Silo Operations Management System- Phase 2

National Collateral Management Services Ltd.

Software Requirement Specification (SRS)

Project ID:

The document details the summary of solution architecture and approach for the development of Silo Operations Management System (Phase 2) for NCML. The document is based on the inputs, system study, discussions and meeting held between BCI & NCML Teams.

Prepared By: Kanishka

Submission Date: 9-Aug-21

Version: 4.0.2

Revision History

REVISION NO.	DATE	PREPARED BY	REVIEWED BY	COMMENT
2.0.0	16-Jun-21	Kanishka	Gaurav Arora	Phase 2 – Shipping by Road process description based on process discussion with NCML
2.1.0	17-Jun-21	Kanishka	Gaurav Arora	Corrections as per Internal Review
2.1.1	18-Jun-21	Kanishka	Gaurav Arora	Changes in existing modules as per NCML feedback on SRS V2.1.0. Addition of New Modules – Procurement Bag Inventory and Bag Transfer P to D
2.1.2	6-Jul-21	Kanishka	Gaurav Arora	Changes as per feedback from NCML on Version 2.1.1
3.0.0	6-Jul-21	Kanishka	Gaurav Arora	Addition of Shipping by Rake, Storage & Preservation, Stock Audit process based on detailed discussion with NCML
3.0.1	14-Jul-21	Kanishka	Gaurav Arora	Changes as per NCML feedback on Version 3.0.0
3.0.2	15-Jul-21	Kanishka	Gaurav Arora	Addition of Invoicing Reports and Charge Master
4.0.0	29-Jul-21	Kanishka	Gaurav Arora	Rake Receiving Process added (Heading 9.7), Delivery Notice master added (Heading 8.1.6)
4.0.1	5-Aug-21	Rajeev	Gaurav Arora	Changes as per feedback from NCML on V4.0.0
4.0.2	9-Aug-21	Kanishka	Rajeev Roy	Updated Invoicing Module

Abbreviations:

Client: National Collateral Management Services Ltd., henceforth will be referred as NCML.

Vendor: Bar Code India, henceforth, will be referred as BCI

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Table of Contents

1 SPECIFICATION ORGANIZATION

The objective of this document is to supply underlying concepts, procedures, and formats used in the design, development and installation of this software application. This specification consists of three sections organized as follows:

Section 1: Introduction

This section provides hardware requirements and documentation conventions.

Section 2: User Interface

This section depicts module design and logic flow, and is categorized into two groups:

- Application Function Module
- Common Routine

Section 3: System Architecture

This section provides information of system architecture.

2 INTRODUCTION

2.1 INTENDED AUDIENCE AND READING SUGGESTIONS

The scope of this document is to provide the understanding of this solution to user & development teams associated with the application development & implementation.

This document major emphasizes on providing clear understanding of Silo Operations Management System (SOMS)-Phase 2 application.

This solution comprises of:

- Web Application (Dot Net Framework 4.5)

2.2 PROJECT SCOPE

The scope of the project is the development and implementation of Silo Operations Management System application which will facilitate the automation of manual operations required in warehousing and storage of the food grains received from farmers, local mandi or regional godowns and shipment of the same to wholesale consumers, end users and distributors' at large scale.

The application provides procedures to keep track and control of the receiving and transportation of food grains by means of Vehicle and / or Train. The scope of application includes

A. Grain Receiving

1) Gate Entry
2) Quality Test
3) Weighbridge Entry
4) Debagging
5) Dumping Station
6) Exit Gate Weighbridge Entry
7) Exit Gate Entry
8) Silo Summary- Weighted Average Quality & Quantity

B. Grain Shipping

1) Empty Vehicle Gate Entry (Capture Tare Weight)
2) Shipping Lot Details
3) Bagged Shipping (Capture Weight)
4) Bulk Shipping (Capture Weight)
5) Exit Gate Entry

~~C.~~ Storage and Preservation

1) Sanitation
2) Loading
3) Aeration
4) Monitoring

D. Silo Movement

E. Grain Shipping via Rake/Wagon

1. Rake Entry- Tare Weight
2. Wagon Loading- Gross Weight
3. Quality/Lab Testing
4. Rake Shipping completed
5. Rake/Wagon Shipping

F. Grain Receiving via Rake/Wagon

1. Rake Import
2. Rake Entry- Gross Weight
3. Rake Unloading – Tare Weight
4. Quality lab testing
5. Rake Receiving complete

The document lays down the specifications of the Silo Operations Management System, its Architecture and also the Infrastructure requirements.

3 SOFTWARE/HARDWARE REQUIREMENTS

Below are the hardware and the software requirements of the application:

3.1 CENTRAL APPLICATION & DATABASE SERVER

The solution would require the high performance server with minimum following:

- Intel Xeon Processor E5-2620 v3 6C 2.4GHz 15MB Cache 85W /**16GB 1866MHz TruDDR4 Memory / 2 x 1TB 2.5in 7.2K RPM SAS SFF Hot Swap**/ Server AID M5210 SAS/SATA Controller MULTIBURNER DVD System x 550W
- Windows Server 2012
- MS SQL Standard 2012 Management Studio
- Dot Net Framework

It is recommended that NCML procure database server with expandable data storage capacity since the volume of data generated would increase with increase in the daily transactions. The exact amount of data generated shall be visible after pilot test of entire cycle of the system.

3.2 DESKTOP COMPUTERS

Desktop would require following specifications:-

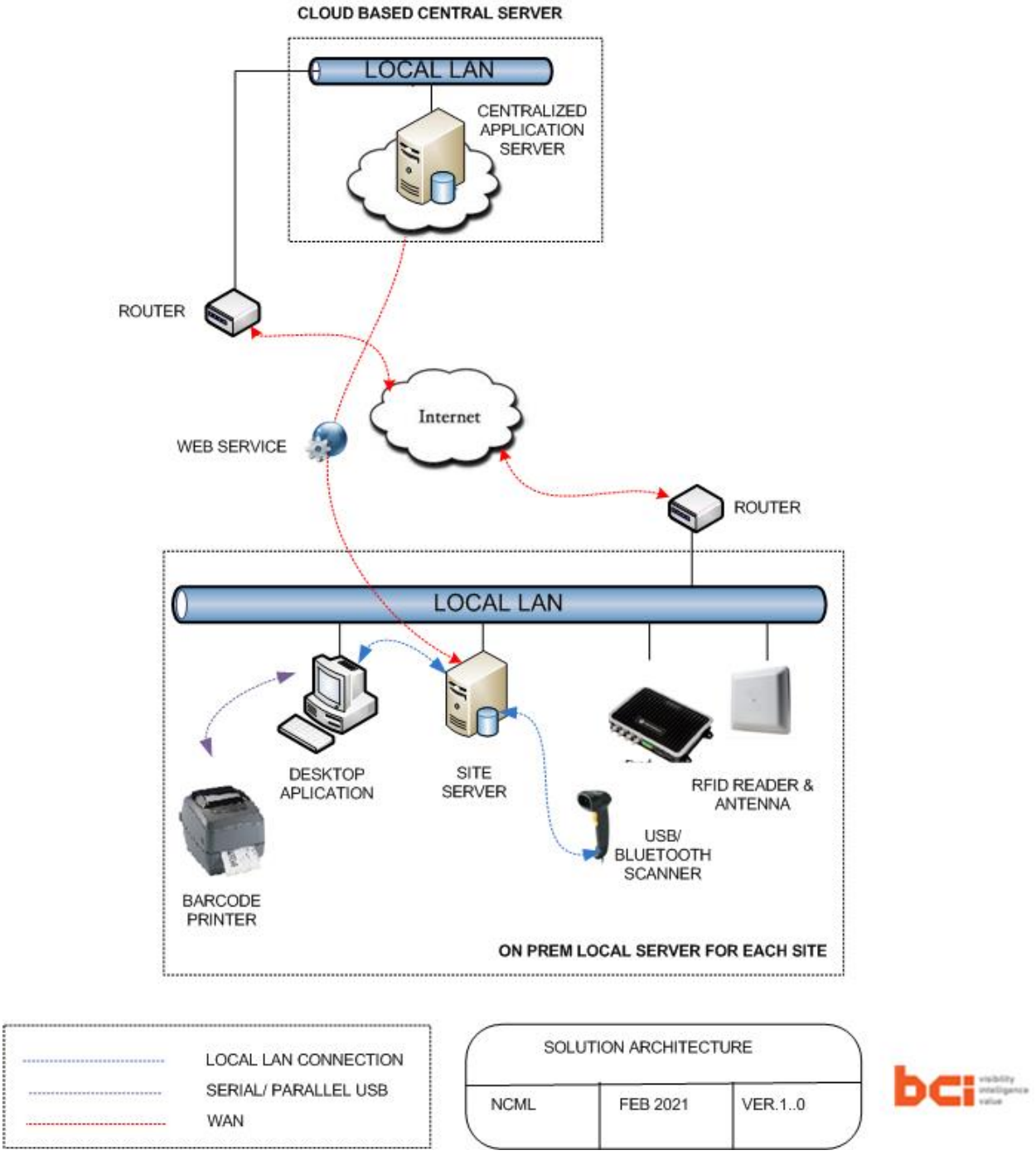
- I3/i5 Processor with Windows 7 operating System
- 16 GB RAM
- 100GB HDD
- Dot net Framework 4.0

3.3 HARDWARE REQUIREMENTS

Hardware required for the application:

- RFID Readers
- Camera
- RFID Tags
- Thermal Barcode Printer
- USB/ Bluetooth Scanner

4 SOLUTION ARCHITECTURE



5 User Interface Specification Conventions

This section specifies the user interface portion of the application.

Section Organization

The User Interface Specification presents screen displays or "**Dialogs**".

Documentation Conventions

This section incorporates illustrations of the application user interface. Each screen display "Dialog" consists of the screen display image, a process name, a paragraph documenting the processing required for the dialog, a paragraph listing the navigation options, and a table listing for each variable field on the dialog, its database source or destination, format, and any instructions required to process the field.

The following section contains a sample dialog with each area identified.

6 System Log

System shall maintain internal logs for application.

6.1 Error Logs

These logs will contain any errors encountered during runtime for faster resolution of any problem post deployment.

The log file is maintained for each transaction on daily basis and can get removed from system on set time intervals.

7 ARCHITECTURAL DESIGN

Overall System consists of:

- Web Application

7.1 WEB APPLICATION

A Web Application will be developed using which users will create the master data. It helps to generate and display related transaction reports to End Users in real time. The web application will be accessible to Plant Users and provide process modules as per assigned rights and let user to perform following operations:

- Master Data Creation
- Managing Users and Roles
- Silo Grain Movement
    - Job Request Creation
    - Job Request Approval
    - Job Transfer Sheet
    - Empty Bags Receiving
    - Stacking of Bagged Grain
- Grain Shipping
    - Gate Entry
    - Entry Weighbridge
    - Quality Checking
    - Bags Loading
    - Exit Weighbridge
    - Exit Gate

**Grain Receiving by Road process is already covered and implemented at NCML in Phase 1 application.*

8 Application Modules

8.1 Master Data

The application will have master data to store details in database. Masters will be created as per the application's requirement and details will be stored in database.

Master data can also be uploaded in application via excel/ CSV file in a defined format. The application provide following masters:

8.1.1 Dispatch Note / Release Order Master

This master will be used to create Customer wise Dispatch Note / Release Order details in database. Dispatch Note / Release Order will be used in Grain Shipping process.

Data Fields	1. Dispatch Note Number 2. Dispatch Note Date 3. Dispatch Note Expiry Date 4. Customer Name 5. Dispatch Weight 6. Status – Open / Close
Process Steps	1. Enter Dispatch Note details 2. Select Status i.e. Open **By default, new Dispatch Note will have Open status.* 3. Click on Save button to store details in database 4. Dispatch Note details will get saved 5. Newly added Dispatch Note will appear in data grid on screen 6. To **Close the Dispatch Note** a. Select Dispatch Note Number from data grid b. Click on Edit icon c. Dispatch Note details will appear on screen d. Select status as 'Close' e. Click on Save to close the selected Dispatch Note
Functions	1. Add, Edit and Delete functionality as per requirement
Role	Admin/ Authorized User will add Dispatch Note details into the database
Data Required from NCML	1. Data Fields for Dispatch Note master are pending for finalization from NCML

8.1.2 Rake Master

This master will be used to store Rake (Rail) details in database which is used for shipping grain.

Data Fields	1. Rake Number 2. Active/ Inactive
Process Steps	1. Enter Rake Number 2. Check the active checkbox to make the Rake active 3. Click on Save to store details in database 4. Newly created Rake will appear in data grid
Functions	1. Add, Edit and Delete functionality as per requirement
Role	Admin/ Authorized User will add Rake details into the database
Data Required from NCML	1. Data Fields for Rake master are pending for finalization from NCML

8.1.3 Wagon Master

This master will be used to store wagon details in database and to map wagon to the particular Rake.

Data Fields	1. Wagon Number 2. Tare Weight 3. Capacity 4. Rake Number 5. Active/ Inactive
Process Steps	1. Select Rake Number 2. Enter Wagon Number 3. Enter Tare Weight, Capacity (optional data fields) 4. Check the active checkbox to make the Wagon active 5. Click on Save to store details in database 6. Newly created Wagon will appear in data grid
Functions	Add, Edit and Delete functionality as per requirement
Role	Admin/ Authorized User will add Wagon details into the database
Data Required from NCML	Data Fields for Wagon master are pending for finalization from NCML

8.1.4 Area Master

This master will be used to store silo maintenance area details in database.

Data Fields	1. Area Name 2. Description 3. Active/ Inactive
Process Steps	1. Enter Area Name and Description 2. Check the active checkbox to make the Wagon active 3. Click on Save to store details in database 4. Newly created Area will appear in data grid
Functions	Add, Edit and Delete functionality as per requirement
Role	Admin/ Authorized User will add Area details into the database
Data Required from NCML	Data Fields for Area master are pending for finalization from NCML

8.1.5 Charges Master

This master will be used to define charges for food-grain storage and handling in order to raise invoices.

