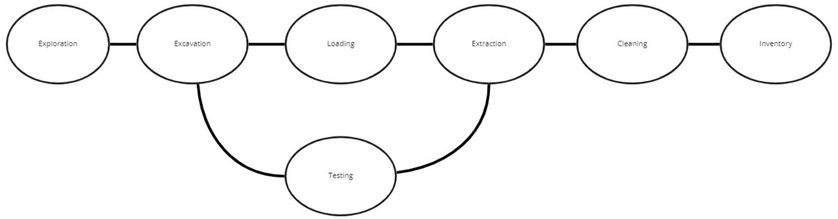

Exploration

1. determine new areas to mine
2. remove tracking of areas already mined

Excavation

1. maintains n excavators
2. dynamically allocates
3. dynamically deallocates
4. manager monitor

Loading

1. maintain n loaders
2. dynamically allocate loaders
3. manager monitor

Extraction

1. dynamically match speed to load
2. Manager monitor

Testing

1. on-going monitoring of gold content
2. notifies world about current purity
3. notification is if purity decreased by 1 unit (undefined yet)

Inventory

1. determines to keep or sell gold based on market trends
2. manager monitor

Process:

1. Exploration finds areas to mine
2. Excavation involved in extracting paydirt using **Excavator**
3. Loading picks up load paydirt from Excavator, using RockTruck to pickup paydirt and loads the paydirt into the Trommel.
4. The Trommel produces slurry which is cleaned
5. Once cleaned, the gold is either sold if prices are considered "down". If going "up", the gold is kept and sold based on predictions of the market going "down"

Assumptions

1. 1 cut mined at a time
2. Each excavator operated by distinct operator
4. operators for both excavators and loaders are assumed to be enrolled
5. Extractor turns on and off, and also adjusts speed up and down by increment.
6. Excavation will shutdown when:
a. operator shuts down
b. testing results decrease by 3 total units
7. Excavators and Loaders need to move if the cut is changed
8. Excavators never stop. Piles up paydirt endlessly for Loaders
8. If extraction shuts down, then Loaders shutdown
9. If extraction increases, then Loaders increase
10. If extraction decreases then Loaders increase
11. Loaders must stop when Extractor turned off due to problems or for cleaning
12. All equipment and operators are running 24/7

Todo:

1. Allow for multiple cuts active
2. Control schedule of operators and equipment better than 24/7
3. Add dump trucks to Loading domain
4. Operators need a Read Model for handling change of location.
5. Scripts needed:
a. loading sites for exploration
b. hitting Extraction with shutdown problems
6. Allow operators to switch vehicles due to capacity issues
7. Allow for different size Loaders, Excavators, and Dump Trucks
8. Limit how much Excavators can pile up without shutting down
9. Based on load, trigger more Excavators, Loaders, Dump Trucks

