates CSV file 8. PM downloads CSV file 9. PM uploads to banking system 10. System marks period as "Paid"

Document End

This PRD is a living document and will be updated as requirements evolve and feedback is received from stakeholders.