Data Fields	1. Charge Type - Storage Charge/ Variable Charge/ Handling Charge 2. Sub-Charge(Sub charges will be applicable for handling only). a. Unloading Charge b. Weighment Charge c. Bagging Charge d. Stocking Charge e. Directly Loading Charge f. Loading with Stock Breaking Charge 3. UOM – Quintal/ Kg/ Bag/Ton etc. 4. Charge Value(Rate per Unit) 5. Rate applicable per: (Day/Year/Month) 6. Charge On- Actual Usage / Capacity of Silo 7. Fix Storage Charge Consideration (%): Capacity of silo will only for Fixed Storage. Rest two will work on actual. 8. Financial Year -1/2/3/4… 9. Wholesale Price Index (WPI) 10. Consumer Price Index (CPI)

	11. Month 12. Year 13. Active/ Inactive
Process Steps	1. Select Charge Type i.e. Storage Charge, Variable Charge, Handling Charge 2. Select UOM, Charge On i.e. Actual Usage/ Capacity of Silo 3. Enter Charge Value 4. If selected Charge is **Handling Charge**, enter Charge Value and UOM of following a. Unloading Charges and UOM b. Weighment Charges and UOM c. Bagging Charges and UOM d. Stocking Charges and UOM e. Directly Loading Charges and UOM f. Loading with Stock Breaking Charges and UOM 5. Select Year and enter Fixed Storage Charges %age 6. Enter WPI and CPI value 7. Select Month and Year (charges will be calculated in invoice based on the selected primary month and year) 8. Check the active checkbox to make the Charges active 5. Click on Save to store details in database 6. Newly created record will appear in data grid
Functions	Add, Edit and Delete functionality as per requirement
Role	Admin/ Authorized User will add Charges details into the database
Data Required from NCML	Data Fields for Charges master are pending for finalization from NCML

8.1.6 Delivery Notice Master

This master will be used to create Customer wise Delivery Notice and store details in database. Delivery Notice will be used in Grain Receiving via Rake process.

Data Fields	1. Delivery Notice Number 2. Delivery Notice Date 3. Delivery Notice Weight 4. Status – Open / Close
Process Steps	1. Enter Delivery Notice details

	2. Select Status i.e. Open **By default, new Delivery Notice will have Open status.* 3. Click on Save button to store details in database 4. Delivery Notice details will get saved 5. Newly added Delivery Notice will appear in data grid on screen 7. To **Close the Delivery Notice** a. Select Delivery Notice Number from data grid b. Click on Edit icon c. Delivery Notice details will appear on screen d. Select status as 'Close' e. Click on Save to close the selected Delivery Notice

9 PHASE 2 PROCESS – GRAIN SHIPPING BY ROAD (BULK/ BAGGED)

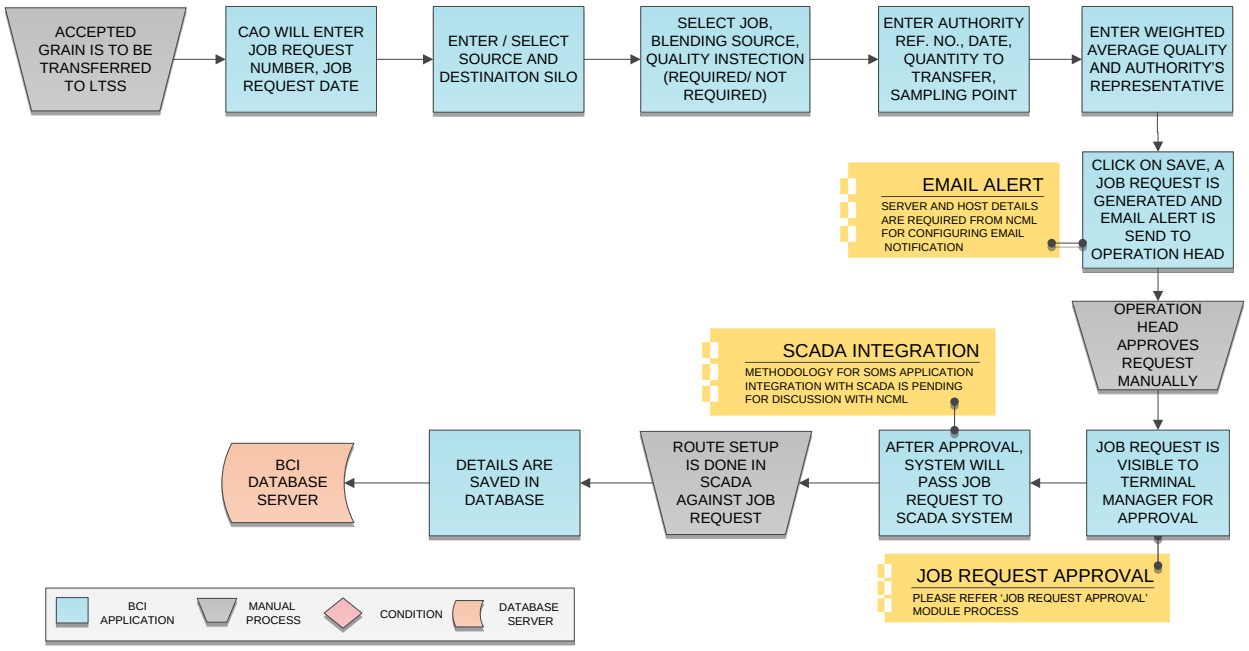
9.1 SILO GRAIN TRANSFER

The section describes the solution for moving grain from one Silo to another against Job Request. 'Accepted' Grain can be transferred from

- Storage Silo (LTSS) to Bagging Surge Silo
- Long Term Storage Silo (LTSS) to Loading Silo
- Storage Silo LTSS to Shipping Silo (used in Rake Shipping process)
- Shipping Silo to Loading Wagon (used in Rake Shipping process)

In every case of grain transfer within terminal, user need to first create a Job Request in system (Source and Destination Silo will be different) and pass on Job Request data to SCADA System. Once grain is successfully transferred from Source to Destination Silo, a Job Transfer Sheet is generated.

9.1.1 JOB REQUEST CREATION



Activities

Module Description	This module will be used to create Job Request for grain transfer from one Silo to another i.e. from Source to Destination Silo by means of SCADA system. Job Request specifies the

	Source and Destination details along with quantity to be transferred. Once Job Request is generated by CAO (Commercial cum Admin Officer), it is send to be approved by Terminal Manager. Once approved, Job Request is sent to SCADA for Route Plan setup.

Pre-Conditions	1. Desktop should be available to access application 2. Grain with 'accepted' status will be eligible for transfer 3. CAO / Authorized personnel Should login to the application to generate Job Request 4. SMTP should be configured to auto-send email notification to the concerned personnel

Process Steps	1. Accepted Grain is required to be transferred from one place to another 2. User will login to the application using authorized credentials 3. Open 'Grain Transfer' module and select Job Request Creation sub-module 4. A screen will get open 5. User will enter Job Request Number, Job Request Date, Authority's Reference Document Number 6. Enter / select Source, Destination, Blending Silo 7. Enter Quantity to be transferred, Designated Sampling point Number 8. Select Job i.e. Food-grain Transfer /Receipt /De-Coring /Shuffling /Reclaim /Dispatch 9. Select Quality Inspection i.e. Required / Not Required 10. Enter Weighted Average Quality and Authority's Representative 11. Click on Save button 12. System will generate Job Request Number 13. System will auto-send email notification to the Operation Head 14. Operation Head will approve/ reject the request manually and communicate it to the Terminal Manager internally. 15. Job Request data is visible to Terminal Manager for approval. **Please refer Job Request Approval module.* 16. Once Approved, Post Job Request to SCADA for Route Plan Setup **Integration with SCADA is pending for discussion with NCML Team* 17. Corresponding details will get saved in database 18. Route Setup is done in SCADA

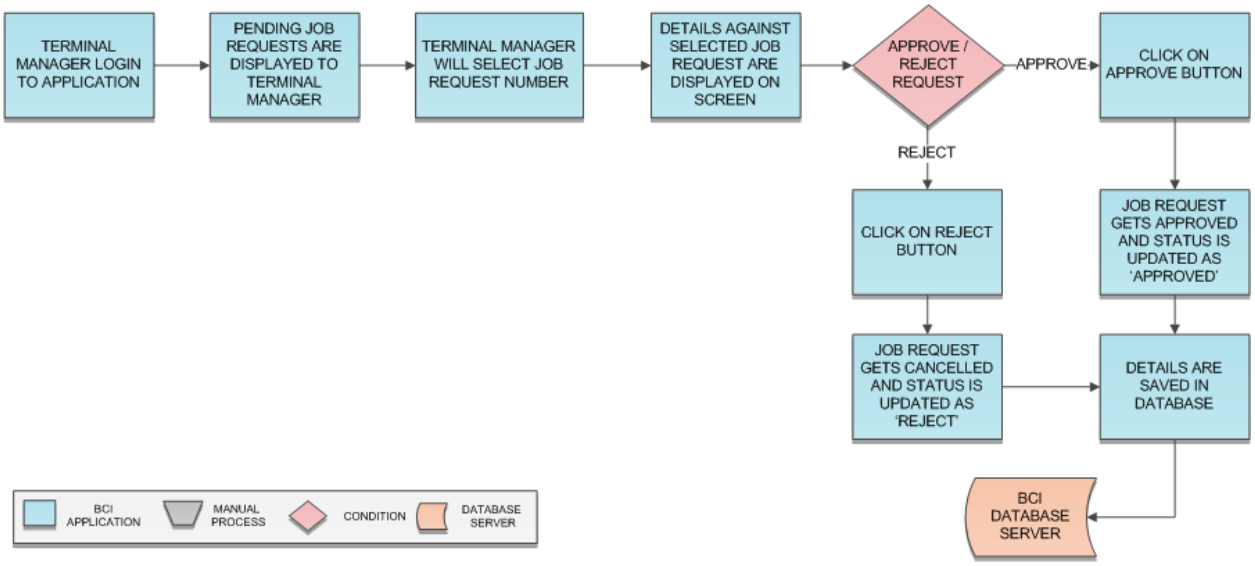
Post-Conditions	1. Job Request details are saved in database table

	2. Unique Job Request is created 3. Job Request details are visible to Terminal Manager for approval (refer module Job Request Approval) 4. Email Notification to the Operation Head 5. Status of Job Request is updated as 'Pending'

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Status of the Job Request should be updated as 'Pending'

Data Required from NCML	1. Job Request Form data fields are to be finalized by NCML 2. Methodology to be used for SCADA Integration is pending for discussion from NCML 3. SMTP configuration details need to be provided by NCML

9.1.2 JOB REQUEST APPROVAL



Activities

Module Description	This module will be used by Terminal Manager to approve the Job Requests for Grain Transfer. Terminal Manager can approve/ reject the request after verification and notification for the same is send to the Initiator (CAO)

Pre-Conditions	1. Job Request should be created 2. Terminal Manager should login to the application

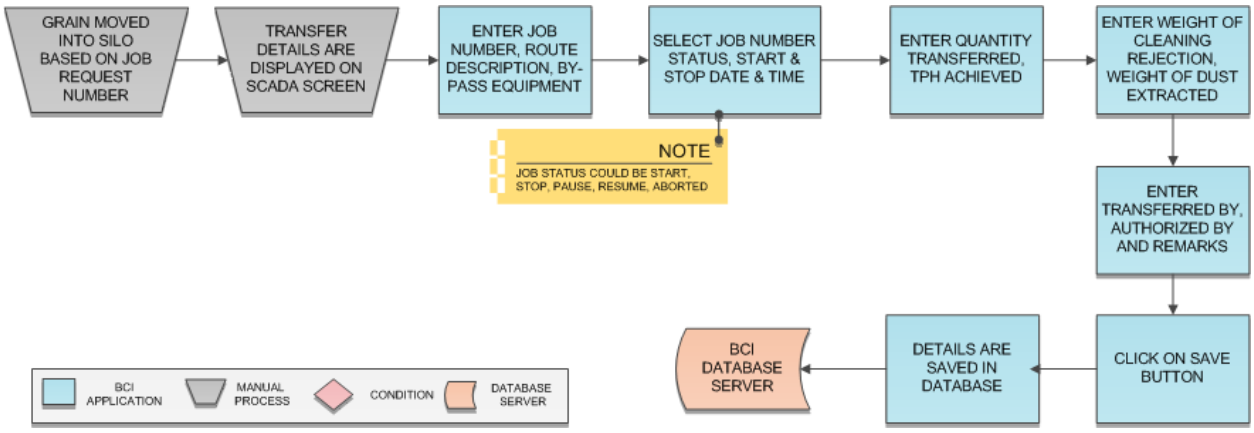
Process Steps	1. Terminal Manager will login to the application using authorized credentials 2. Open 'Pending Job Requests' screen 3. List pf pending Job Requests are displayed on screen 4. Terminal Manager will select the Job Request Number 5. Corresponding details will get displayed on screen 6. Terminal Manager will verify the details 7. Click on Approve / Reject Button to approve / reject the selected Request 8. System will update the status against the Job Request Number as Approved / Reject. 9. Corresponding details will get saved in database

Post-Conditions	1. Job Request Approval details are saved in database table

	2. Status of Job Request is updated from 'Pending ' to 'Approved / Rejected' 3. Job Request Status is visible to the request initiator.

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Module will be accessible to the user as per assigned rights 5. Pending Job Request Numbers should be visible to Terminal Manager 6. On click of Approve / Reject Button against the Job Request Number, status should get updated from Pending to 'Approve' / 'Rejected' 7. In case Job Request gets rejected, it will get cancelled and new Job Request should be created.

9.1.3 Grain Transfer Sheet



Activities

Module Description	This module will be used to create Job Transfer Sheet after grain has transferred from one Silo to another i.e. from Source to Destination Silo by means of SCADA system. Job Transfer specifies the route description along with quantity transferred.

Pre-Conditions	1. Desktop should be available to access application 2. Grain Transfer should happen against Job Request approved by Terminal Manager

Process Steps	1. User will login to the application using authorized credentials 2. Open 'Grain Transfer Sheet Creation' module 3. A screen will get open 4. User will enter Job Number, Route Description, By-Pass Equipment 5. Select Job Number Status i.e. Stop, Start, Pause, Abort, Resume 6. Select Start and Stop Date & Time 7. Enter Quantity transferred, Weight of Cleaning Rejections, Weight of Dust Extracted, TPH Achieved 8. Enter Transferred By, Authorized By and Remarks 9. Click on Save button 10. System will generate Job Transfer Sheet 19. Corresponding details will get saved in database.

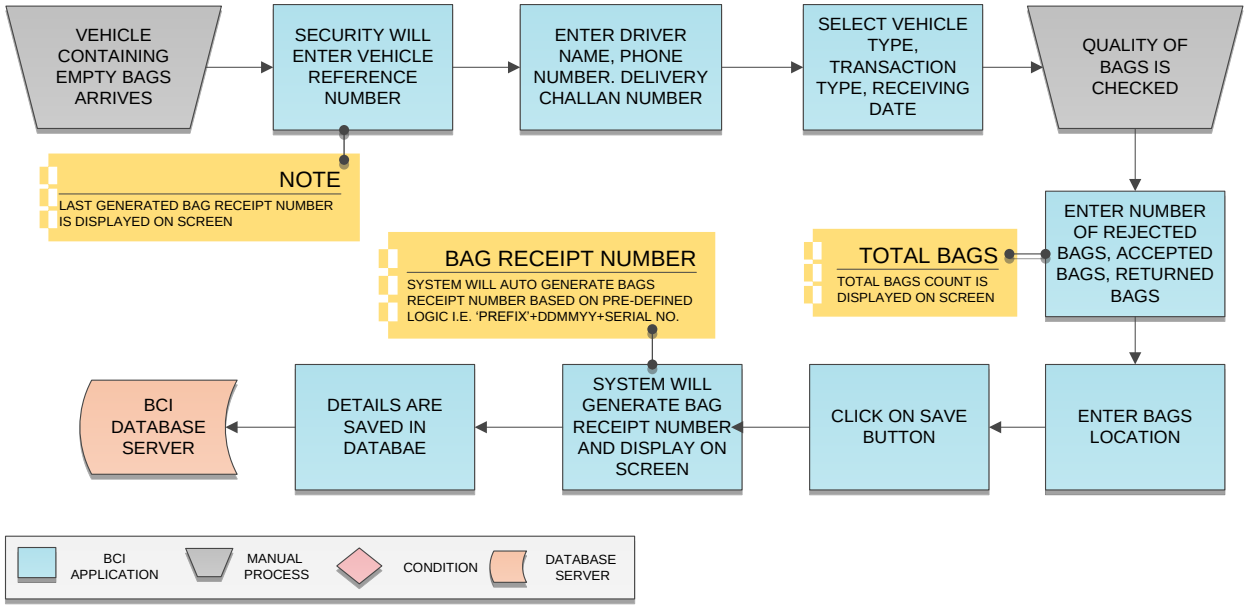
Post-Conditions	1. Job Transfer Sheet details are saved in database table

	2. Unique Job Transfer Number is created in SCADA

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity.