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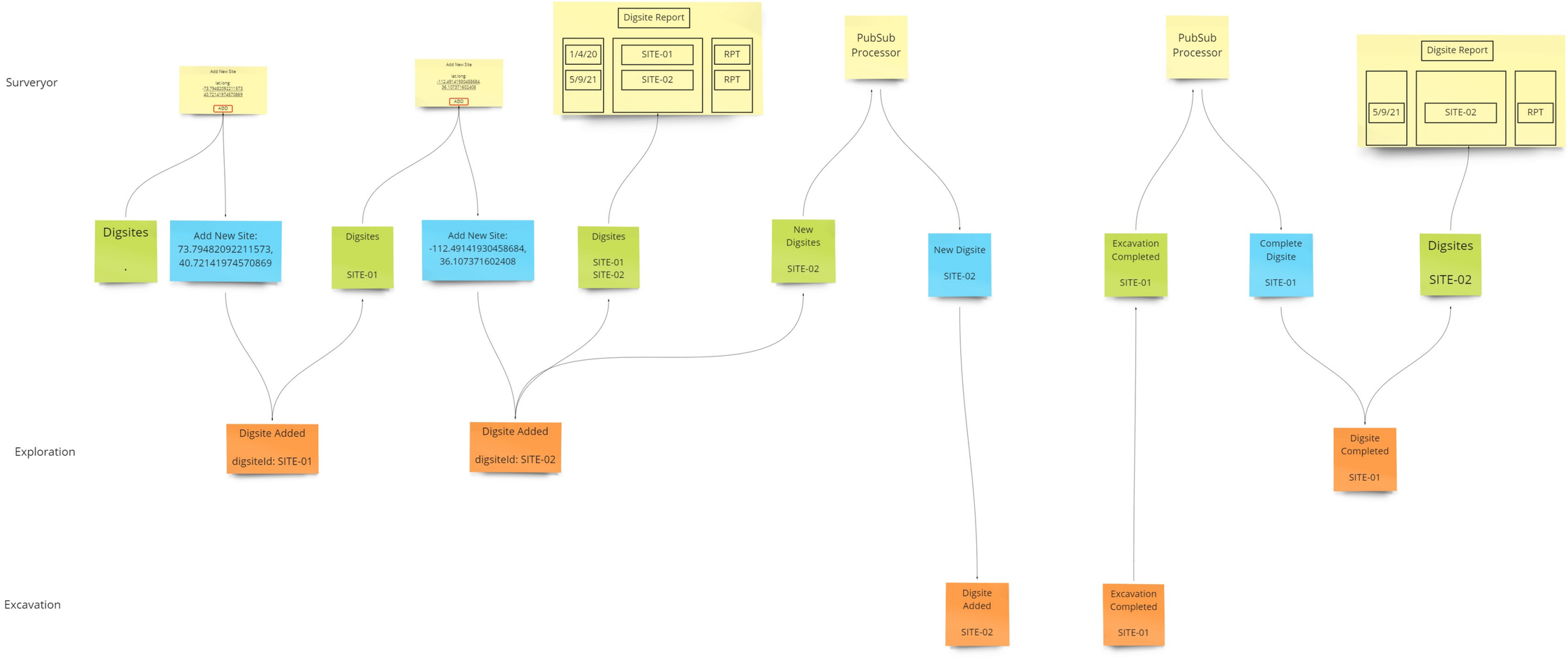
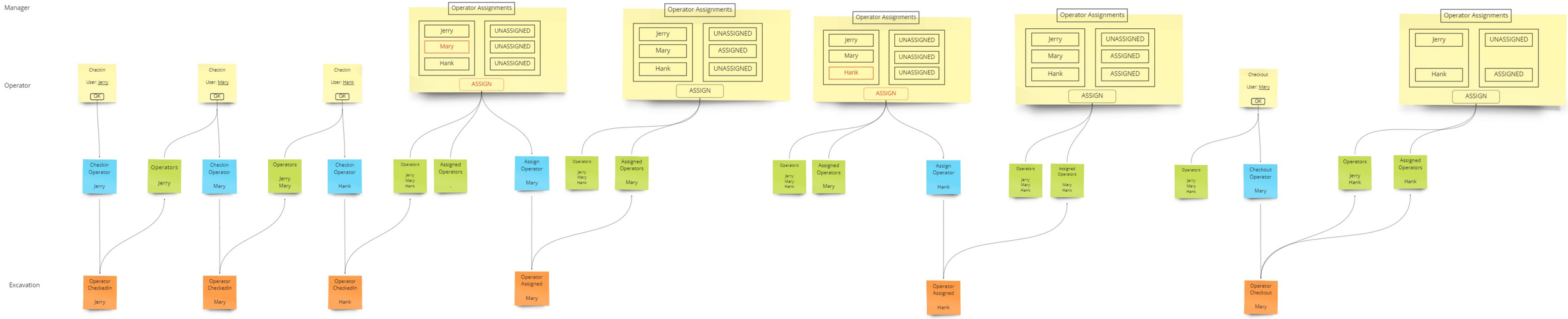

Surveryor
Exploration
Excavation
Add New Site
actionE
-73.79482092211573
40.72141974570869
ADD
Add New Site
actionE
-112.49141930458684
36.107371602408
ADD
Digsite Report
1/4/20
5/9/21
SITE-01
SITE-02
RPT
RPT
PubSub Processor
PubSub Processor
Digsite Report
5/9/21
SITE-02
RPT
Digsites
.
Add New Site: 73.79482092211573, 40.72141974570869
Digsites
SITE-01
Add New Site: -112.49141930458684, 36.107371602408
Digsites
SITE-01
SITE-02
New Digsites
SITE-02
New Digsite
SITE-02
Excavation Completed
SITE-01
Complete Digsite
SITE-01
Digsites
SITE-02
Digsite Added
digsiteId: SITE-01
Digsite Added
digsiteId: SITE-02
Digsite Added
SITE-02
Excavation Completed
SITE-01
Digsite Completed
SITE-01