Data Required from NCML	1. Methodology to be used for SCADA Integration is pending for discussion from NCML

9.1.4 Empty Bags Receiving



Activities

Module Description	This module will be used to store empty bags receiving details in database. Bags will be received against Delivery Challan and a unique Bags Receipt Number is generated by system. It also keep record of the number of accepted and rejected bags along with the number of bags returned back to the vendor.

Pre-Conditions	1. Desktop should be available to access application 2. Delivery Challan should be available

Process Steps	1. User will login to the application using authorized credentials 2. Open 'Empty Bags Receiving' module, a screen will get open 3. Security Guard will enter Delivery Challan Number, Vehicle Reference Number, Driver Name, Phone Number **Last Bag Receipt Number (Transaction ID) is displayed on screen as soon as user opens the screen* 4. Select Vehicle Type, Transaction Type, Receiving Date **By default, current date is displayed.* 5. Quality of Bags is checked 6. Enter No. of Accepted Bags, No. of Rejected Bags, No. of Bags Returned

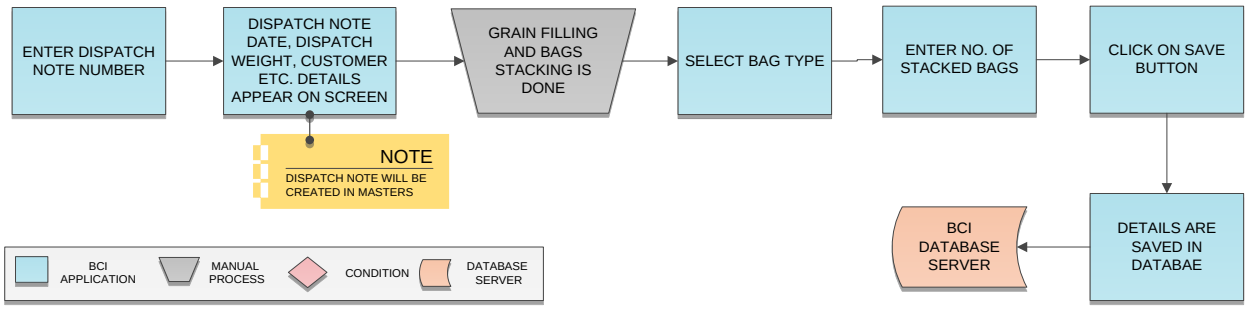
	7. System will auto calculate the total number of bags and display on screen 8. Enter Bags Location where empty bags are to be placed 9. Click on Save button 11. System will generate Bags Receipt Note based on predefined logic and display it on screen **Bags Receipt Number will have 'Prefix'+ DDMMYY + Running Serial Number (4 Digits)* 20. Corresponding details will get saved in database.

Post-Conditions	1. Transaction details are saved in database table 2. Unique Transaction ID (Bag Receipt Number) is generated by system for each new transaction.

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Bag Receipt Number should be auto generated by system based on pre-defined logic i.e. 'Prefix' + DDMMYY + Serial Number (4 Digits) 5. Bag Receipt Number should be unique for each transaction

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

9.1.5 STACKING OF BAGGED GRAIN



Activities

Module Description	This module will be used to capture stacked bags details and store details in database.

Pre-Conditions	1. Desktop should be available to access application 2. Dispatch Note should be created using Dispatch Note/ Release order master module

Process Steps	1. User will login to the application using authorized credentials 2. Open 'Stacking of Bagged Grain' module, a screen will get open 3. User will enter Dispatch Note Number, corresponding Customer Name, Dispatch Note Date, Expiry, Dispatch Weight are displayed on screen **Dispatch Note details will be fetched from master data and displayed on screen* 4. Grain filling in bags and stacking process is done 5. Select Bag Type 6. Enter Number of Bags Stacked 7. Click on Save button 8. Corresponding details will get saved in database.

Post-Conditions	1. Transaction details are saved in database table 2. Unique Transaction ID is generated by system for each new transaction.

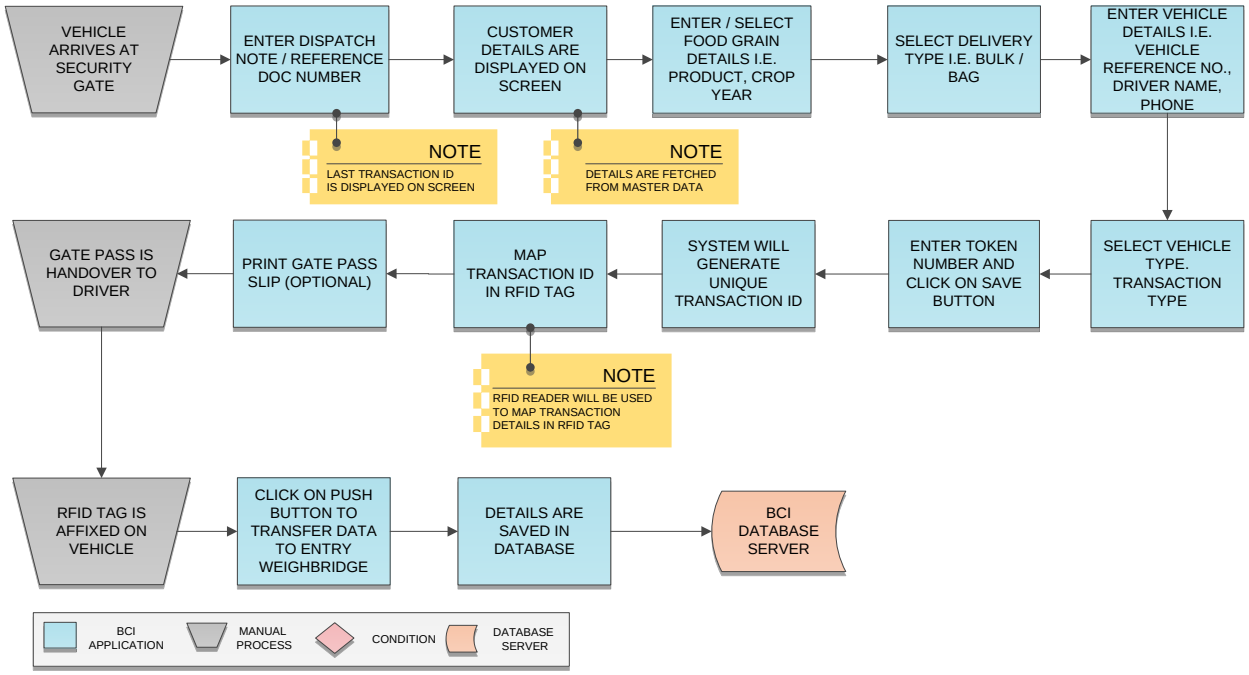
Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity.

	4. System should validate the bags weight against the Dispatch Weight mentioned in Dispatch Note 5. On entering Dispatch Note Number, system should fetch corresponding details from master data 6. System should validate whether entered Dispatch Note Number is available. If not, an error message should be displayed.

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

9.2 GRAIN SHIPPING (VIA ROAD)

9.2.1 GATE ENTRY



Activities

Module Description	This module will be used to store gate entry details of the Vehicle arrived for Shipping process. System will generate unique Transaction ID for each new transaction and Gate Pass / Challan can be printed for the same. An RFID Tag will be provided to each incoming Vehicle (mapped with the Transaction ID) which will be validated on different stages.

Pre-Conditions	1. RFID Reader should be available and attached with system to write RFID Tags 2. RFID Tags should be available for Incoming Vehicles 3. Dispatch Note/ Reference Document should be available 4. Barcode Printer should be connected with the system for printing Gate Pass

Process Steps	1. Vehicle arrives at Gate Entry 2. User Login in web application using authorized credentials 3. Open Shipping module and select Gate Entry sub-module, a screen will get open 4. User will enter Dispatch Note / Reference Doc Number

	5. Corresponding Customer Account details i.e. Account Type, Name, Address and Phone Number are displayed on screen. 6. Enter/ select Food Grain details i.e. Product, Crop Year, Delivery Type (Bulk / Bag) 7. Enter / select Vehicle details i.e. Vehicle Reference Number, Driver Name, Phone Number, Vehicle Type 8. Select Transaction Type 9. Enter Token Number (4 digits) 10. Click on Save button, system will generate unique Transaction ID based on the pre-defined logic 11. Place RFID Tag on RFID Reader and click on Get button to map Transaction ID in RFID Tag 12. Click on Print to generate Gate Pass slips (optional) **When Gate pass is printed at Gate Entry, no vehicle weight is printed* 13. Click on Push to Weighbridge button to transfer transaction details to Entry Weighbridge **Application should be integrated with Weighbridge* 14. Corresponding details will get saved in database 15. Handover Gate Pass Slip and RFID Tag to Driver 16. RFID Tag is affixed on Vehicle 17. Vehicle enters the premises

Post-Conditions	1. Transaction details are saved in database table 2. Unique Transaction ID is generated by system for each new transaction. 3. Transaction ID is mapped with RFID Tag ID 4. Gate Pass is printed 5. Transaction data is pushed to Weighing Bridge data table

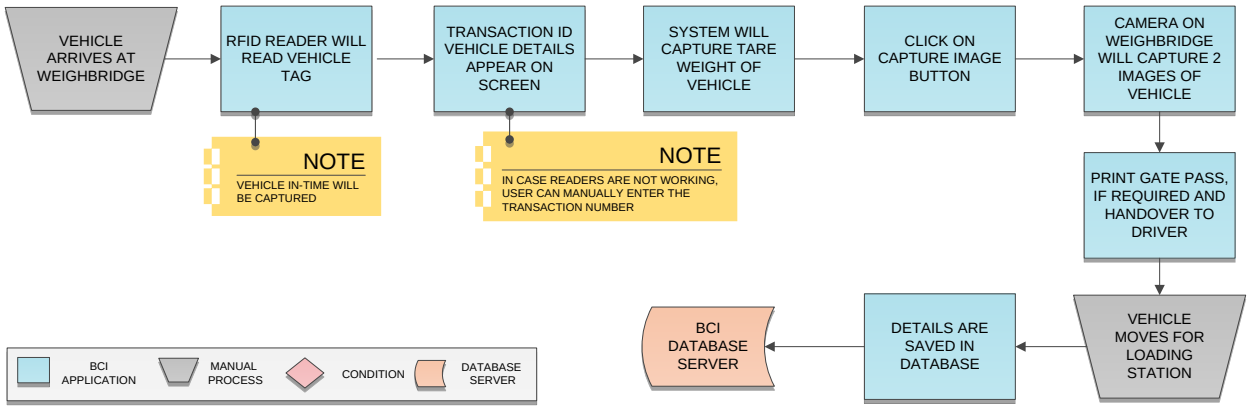
Format & Logics	• **Format to generate Transaction ID** Transaction ID is generated by BCI system for each incoming Vehicle at Gate Entry and has format 'Prefix'+YYMMDD+4 Digits Running Serial Number + Token Number (4 Digits)

Validations	1. Application will validate input data i.e. text field values and selections.

	2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Alert displayed in case RFID Reader is not working / not connected 5. Error is displayed on screen in case of any issue in generating barcode labels 6. An error message should be displayed in case of any issue in transferring transaction data to Weighbridge system

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML 2. Data to be printed on Gate Pass is to be finalized by NCML 3. Application Integration along with Data fields to be pushed on Weighbridge is to be provided by NCML

9.2.2 Entry Weighbridge



Activities

Module Description	This module will be used to capture tare weight of the Vehicle at Weighbridge and store details in database.

Pre-Conditions	1. Weighbridge should be equipped with RFID Readers & Antenna 2. Weighbridge should have Camera to capture Vehicle image 3. Desktop should be available to access application

Process Steps	1. Authorized user will open Grain Shipping module and select Entry Weighbridge, a form will get displayed on screen 2. Vehicle arrives at Weighbridge 3. RFID readers will read and validate RFID Tag of the Vehicle **In Case Readers aren't working, user can manually enter Transaction ID in system.* ***In case of Breakdown/ offline, user need to capture the weight against the Dummy Transaction ID and when system is online again, Dummy Transaction ID details can be updated in system against the actual Transaction ID* 4. Transaction ID and Vehicle details will appear on screen i.e. Vehicle Type, Vehicle Reference Number, Driver Name, Transaction Type 5. Once Vehicle is positioned on Weighbridge, Click on Get weight to capture the Tare weight of the Vehicle and display on screen 6. Click on Capture Image, Camera on weighbridge will capture the 2 images of the Vehicle 7. Click on Print button to generate Gate Pass, if required and handover to Driver

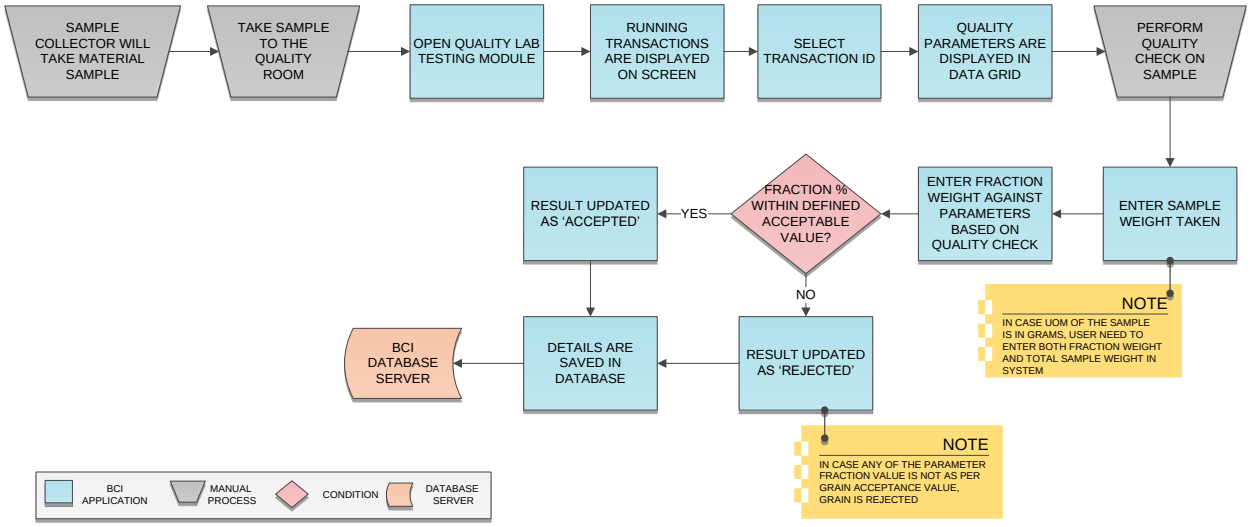
	8. Click on Save, corresponding details will get saved in database

Post-Conditions	1. System will capture Vehicle-In time at entry weighbridge. 2. Vehicle Tare Weight and Camera images (Front & Rear) are stored in database table against Vehicle Transaction ID 3. Vehicle move towards Loading Station

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. System should capture in-time of the Vehicle 5. System must validate Vehicle Tag and alert user in case of invalid Vehicle 6. System will display error in case Readers are not connected with system/ not working 7. In case Readers aren't working, option to enter Transaction manually is available 8. In case of system breakdown/ offline, user should capture the weight against Dummy Transaction ID and update against the actual Transaction ID when system is online again/ start working. 9. An alert should be displayed in case weighbridge is not connected with the application

Data required from NCML	Data to be printed on Gate Pass is to be finalized by NCML

9.2.3 Quality Checking



Activities

Module Description	This module will be used to record quality inspection result of the grain before dispatch. Quality is checked against pre-defined parameters. Sample Collector will take the grain sample, send for testing and result is stored.

Pre-Conditions	1. Desktop should be available to access application 2. Sample should be taken for quality testing

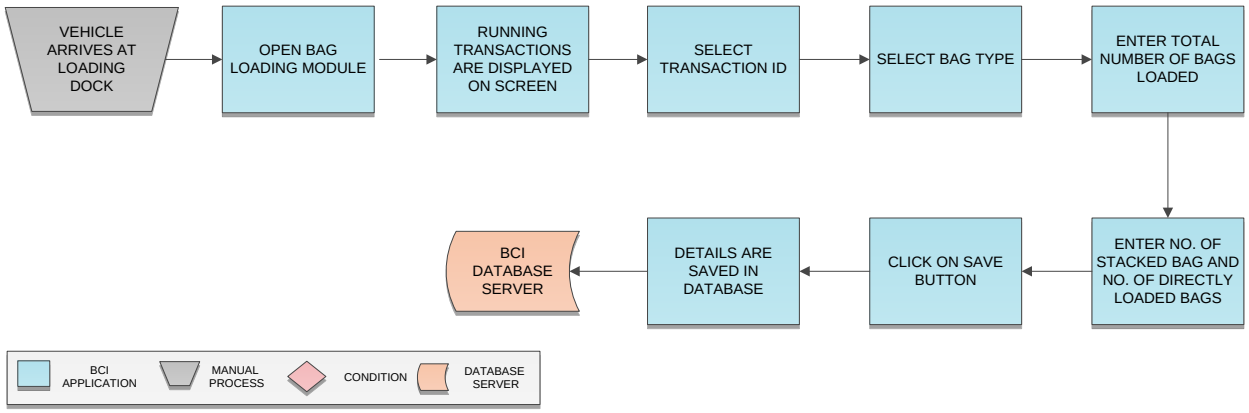
Process Steps	1. Quality Personnel login to the application using authorized credentials 2. Open Quality Lab Testing module, a form will get displayed on screen 3. Running Transactions will be displayed on screen 4. Select Transaction ID 5. Quality Test Parameters will appear on screen 6. Enter Total Sample Weight taken. 7. Quality is done on sample 8. Quality Personnel will enter the result Fraction Weight (as per defined UOM) against test parameters based on quality check 9. System auto calculate the fraction percentage as per defined formulas and logic **Fraction Percentage is calculated using following formula* *Fraction Percentage = Faction Weight / Total Weight of Sample * 100*

	***In case UOM of the sample is in grams, user need to enter both Fraction Weight and Total Sample Weight of the material.* 10. If calculated percentage is within defined acceptable value: a. Result is updated as 'Accepted' b. Status is displayed on screen 11. If percentage is **not** within defined acceptable value: a. Result is updated as 'Rejected' b. Status is displayed on screen 12. Click on Save, corresponding details will get saved in database

Post-Conditions	1. Transaction details will get saved in database 2. Quality Status is updated as Accepted or Rejected based on fraction weight percentage

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Pre-defined parameters should be fetched from master data and display on screen as per material type 5. System should calculate the Fraction Percentage based on the formula/ logic defined by NCML. 6. If Fraction Percentage calculated by system is within Grain Acceptance Specification, system must display result as 'Accepted' else display 'Rejected'

9.2.4 BAGS LOADING



Activities

Module Description	This module will be used to record the details of bags loaded in Vehicle for dispatch.

Pre-Conditions	1. Desktop should be available to access application 2. Module should be used when Grain Shipping is through Bags 3. Quality process should be complete

Process Steps	1. Vehicle visit the loading dock 2. User will login to the application using authorized credentials 3. Open Bags Loading module, a form will get displayed on screen 4. Running Transactions will appear on screen 5. Select Transaction ID 6. Transaction ID, Product and Vehicle details appear on screen 7. Select Bag Type 8. Enter Total Number of Bags Loaded, No. of Stacked Bags, No. of Directly Loaded Bags 9. Click on Save, corresponding details will get saved in database

Post-Conditions	1. Transaction details will get saved in database 2. Vehicle moves towards Exit Weighbridge

Validations	1. Application will validate input data i.e. text field values and selections.

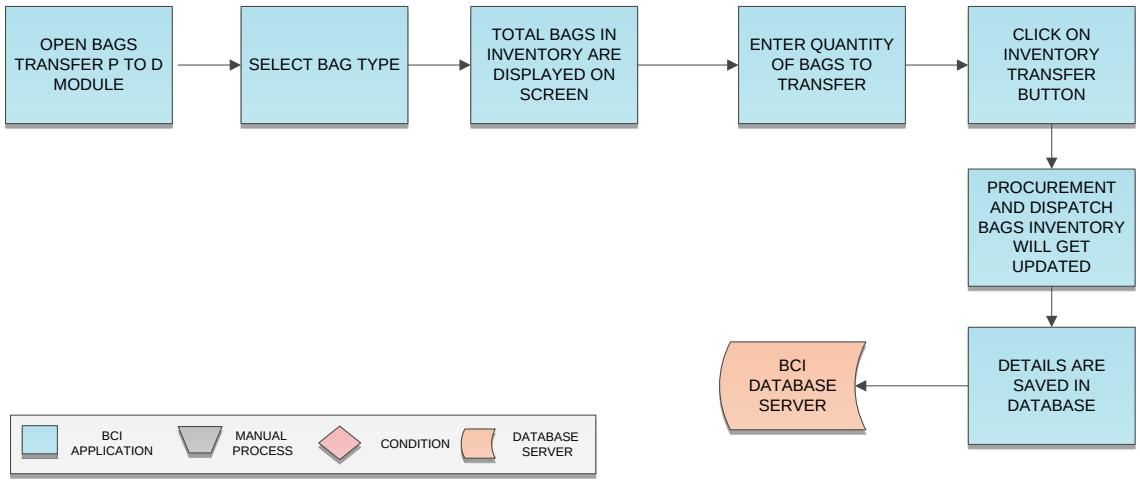
	2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity.

9.2.5 PROCUREMENT OF BAGS

Activities

Module Description	There will be a reporting module provided to keep the inventory of the total Bags received in the premises. User will be able to generate and view date/ month wise consolidated report of the Bags received in premises.

9.2.6 Bags Transfer (Procurement to Dispatch)



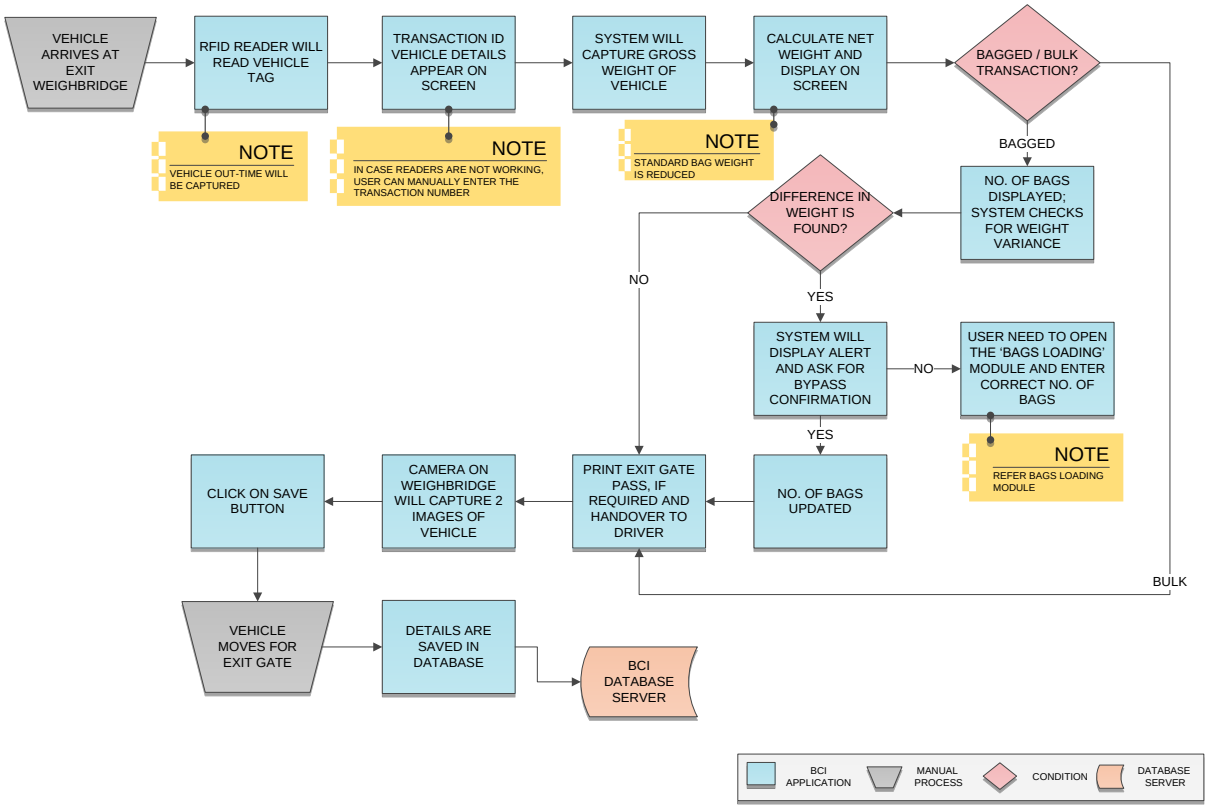
Activities

Module Description	This module will be used to transfer the Bags from Procurement Inventory to Dispatch Inventory and update details for the same in database.

Pre-Conditions	1. Desktop should be available to access application
Process Steps	1. Login to the application using authorized credentials 2. Open Bags Transfer from P to D module 3. Select Bag Type 4. No. of Bags available in inventory will get displayed on screen 5. Enter No. of Bags to transfer 6. Click on Inventory Transfer button 7. System will update the No. of Procurement Bags (decreased) and Dispatch Bags (increased) in inventory 8. Corresponding details will get saved in database
Post-Conditions	1. Transaction details will get saved in database 2. Bags inventory will get updated
Validations	1. Application will validate input data i.e. text field values and selections.

	2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Upon transfer, number of procured bags should be decreased from inventory and number of dispatch bags should get increased in inventory

9.2.7 EXIT WEIGHBRIDGE



Activities

Module Description	This module will be used to capture gross weight of the Vehicle at Exit Weighbridge and calculate net weight of the material being shipped.

Pre-Conditions	1. Weighbridge should be equipped with RFID Readers & Antenna 2. Weighbridge should have Camera to capture Vehicle image 3. Desktop should be available to access application

Process Steps	1. Authorized user will open Shipping module and select Exit Weighbridge, a form will get displayed on screen 2. Vehicle arrives at Exit Weighbridge 3. RFID readers will read and validate RFID Tag of the Vehicle **In Case Readers aren't working, user can manually enter Transaction ID in system.*

	***In case of Breakdown/ offline, user need to capture the weight against the Dummy Transaction ID and when system is online again, Dummy Transaction ID details can be updated in system against the actual Transaction ID* 4. Transaction ID, Vehicle and grain details will appear on screen 5. In case of Bulk Grain: a. Click on Get Weight, System will capture the gross weight of the Vehicle and display on screen b. System will calculate the net weight of the material **Net Weight = Gross Weight – Tare Weight Vehicle – Tare Weight of Bags* c. Continue steps 7 - 10 6. In case of Bagged Grain: a. Click on get Weight, system will capture the gross weight of the vehicle b. Calculate net weight and total No. of Bags **Net Weight = (Gross Weight – Tare Weight Vehicle – Standard Weight of Bags)/ 50* ***Here 50 is the standard weight of one filled Grain Bag in KG* c. System compares the no. of bags entered by user at the time of loading with the no. of bags calculated at weighbridge d. If weight variance is found: i. Alert message is displayed along with By-pass confirmation ii. If user confirms to By-Pass the weight variance, No. of bags displayed are updated, continue steps 7-10 iii. If user denies to By-Pass the weight variance, transaction is not closed and user need to update the number of bags using Bags Loading module. e. If weight variance is not found: i. Continue steps 7-10 7. Click on Capture Image 8. Camera on weighbridge will capture the 2 images of the Vehicle (Front and Rear) 9. Click on Print to generate Exit Gate Pass, if required, and handover to driver. 10. Corresponding details will get saved in database

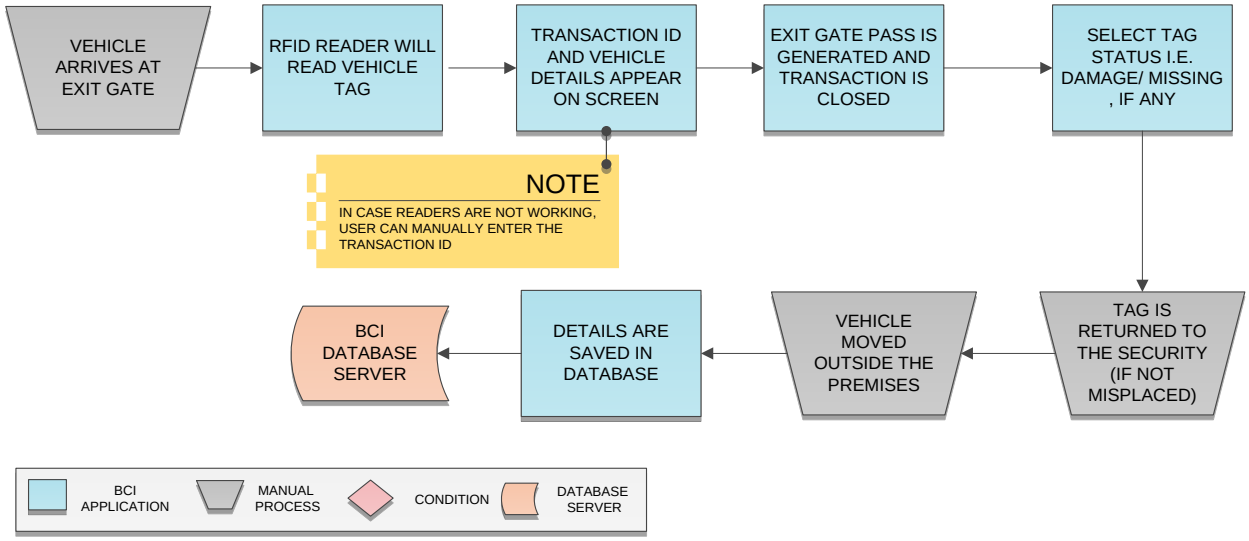
Post-Conditions	1. System will capture Vehicle Out time at Exit weighbridge. 2. Exit Gate Pass can be printed, if required

	3. Net Weight and Camera images are stored in database table against Vehicle Transaction ID 4. Vehicle move towards Exit Gate

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. System must validate Vehicle Tag and alert user in case of invalid Vehicle 5. System will display error in case Readers are not connected with system/ not working 6. In case Readers aren't working, option to enter Transaction ID manually should be given 7. Exit Gate Pass should contain details of Weighment, Vehicle & Driver, Bagged Food Grain, Gate Entry/ Exit. 8. In case of Bagged Grain, system should compare the Number of Bags entered by user at the time of Bags loading with the Number of Bags calculated by system at weighbridge.