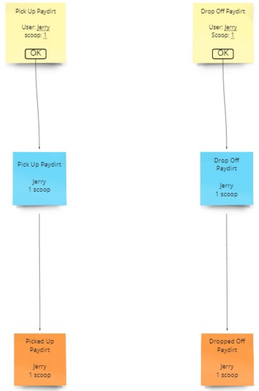

Manager
Operator
Excavation
Checkin
User: Jerry
OK
Checkin
User: Mary
OK
Checkin
User: Hank
OK
Operator Assignments
Jerry
Mary
Hank
UNASSIGNED
UNASSIGNED
UNASSIGNED
ASSIGN
Operator Assignments
Jerry
Mary
Hank
UNASSIGNED
ASSIGNED
UNASSIGNED
ASSIGN
Operator Assignments
Jerry
Mary
Hank
UNASSIGNED
UNASSIGNED
UNASSIGNED
ASSIGN
Operator Assignments
Jerry
Mary
Hank
UNASSIGNED
ASSIGNED
ASSIGNED
ASSIGN
Checkout
User: Mary
OK
Operator Assignments
Jerry
Hank
UNASSIGNED
ASSIGNED
ASSIGN
Checkin Operator
Jerry
Operators
Jerry
Checkin Operator
Mary
Operators
Jerry
Mary
Checkin Operator
Hank
Operators
Jerry
Mary
Hank
Assigned Operators
.
Assign Operator
Mary
Operators
Jerry
Mary
Hank
Assigned Operators
Mary
Operators
Jerry
Mary
Hank
Assigned Operators
Mary
Assign Operator
Hank
Operators
Jerry
Mary
Hank
Assigned Operators
Mary
Operators
Jerry
Mary
Hank
Checkout Operator
Mary
Operators
Jerry
Hank
Assigned Operators
Hank
Operator CheckedIn
Jerry
Operator CheckedIn
Mary
Operator CheckedIn
Hank
Operator Assigned
Mary
Operator Assigned
Hank
Operator Checkout
Mary