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML 2. Data to be printed on Gate Pass is to be finalized by NCML 3. Application Integration details with Weighbridge is to be provided by NCML

9.2.8 EXIT GATE



Activities

Module Description	This module will be used to record exit of the Vehicles in database. System will generate Exit Gate Pass providing Grain, Quality and Weighment details. At exit, RFID Tag is returned to Security.

Pre-Conditions	1. Exit gate should be equipped with RFID Readers & Antenna 2. Desktop should be available to access application 3. Weighment at Exit Weighbridge should be complete

Process Steps	1. Authorized user will open Shipping module and select Exit Weighbridge, a form will get displayed on screen 2. Vehicle arrives at Exit Gate 3. RFID readers will read and validate RFID Tag of the Vehicle **In Case Readers aren't working, user can manually enter Transaction ID in system.* 4. Transaction ID, Vehicle and grain details will appear on screen 5. Quality and Weighment details are displayed on screen 6. Security Personnel will generate Exit Gate Pass and handover to Driver **User is provided an option to print Exit Gate Pass.* 1. Select Tag Status i.e. Missing / Damage / Returned 2. Tag is removed from the Vehicle and handover to Security Personnel.

	3. Vehicle is moved outside the premises 4. Transaction ID is closed for the Vehicle and Status updated as 'Shipping Complete' 5. Corresponding details will get saved in database

Post-Conditions	1. Transaction is completed 2. Vehicle moves outside the premises

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. System must validate Vehicle Tag and alert user in case of invalid Vehicle 5. System will display error in case Readers are not connected with system/ not working 6. In case Readers aren't working, option to enter Transaction ID manually should be given 7. Exit Gate Pass should contain details of Weighment, Vehicle & Driver, Bagged Food Grain, Gate Entry/ Exit.

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML 2. Data to be printed on Gate Pass is to be finalized by NCML

9.3 GRAIN SHIPPING BY RAKE

9.3.1 SILO GRAIN MOVEMENT

In order to transfer the grain from one Silo to another Silo for Rake Shipping, user need to create the Job Request. The grain movement can be from:

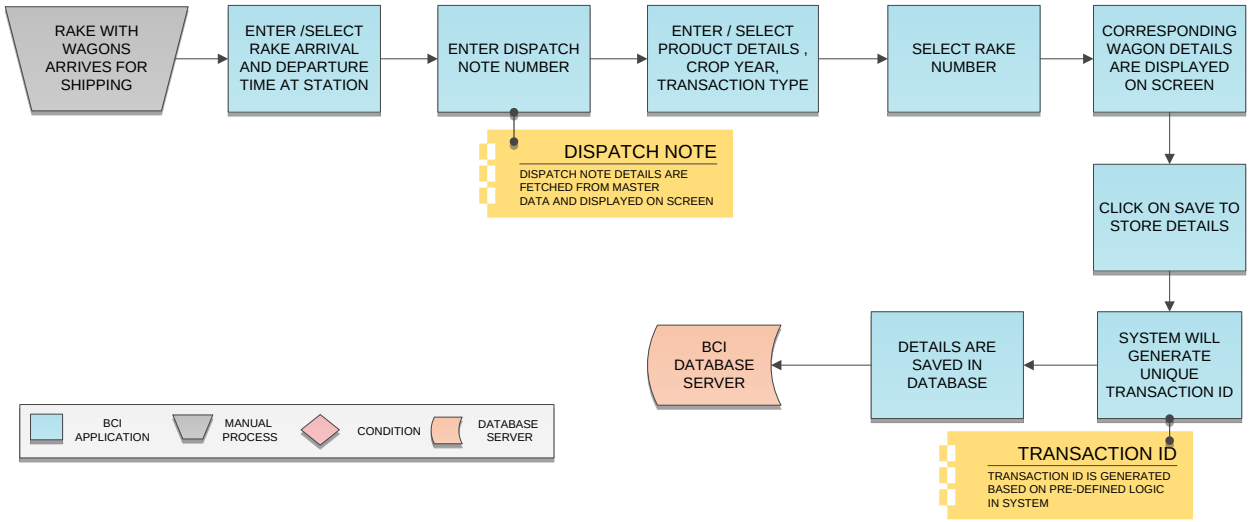
- Storage Silo LTSS to Shipping Silo
- Shipping Silo to Loading Wagon

In any grain transfer within the terminal, user need to first create a Job Request in system (Source and Destination Silo will be different) and pass on Job Request data to SCADA System. Once grain is successfully transferred from Source to Destination Silo, a Job Transfer Sheet is generated.

Please follow following modules to generate Job Request, Job Approval and Job Transfer Sheet

- Job Request Creation module (9.1.1)
- Job Request Approval module (9.1.2)
- Job Transfer Sheet module (9.1.3)

9.3.2 RAKE ENTRY



Activities

Module Description	This module will be used to store rake shipping details in database. Rake entry will be done for each rake arrived at Station for shipping against Dispatch Note

Pre-Conditions	1. Dispatch Note should be available 2. Rake and Wagon master should be available

Process Steps	1. Rake with Wagons arrives at station for Shipping 2. Authorized user will open Rake Shipping module and select Rake Entry, a form will get displayed on screen 3. Enter / Select Rake Arrival and Departure Date & Time from Station 4. Enter Dispatch Note Number 5. Dispatch details appear on screen i.e. Consignee, Dispatch Weight etc. 6. Enter / Select Product details, Crop Year, Transaction Type etc. 7. Select Rake Number, corresponding Wagons details are appear on screen 8. Click on save to store details 9. System will generate unique Transaction ID based on predefined logic (refer Logic ad Formats section described below) 10. Corresponding details will get saved in database

Post-Conditions	1. Transaction details are saved in database table 2. Unique Transaction ID is generated for each Rake entry. 3. Grain transfer should be done from Shipping Silo to Wagon Loading

Format & Logics	• **Format to generate Transaction ID** Transaction ID is generated by BCI system for each Rake Entry and has format 'Prefix'+YYMMDD+4 Digits Running Serial Number

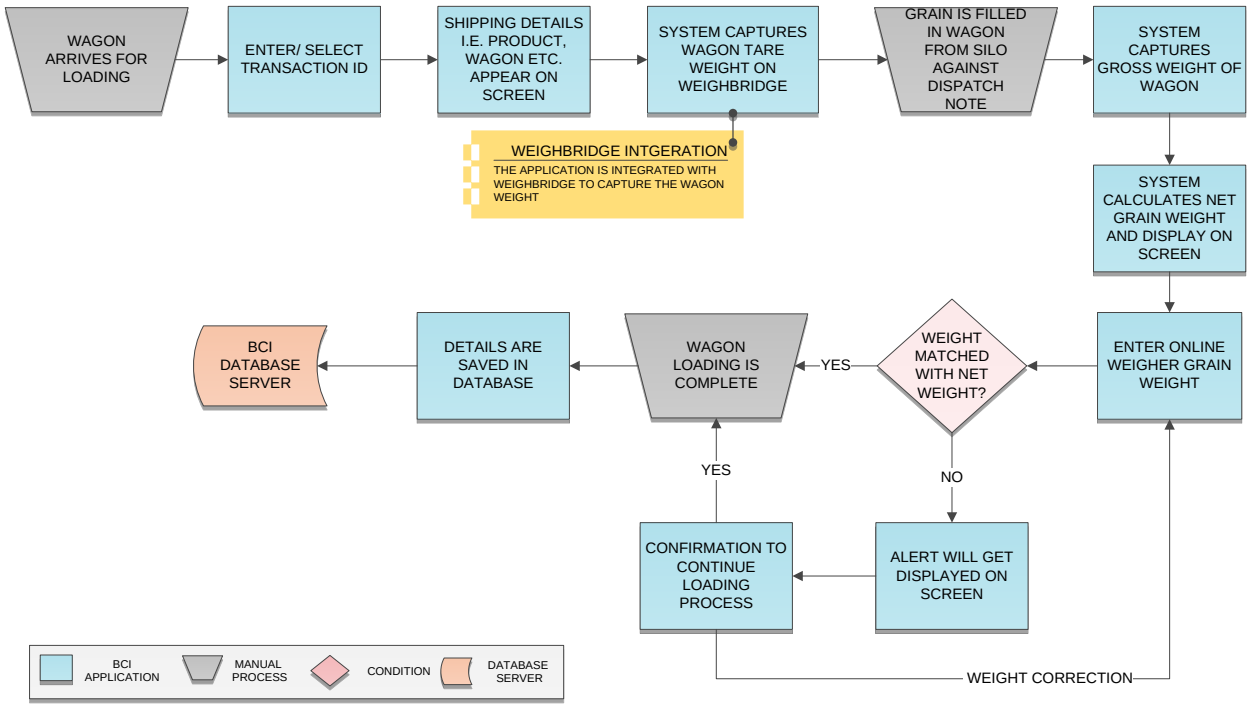
Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Transaction ID should be unique 5. Dispatch Note should be available and details should be fetched from master data based on Dispatch Note Number

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

9.3.3 Grain Transfer from Shipping Silo to Wagon Loading

Module Description	In this process, grain will be transferred from Shipping Silo to Wagon Loading Silo. In order to perform the transfer, Job Request will be generated which needs to be approved by Terminal Manager. Upon transfer, Job Request Sheet should be generated. Please refer the following modules to perform this activity. 1. Job Request Creation module (9.1.1) 2. Job Request Approval module (9.1.2) 3. Job Transfer Sheet module (9.1.3)

9.3.4 WAGON LOADING (WEIGHBRIDGE)



Activities

Module Description	This module will be used to capture the details of grain loading in Wagon. Before and after loading process Wagon's weight is captured and net Grain Weight is calculated by system. The application also compares the net weight captured through weighbridge and the Online Weigher weight manually entered by user when grain is transferred from Silo to Wagon.

Pre-Conditions	1. Weighbridge should be integrated with the application 2. Grain Transfer from Shipping Silo to Loading Silo should be complete

Process Steps	1. Wagon arrives at Weighbridge 2. Authorized user will login to the application and open Wagon Loading module 3. Select / Enter Transaction ID (created at the time of rake entry process) 4. Shipping details i.e. Product, Crop Year, Weight, Wagon etc. are appeared on screen 5. Click on Get Weight 6. System will capture the Tare Weight of the Wagon along with the timestamp

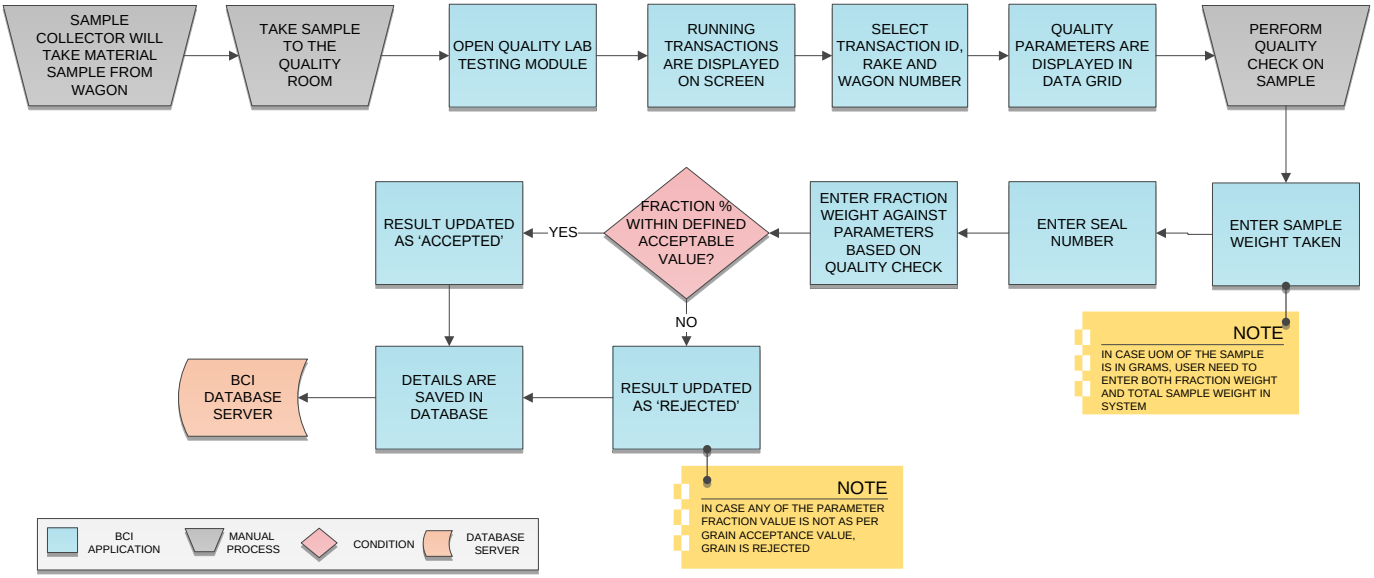
	7. Wagon arrives at loading point 8. Grain is filled in Wagon 9. User will enter the Online Weigher Grain weight manually 10. Wagon arrives at weighbridge 11. System will capture the Gross Weight and calculate Net Weight 12. System will compare the Net Weight with the Online Weigher weight 13. If weight is matched a. Wagon Loading is complete b. Status is updated as 'Loading Complete' 14. If weight is not matched: a. An alert is displayed on screen b. Confirmation message appear to continue process (bypassing the mismatch) c. If confirmed, loading process complete and details saved d. If not confirmed, loading screen will continue to display 15. Corresponding details will get saved in database

Post-Conditions	1. Transaction details are saved in database table 2. Wagon Loading is complete 3. Net Grain Weight is calculated

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Running Transaction IDs should be displayed on screen 5. Application should be integrated with Weighbridge to capture wagon weight 6. If weight is mismatched, confirmation message should appear to continue process 7. If user bypass the mismatch, loading should get complete else Wagon Loading screen will continue to display

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML 2. Methodology and communication protocols for application integration with Weighbridge is pending for discussion with NCML

9.3.5 Quality Checking



Activities

Module Description	This module will be used to record quality inspection result of the grain after Wagon Loading is done. Quality is checked against pre-defined parameters. Sample Collector will take the grain sample, send for testing and result is stored.

Pre-Conditions	1. Desktop should be available to access application 2. Sample should be taken for quality testing

Process Steps	1. Quality Personnel login to the application using authorized credentials 2. Open Quality Lab Testing module, a form will get displayed on screen 3. Running Transactions will be displayed on screen 4. Select Transaction ID 5. Select Rake and Wagon Number 6. Quality Test Parameters will appear on screen 7. Quality checking is performed on sample 8. Quality Personnel will enter the result Fraction Weight (as per defined UOM) against test parameters based on quality check 9. Enter Total Sample Weight taken. 10. System auto calculate the fraction percentage as per defined formulas and logic **Fraction Percentage is calculated using following formula*

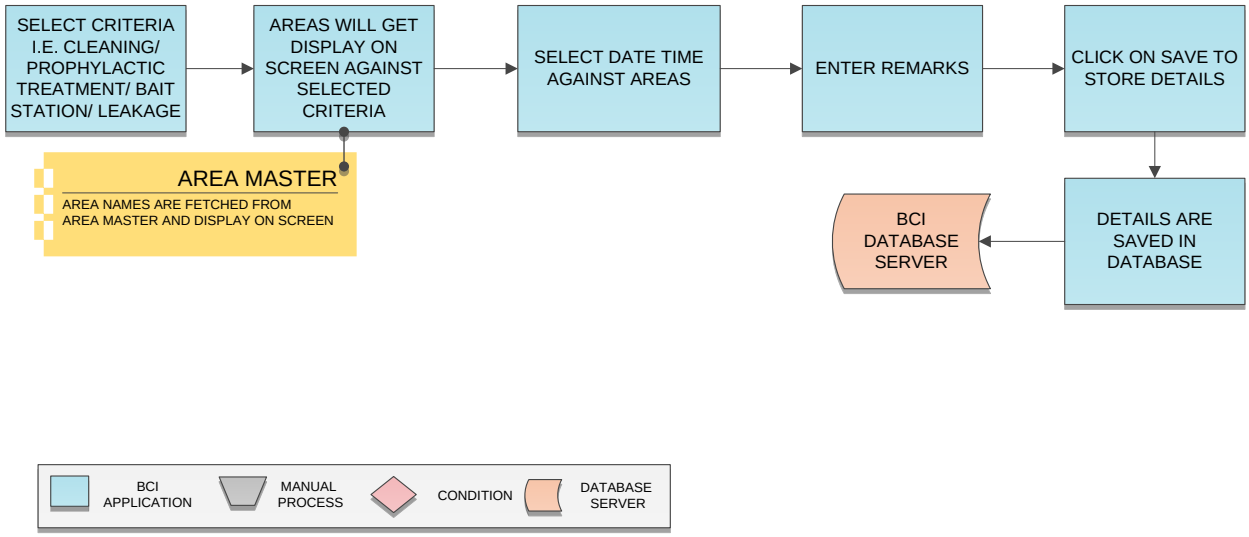
	*Fraction Percentage = Faction Weight / Total Weight of Sample * 100* ***In case UOM of the sample is in grams, user need to enter both Fraction Weight and Total Sample Weight of the material.* 11. If calculated percentage is within defined acceptable value: a. Result is updated as 'Accepted' b. Status is displayed on screen 12. If percentage is **not** within defined acceptable value: a. Result is updated as 'Rejected' b. Status is displayed on screen 13. Enter Seal Number 14. Click on Save, corresponding details will get saved in database

Post-Conditions	1. Transaction details will get saved in database 2. Quality Status is updated as Accepted or Rejected based on fraction weight percentage

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Pre-defined parameters should be fetched from master data and display on screen as per material type 5. System should calculate the Fraction Percentage based on the formula/ logic defined by NCML. 6. If Fraction Percentage calculated by system is within Grain Acceptance Specification, system must display result as 'Accepted' else display 'Rejected'

9.4 Storage & Preservation

9.4.1 Cleaning and Sanitization



Activities

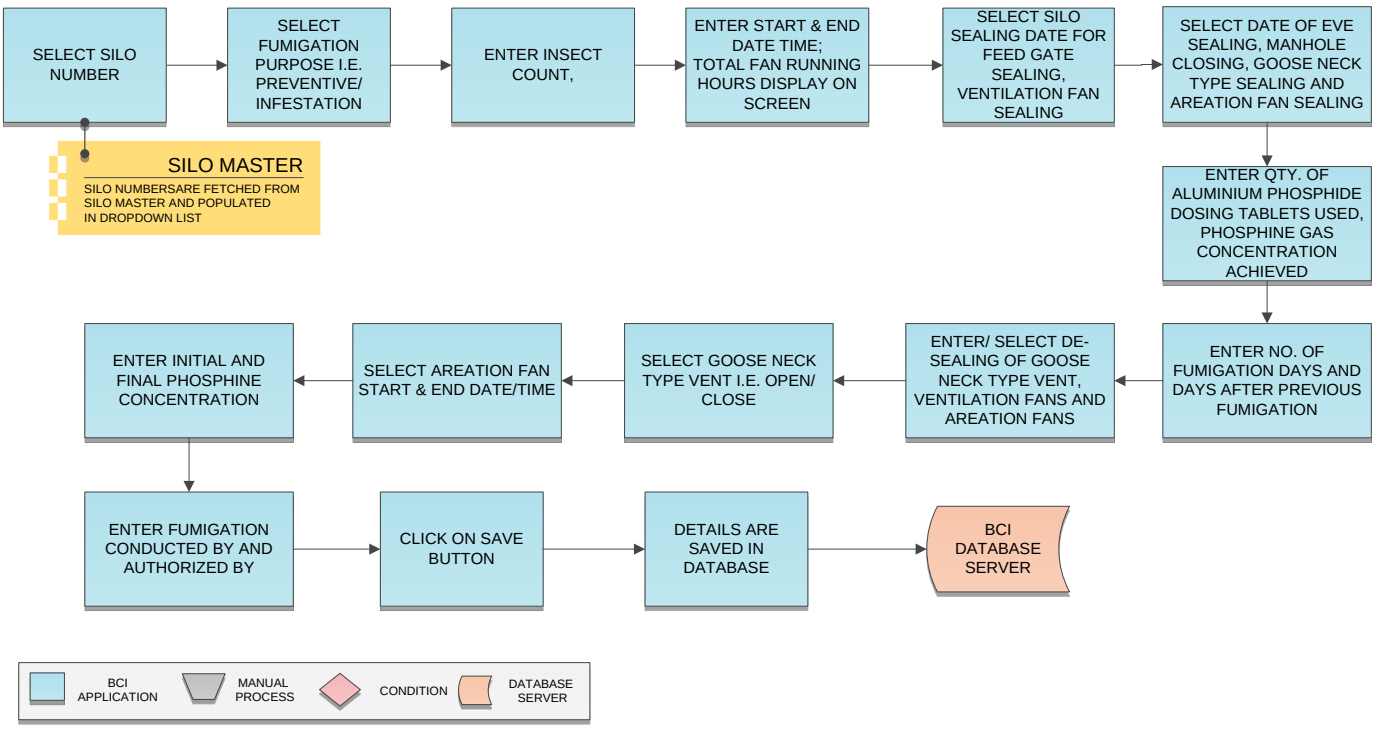
Module Description	This module will be used to store details of cleaning and sanitization performed in selected Area.

Pre-Conditions	1. Area master should be created
Process Steps	1. Login to the web application using authorized credentials 2. Open Storage and Preservation section and select Cleaning and Sanitization module 3. Select Criteria i.e. Cleaning / Prophylactic Treatment/ Bait Station/ Leakage 4. List of Area will get displayed on screen in data grid 5. Enter / select Date Time against Area 6. Enter Remarks 7. Click on Save button 8. Details will get saved in database
Post-Conditions	1. Transaction details are saved in database table
Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity

	4. Area Names should be displayed in data grid

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

9.4.2 FUMIGATION



Activities

Module Description	This module will be used to store the fumigation process details against selected Silo.

Pre-Conditions	1. Silo Master should be available

Process Steps	1. Login to the web application using authorized credentials 2. Open Storage and Preservation section and select Fumigation module 3. Select Silo Number 4. Select Fumigation Purpose i.e. Preventive/ Infestation 5. Enter Insect Count 6. Select Start & End Date Time 7. System will calculate Total Fan Running Hours and display on screen 8. Enter/ Select Silo Sealing details i.e. Feed Gate Sealing Date, Ventilation Fans Sealing Date, Eve Sealing Date, Manhole Closing Date, Goose Neck Type Vent Sealing Date, Aeration Fan Sealing Date

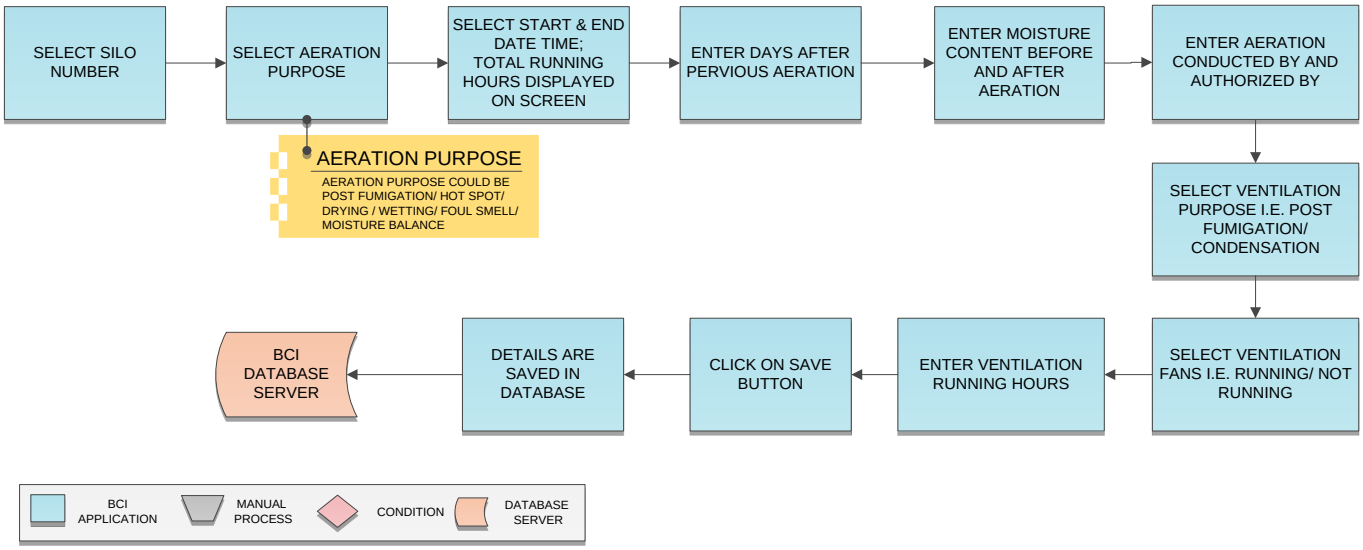
	9. Enter/ Select Aluminum Phosphide Dosing details i.e. Quantity of Tablets Used, Phosphine Gas Concentration Achieved, No. of Days of Fumigation, Days after Previous Fumigation 10. Enter/ select Fumigation Completion details i.e. De-Sealing of Goose Neck Type Vents, De-Sealing of Ventilation Fans, De-Sealing of Aeration Fans, Goose Neck Type Vents (Open/ Close), Aeration Fan Start Date / Time, Aeration Fan Stop Date / Time, Initial Phosphine Concentration, Final Phosphine Concentration, Fumigation Conducted by, Fumigation Authorized by 11. Click on Save button 12. Details will get saved in database

Post-Conditions	1. Transaction details are saved in database table

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity.

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

9.4.3 Aeration & Ventilation



Activities

Module Description	This module will be used to store details of Aeration and Ventilation process done on selected Silo.

Pre-Conditions	1. Silo Master should be available

Process Steps	1. Login to the web application using authorized credentials 2. Open Storage and Preservation section and select Aeration & Ventilation module 3. Select Silo Number 4. Select Aeration Purpose i.e. Post Fumigation/ Hot Spot/ Drying/ Wetting/ Foul Smell/ Moisture Balance 5. Select Start & Stop Date Time 6. System will calculate Total Running Hours and display on screen 7. Enter Days after Previous Aeration, Moisture Content Before Aeration and Moisture Content After Aeration 8. Enter Aeration Conducted By and Authorized By 9. Select Ventilation Purpose i.e. Post Fumigation / Condensation 10. Select Ventilation Fans i.e. Running / Not Running 11. Enter Ventilation Running Hours

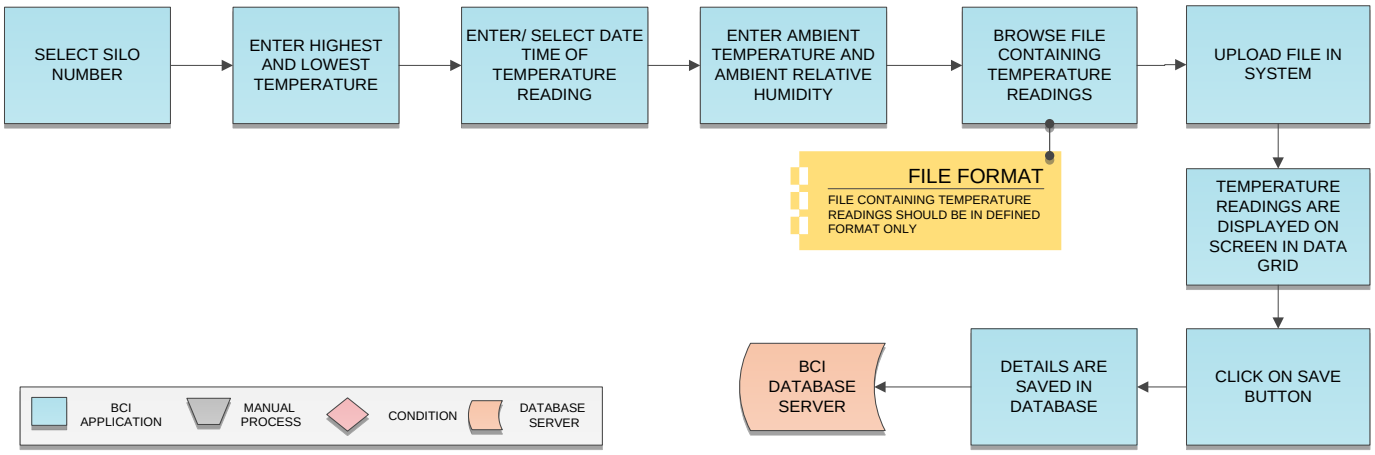
	12. Click on Save button 13. Details will get saved in database

Post-Conditions	1. Aeration and Ventilation Transaction details are saved in database table

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity.