miro

Manager

Operator

Excavation



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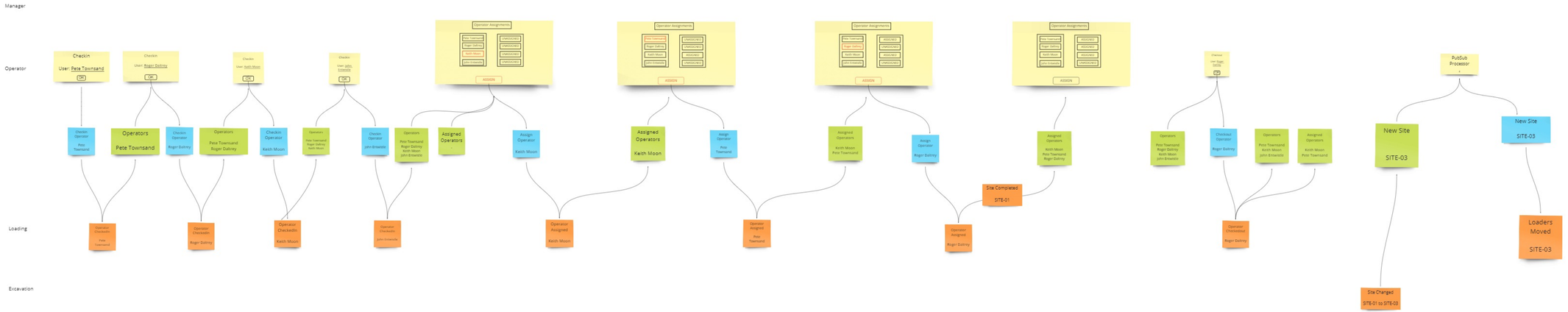
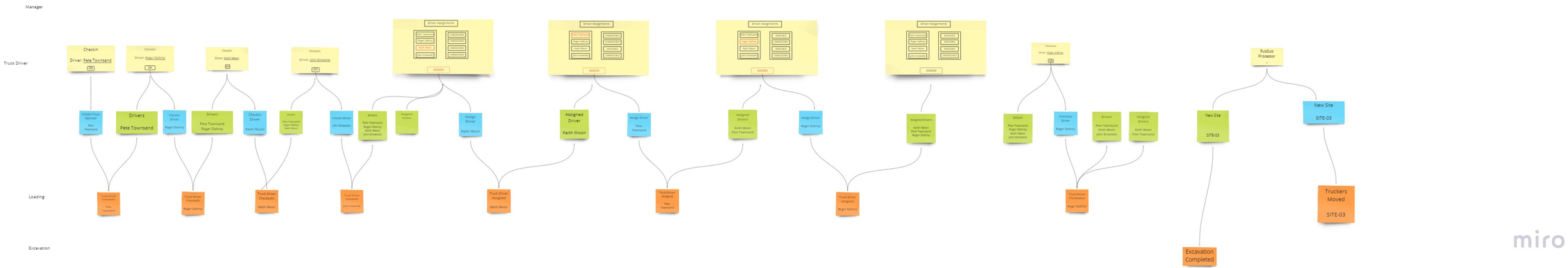
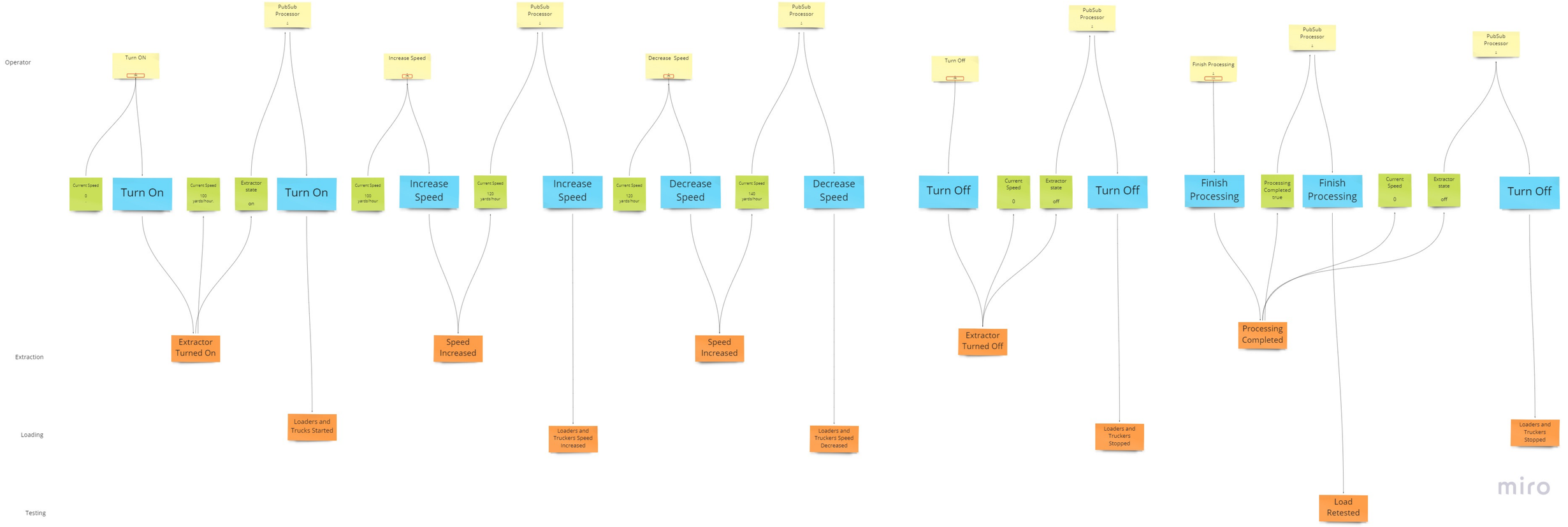
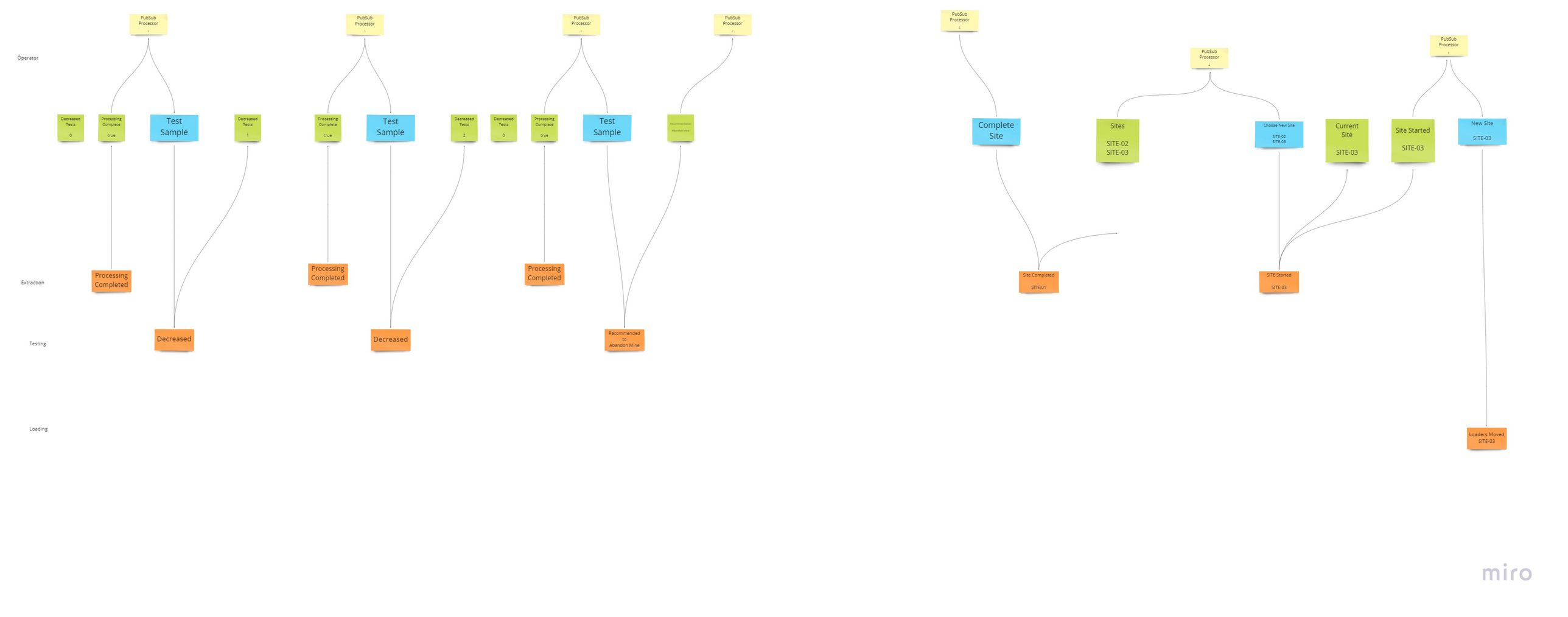