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

9.4.4 TEMPERATURE MONITORING



Activities

Module Description	This module will be used to store temperature monitoring details of selected Silo in database

Pre-Conditions	1. Silo Master should be available 2. Temperature Reading File should be available in defined format

Process Steps	1. Login to the web application using authorized credentials 2. Open Storage and Preservation section and select Temperature Monitoring module 3. Select Silo Number 4. Enter Highest and Lowest Temperature 5. Select Date Time of Temperature Reading 6. Enter Ambient Temperature and Ambient Relative Humidity 7. Browse file containing Temperature Readings of selected Silo 8. Click on Upload to import the selected File 9. File contents (Temperature Readings) are displayed on screen in data grid 10. Click on Save button 11. Details will get saved in database

Post-Conditions	1. Temperature details are saved in database table against Silo Number

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Alert should be displayed in case selected file is not in defined format.

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

Sample Temperature Readings File Format

	Cable 1	Cable 2	Cable 3	Cable 4	Cable 5	Cable 6	Cable 7	Cable 8	Cable 9	Cable 10	Cable 11	Cable 12	Cable 13	Cable 14	Cable 15	Cable 16	Cable 17	Cable 18	Cable 19
Sensor 14	43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sensor 13	43	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sensor 12	34.5	43	43	42.5	43	42	43	--	--	--	--	--	--	--	--	--	--	--	--
Sensor 11	33	34	34	35	34	36.5	34.5	42	41.5	42	42	42	42	42	41.5	41.5	41.5	42	42
Sensor 10	33	33.5	33.5	33	32.5	33	33	33.5	34	33.5	33.5	33.5	33.5	34	33.5	33.5	33.5	33.5	33.5
Sensor 9	32.5	33	33.5	33	33	32.5	33.5	32.5	32.5	33	32.5	32.5	32.5	32.5	32.5	32.5	32.5	33	32.5
Sensor 8	33.5	32.5	32.5	32.5	32.5	33	32.5	33	32.5	33	33	33.5	33	33.5	33.5	33	32.5	32.5	32.5
Sensor 7	32	33	33	33.5	32.5	32.5	33	32.5	32	32	32	32	32.5	32	32.5	32.5	33	32.5	33
Sensor 6	34	32	32	32	32.5	33	32.5	32.5	32.5	32.5	32.5	33	32.5	32.5	32.5	32.5	32.5	32	32
Sensor 5	35	34.5	34	34	34.5	32.5	34.5	32	32.5	32.5	32	32.5	32.5	32.5	32.5	33	33	33.5	33
Sensor 4	34.5	35	35	35.5	35.5	33	35	34.5	34.5	35	34.5	34.5	34.5	34.5	34.5	34.5	35	35	34.5
Sensor 3	34	35	34.5	35	34.5	35	35	35	35	35	35.5	35	35	35	35	35	35	35	35
Sensor 2	33.5	34	34.5	35	34	34.5	34	34	34.5	34.5	34.5	34.5	34.5	34.5	34	34	34.5	34.5	34
Sensor 1	32.5	32	33	33.5	33	34	33	33	32.5	32.5	32.5	32.5	33	33.5	33	33	33	32.5	32.5

9.5 Stock Audit

9.5.1 Quality Audit

Activities

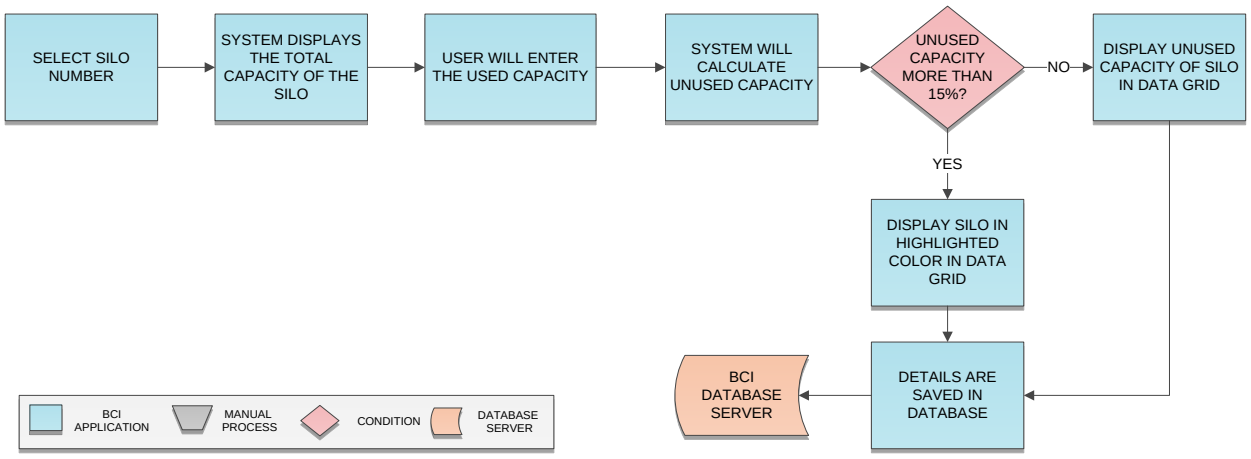
Quality Report	Using the reporting module of the application, user can generate report displaying quality process (pre-acceptance quality) performed in the premises on the selected date. 1. User will select the Date 2. Click on Search button 3. System will display details of the quality process performed on Grain on selected date i.e. received grain and shipped grain **Data Fields of the report are yet to be finalized by NCML* 4. User can also export the details in defined file format, if required
Weighted Average Quality Report	This report will display the weighted average of the quality performed on all consignments (reconciled) received in premises on selected date. The average will be calculated on the basis of pre-defined formula (shared by NCML). 1. User will select the Date 2. Click on Search button 3. System should generate report of the total weight of the whole consignment of selected date based on the tested value of quality parameter of accepted quality consignment 4. System must calculate the average weighted quality of the whole consignment 5. Report should be generated for the weighted average quality **Data Fields of the report are yet to be finalized by NCML* 6. User can also export the details in defined file format, if required *For Example: Suppose **Net Weight of the consignment** is designated **as A1, A2, A3…An** and **value of various fractions** of its quality parameters **is A1.1, A1.2, A1.3** etc. (No. after decimal refers to unique fraction) i.e. A1.1 refers to moisture content of consignment A1 and A1.2 may refer to Foreign Matter % of consignment A1.* Consignment | Weight | Quality Parameters Value 1 | A1 | A1.1, A1.2, A1.3, A1.4……. A1.n 2 | A2 | A2.1, A2.2, A2.3, A2.4……. A2.n 3 | A3 | A3.1, A3.2, A3.3, A3.4……. A3.n n | An | An.1, An.2, An.3, An.4……..An.n

	*Weighted Average Moisture content of all consignments can be calculated using formula: Weighted Average Moisture content=(A1*A1.1+A2*A2.1+ A3*A3.1….An*An.1)/ (A1+A2+A3…An)* 7. Similarly, Weighted Average Quality can be calculated for all consignments received on selected date 8. Weighted Average Quality should be within permissible limits of Grain Acceptance Quality

9.5.2 Quantity Audit

Quantity Report	This report will display the total quantity received, shipped and stocked in premises during selected time interval. The quantity will be the accepted quantity of the grain i.e. excluding rejected weight and dust extracted. 1. User will select From Date and To Date 2. Enter Rejection Quantity and Dust Extracted Quantity 3. System will generate report displaying total weight of food grain stocked, total weight of food grain dispatched, basis on which net grain weight stocked in silo complex is calculated and displayed to user along with Standard Dust Reduction and Final Weight. 4. There will be two reports provide to the User i.e. Summary Report and Detailed Report 5. **Summary Report:** Date wise consolidated report shall be generated 6. **Detailed Report:** Consignment wise report shall be generated 7. The quantity of Food Grain shall be reconciled as given by NCML below: **Designation** : **Description** A : Total Foodgrain Quantity Accepted B : Total Weight of Bags carrying foodgrain C : Total Weight of Cleaner Rejections D : Total Weight of Dust Extracted E : Weight of Foodgrain Dispatched by Trucks F : Weight of Foodgrain Dispatched by Rail G : Total Weight of Empty Bags X : Total Weight of Foodgrain Stocked in Long Term Storage Silo Y : Total Weight of Foodgrain Dispatched Z : Net Foodgrain Stock in Silo Complex **X (Total Weight of Foodgrain Stocked) = A-B-C-D** **Y (Total Weight of Foodgrain Dispatched) = E+F-G** **Z (Net Foodgrain Stock in Silo Complex) =X-Y**

9.5.3 SILO STORAGE CAPACITY (RECONCILIATION)



Silo Storage Report	Using the application's reporting module, user can generate the reconciliation report which will display the storage capacity of the selected silo and also calculates the unused capacity. Unused capacity of more than 15% will be displayed in highlighted color in data grid. 1. Select Silo Number 2. System will display the Total Storage Capacity of the selected Silo 3. Enter Used Capacity 4. System will calculate the unused capacity and display on screen. 5. If unused storage capacity is more than 15% of the total capacity, then it will be displayed in highlighted color in data grid.

9.6 INVOICE

9.6.1 FIXED STORAGE CHARGES

<table>
<tr><td>Fixed Storage Charges Report</td><td>Using the application's reporting module, user can generate the report displaying calculated Fixed Storage Charges in rupees per ton per year based on actual usage / capacity of the Silo (as selected by user in master data).
Process Steps are:
1. User will open the Reporting module and select Fixed Storage Charge
2. Select Month and Year to define the duration
3. Click on Search button
4. System will calculate Fixed Storage Charges based on pre-defined formula (given below) and generate report.
5. Click on Save to store the details in database
*Fixed Storage Charges will be saved for the selected month only once.
6. User can export the report in defined format, if required.</td></tr>
<tr><td>Formula for Fixed Storage Charges Calculation</td><td>1. Calculation of Fixed Storage Charges for a month in nth financial year
a. Fixed Storage Charges payable for a month in 1st Financial Year in Rupees shall be calculated as follows;
<table><tr><td>Fixed Storage Charges payable for a month in 1st Financial Year in Rupees</td><td>=</td><td>(Unit Rate for Storage Charges in Rs per ton per year) x (Capacity in Tons) x (1/12)</td></tr></table>
b. The applicable Fixed Storage Charge for the subsequent Accounting Year shall be determined by decreasing the Base unit rate of Fixed Storage Charge for the immediately preceding Accounting Year by 2% as per table below.
<table><tr><th>Year</th><th>Fixed Storage Charges %ge</th></tr><tr><td>1</td><td>100%</td></tr><tr><td>2</td><td>98.00%</td></tr><tr><td>3</td><td>96.04%</td></tr></table>
c. Fixed Storage Charges payable for a month in nth Financial Year in Rupees shall be calculated as follows (considering WPI and CPI based on month and year);</td></tr>
</table>

Total Storage Charges payable for a month in nth Financial Year in Rupees	=	(Unit Rate for Storage Charges for nth Financial Year in Rs per ton per year) x (Capacity in Tons) x (1/12)

Where

Unit Rate for Storage Charges for nth Financial Year in Rs per ton per year	=	Base Unit Rate of Storage Charges x $[1\text{-}2\%]^{n-1}$ x [1 + (70% (WPI_n –WPI_b)/ WPI_b)+ (30% X (CPI_n –CPI_b)/ CPI_b)]

2. Invoicing amount will be calculated on monthly basis.

**The Base Unit Rate of Fixed Storage Charges for preceding years is decreased by 2%*

9.6.2 VARIABLE CHARGES

<table>
<tr><td>Variable Charges Report</td><td>Using the application's reporting module, user can generate the report displaying calculated Variable Charges for the food-grain actually stored in the Storage Facility for a month.
Quantity of food grains in the month is to be determined by computing the daily average of actual quantity stored in Silo Complex over the month.
Process Steps are:
1. User will open the Reporting module and select Variable Charge
2. Select Month and year to define the duration
3. Click on Search button
4. System will calculate Variable Charges based on pre-defined formula (given below) and generate report.
5. Click on Save to store the details in database
*Variable Charges will be saved for the selected month only once.
6. User can export the report in defined format, if required.</td></tr>
<tr><td>Formula for Variable Charges Calculation</td><td>1. In order to calculate the Variable Charges, first Opening and Closing Stock of food-grain should be calculated as given below
Opening Stock of Food grain in MT = XnO
Food grain Receipt in Bags by Road in MT =
Food grain Receipt in Bulk by Road in MT =
Food grain Received by Rail Rake in Bulk in MT =
Food grain Received by Rail Rake in Bags in MT =
Total Food grain Received in MT = XnR
Total Food grain Dispatched by Bulk Trucks in MT =
Total Food grain Dispatched by Bagged Trucks in MT =
Total Food grain Dispatched by Rail Wagons in Bulk in MT =
Total Food grain Dispatched by Rail Wagons in Bags in MT =
Total Food grain Dispatched in MT = XnD
Closing Stock of Food grain (XnC) in MT = XnO + XnR – XnD
2. Once Opening and Closing Stock value is available, Daily Average Quantity is calculated to get the Variable Charges:
Xavg = (X1C+X2C+X3C.....+XnC) / (Total Nos of Days in a Month)</td></tr>
</table>

	Where; Xavg = Daily Average of actual quantity stored in Silo Complex in MT X1C = Closing Stock of Day 1 of the month XnC = Closing Stock of Day n of the month 3. The Variable Charge for the first financial year of Operation Period shall become the base for calculating the Variable Charge in the subsequent year.

9.6.3 HANDLING CHARGES

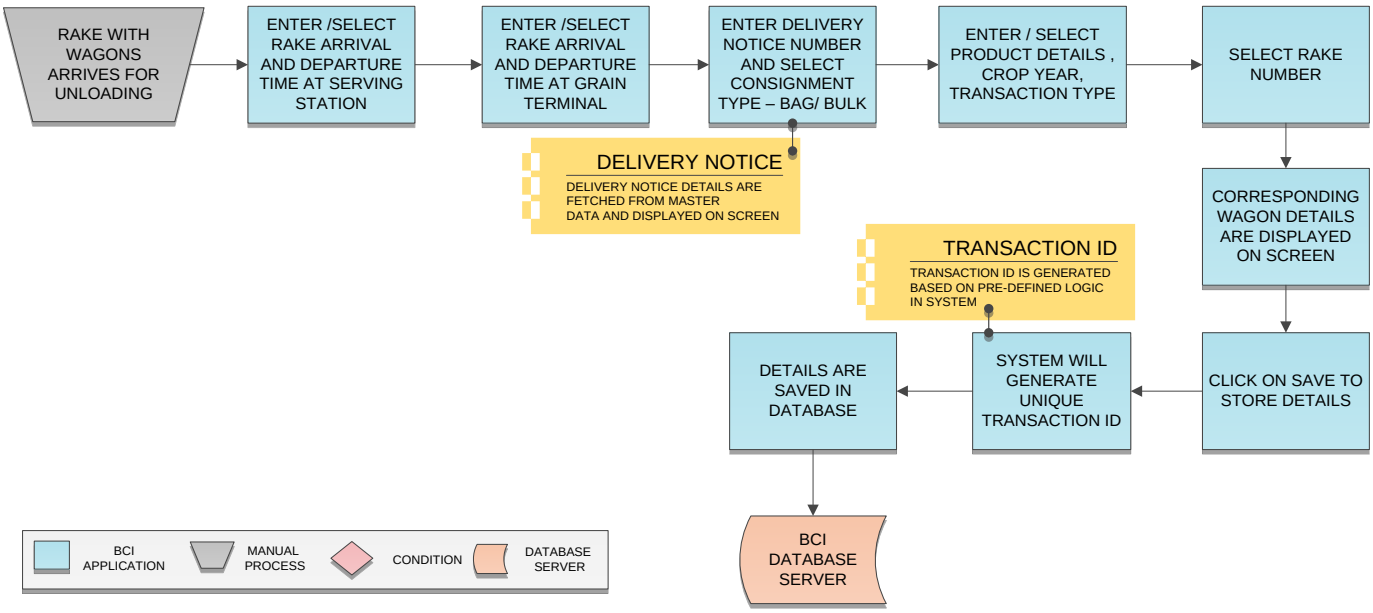
Handling Charges Report	Using the application's reporting module, user can generate the report displaying calculated Handling Charges for the unloading, weighment, bagging, Stocking, loading of grain etc. processes Process Steps are: 1. User will open the Reporting module and select Handling Charges 2. Select Month and Year to define the duration 3. Click on Search button 4. System will display consignment wise Handling Charges based on pre-defined formula (given below) and generate report. 5. Click on Save to store the details in database **Handling Charges will be saved for the selected month only once.* 6. User can export the report in defined format, if required.

Formula for Handling Charges Calculation	1. Daily Report of Bag Handling is generated as follows: 1) Quantity of Bags Unloaded from trucks / trolley and debagged including sampling, testing & weighment for "Unloading charges" — in Bags 2) Quantity of Foodgrain delivered at storage facility directly from the vehicle not requiring any de-bagging for "weighment charges" — In Kgs 3) Quantity of Bags prepared including stitching & evacuation for "Bagging Charges" — In Bags 4) Quantity of Bags Stacked for "Stacking Charges" — In Bags 5) Quantity of Bags Loaded directly on a vehicle for "Loading charges" — In Bags 6) Quantity of Bags Loaded directly on a vehicle, where breaking of stacks is required — In Bags 2. Total monthly quantity of each is calculated for Bags Handling Charges

9.7 Grain Receiving via Rail/ Rake (Bulk/ Bagged)

The section defines the process of receiving food-grain in NCML premises via Rake/ Rail and capture associated transaction details in database

9.7.1 Rake Entry



Activities

Module Description	This module will be used to store Rake Receiving details in database. Rake Entry will be done for each rake arrived at Station for food-grain delivery against Delivery Notice

Pre-Conditions	1. Delivery Notice should be available 2. Rake and Wagon master should be available

Process Steps	1. Rake with Wagons arrives at station for Grain delivery 2. Authorized user will open Rake Receiving module and select Rake Entry, a form will get displayed on screen 3. Enter / Select Rake Arrival and Departure Date & Time at Serving Station 4. Enter/ Select Rake Arrival and Departure Date & Time at Grain Terminal 5. Select Consignment Type – Bulk / Bag 6. Enter Delivery Notice Number 7. Dispatch details appear on screen i.e. Delivery Weight etc. 8. Enter / Select Product details, Crop Year, Transaction Type etc. 9. Select Rake Number, corresponding Wagons details are appear on screen 11. Click on save to store details 12. System will generate unique Transaction ID based on predefined logic (refer Logic ad Formats section described below) 13. Corresponding details will get saved in database

Post-Conditions	1. Transaction details are saved in database table 2. Unique Transaction ID is generated for each Rake entry.

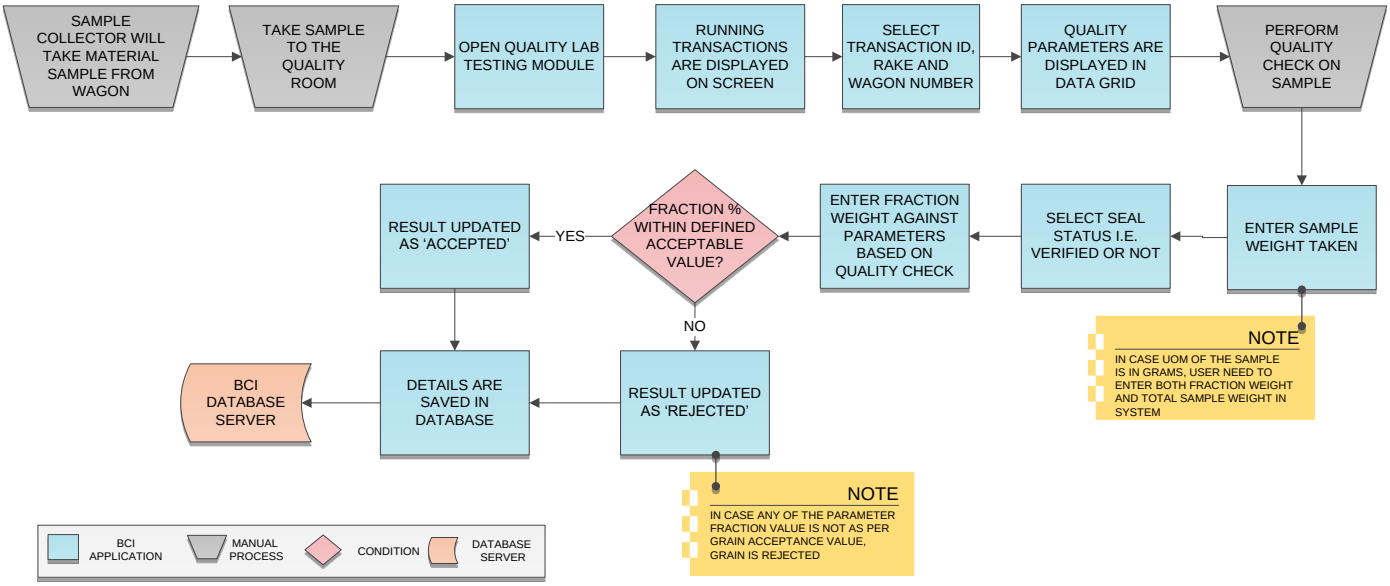
Format & Logics	• **Format to generate Transaction ID** Transaction ID is generated by BCI system for each Rake Entry and has format 'Prefix'+YYMMDD+4 Digits Running Serial Number

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Transaction ID should be unique

	5. Delivery Notice should be available and details should be fetched from master data based on Delivery Notice Number

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML

9.7.2 QUALITY CHECKING



Activities

Module Description	This module will be used to record quality inspection result of the grain received via Rake. Quality is checked against pre-defined parameters. Sample Collector will take the grain sample, send for testing and result is stored.

Pre-Conditions	1. Desktop should be available to access application 2. Sample should be taken for quality testing

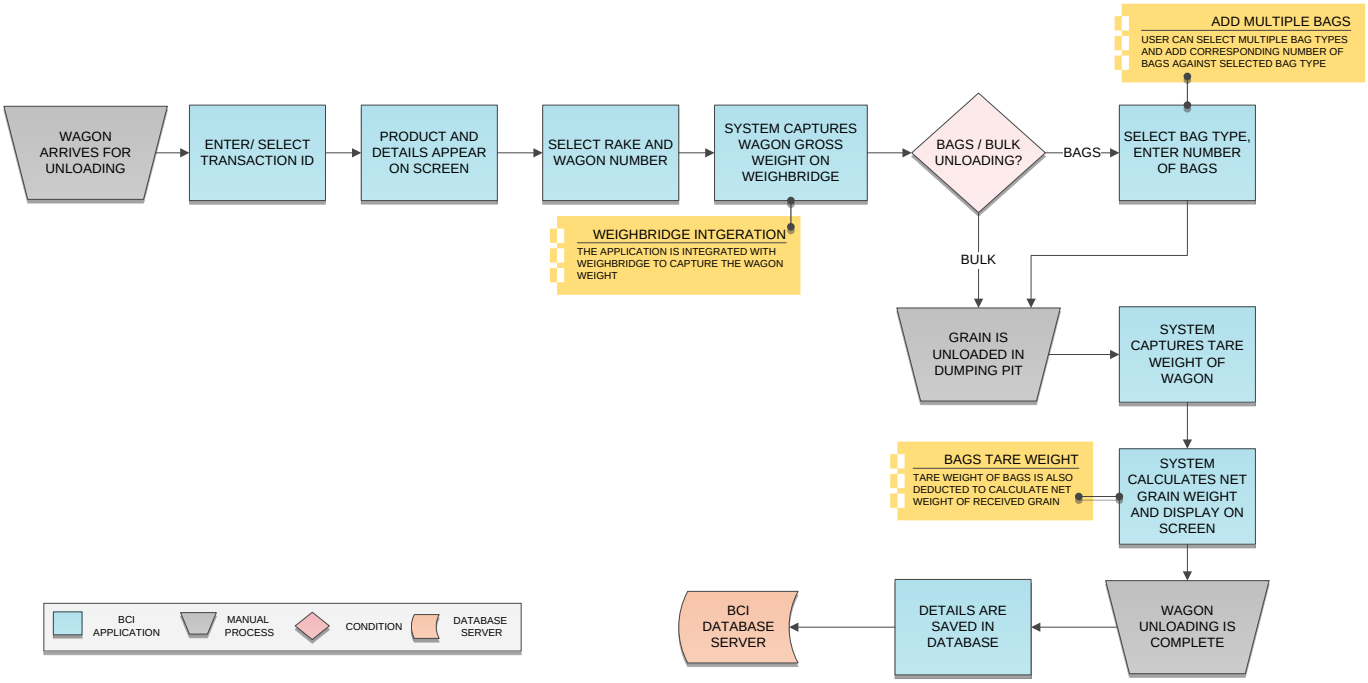
Process Steps	1. Quality Personnel login to the application using authorized credentials 2. Open Quality Lab Testing module under Rake Receiving, a form will get displayed on screen 3. Running Transactions will be displayed on screen 4. Select Transaction ID 5. Select Rake and Wagon Number 6. Quality Test Parameters will appear on screen 7. Quality checking is performed on sample 8. Quality Personnel will enter the result Fraction Weight (as per defined UOM) against test parameters based on quality check 15. Select Seal Status i.e. Verified or Not Verified 16. Enter Total Sample Weight taken. 17. System auto calculate the fraction percentage as per defined formulas and logic **Fraction Percentage is calculated using following formula* *Fraction Percentage = Faction Weight / Total Weight of Sample * 100* ***In case UOM of the sample is in grams, user need to enter both Fraction Weight and Total Sample Weight of the material.* 18. If calculated percentage is within defined acceptable value: a. Result is updated as 'Accepted' b. Status is displayed on screen 19. If percentage is **not** within defined acceptable value: a. Result is updated as 'Rejected' b. Status is displayed on screen 20. Click on Save, corresponding details will get saved in database

Post-Conditions	1. Transaction details will get saved in database 2. Quality Status is updated as Accepted or Rejected based on fraction weight percentage

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Pre-defined parameters should be fetched from master data and display on screen as per material type

	5. System should calculate the Fraction Percentage based on the formula/ logic defined by NCML. 6. If Fraction Percentage calculated by system is within Grain Acceptance Specification, system must display result as 'Accepted' else display 'Rejected'

9.7.3 UNLOADING



Activities

Module Description	This module will be used to capture the details of grain unloaded from Wagon. Before and after unloading process Wagon's weight is captured and net Grain Weight is calculated by system.

Pre-Conditions	1. Weighbridge should be integrated with the application 2. Wagon Seal should be verified

Process Steps	1. Wagon arrives for Unloading 2. Authorized user will login to the application and open Wagon Unloading module 3. Select / Enter Transaction ID (created at the time of rake entry process) 4. Product, Crop Year, Weight etc. are appeared on screen 5. Select Rake and Wagon Number 6. Click on Get Weight 7. System will capture the Gross Weight of the Wagon along with the timestamp 8. Wagon arrives at unloading point 9. Select Consignment Type – Bag / Bulk

	10. If Bulk is selected: a. Grain is unloaded from Wagon 11. If Bag is selected: a. Unload Bags b. Select Bag Type c. Enter Number of Bags against selected Bag Type **User can also select multiple Bag Types and add corresponding number of bags against selected Bag Type, if required* 12. Wagon arrives at weighbridge 13. System will capture the Tare Weight of Wagon and calculate Net Weight **Tare/ Empty Bag weight is deducted to calculate Grain Net Weight in case of Bags receiving.* 14. Click on Save, corresponding details will get saved in database

Post-Conditions	1. Transaction details are saved in database table 2. Wagon unloading is complete 3. Net Grain Weight is calculated

Validations	1. Application will validate input data i.e. text field values and selections. 2. Only authorized users should be allowed to access the application else an error message should be displayed on screen. 3. An alert message is displayed in case of any error / invalid activity. 4. Running Transaction IDs should be displayed on screen 5. Application should be integrated with Weighbridge to capture wagon weight

Data Required from NCML	1. Data fields to be captured are yet to be finalized by NCML 2. Methodology and communication protocols for application integration with Weighbridge is pending for discussion with NCML

10 SRS SCOPE CHANGE PROCESS

10.1 BEFORE SIGN OFF

Any changes in SRS need to be informed in writing by NCML. It will be incorporated / confirmed only after doing detailed feasibility study by BCI.

10.2 AFTER SIGN OFF

Any changes in proposed solution after approval of this document by NCML are subjected to confirmation from BCI, taking feasibility constraints into account. These changes will be incorporated (if any) into the solution only after delivering proposed solution & may be charged as extra.

The changes in proposed solution before & after acceptance will be mutually agreed and duly signed and accepted by NCML & BCI.

10.3 SRS ACCEPTANCE

Agreed and Accepted by NCML and Bar Code India

For National Collateral Management Services Ltd.	**For Bar Code India (BCI)**
Name:	**Name:**
Designation:	**Designation:**
Department:	**Department:**