Manager
Operator
Loading
Excavation
Checkin
User: Pete Townsend
OK
Checkin
User: Roger Dalrimp
OK
Checkin
User: Keith Moon
OK
Checkin
User: John Entwistle
OK
Checkin Operator
Pete Townsend
Checkin Operator
Roger Dalrimp
Checkin Operator
Keith Moon
Checkin Operator
John Entwistle
Operators
Pete Townsend
Operators
Pete Townsend
Roger Dalrimp
Operators
Pete Townsend
Roger Dalrimp
Keith Moon
Operators
Pete Townsend
Roger Dalrimp
Keith Moon
John Entwistle
Operator Assignments
Pete Townsend
Roger Dalrimp
Keith Moon
John Entwistle
CHANGE/ADD
CHANGE/ADD
CHANGE/ADD
CHANGE/ADD
ASSIGN
Assigned Operators
Assign Operator
Keith Moon
Operator Checkedin
Pete Townsend
Operator Checkedin
Roger Dalrimp
Operator Checkedin
Keith Moon
Operator Checkedin
John Entwistle
Operator Assigned
Keith Moon
Assigned Operators
Keith Moon
Assign Operator
Pete Townsend
Operator Assigned
Pete Townsend
Assigned Operators
Keith Moon
Pete Townsend
Assign Operator
Roger Dalrimp
Operator Assigned
Roger Dalrimp
Site Completed
SITE-01
Assigned Operators
Keith Moon
Pete Townsend
Roger Dalrimp
Checkout
User: Roger Dalrimp
OK
Operators
Pete Townsend
Roger Dalrimp
Keith Moon
John Entwistle
Checkout Operator
Roger Dalrimp
Operators
Pete Townsend
Keith Moon
John Entwistle
Assigned Operators
Keith Moon
Pete Townsend
Operator Checkedout
Roger Dalrimp
PubSub Processor
New Site
SITE-03
New Site
SITE-03
Loaders Moved
SITE-03
Site Changed
SITE-01 to SITE-03

miro


Manager
Truck Driver
Loading
Excavation
Checkin
Driver: Pete Townsand
OK
Checkin
Driver: Roger Dalrey
OK
Checkin
Driver: Keith Moon
OK
Checkin
Driver: John Entwistle
OK
Driver Assignments
Pete Townsand
Roger Dalrey
Keith Moon
John Entwistle
ASSIGN
Checkin Truck Operator
Pete Townsand
Drivers
Pete Townsand
Checkin Driver
Roger Dalrey
Drivers
Pete Townsand
Roger Dalrey
Checkin Driver
Keith Moon
Drivers
Pete Townsand
Roger Dalrey
Keith Moon
Checkin Driver
John Entwistle
Drivers
Pete Townsand
Roger Dalrey
Keith Moon
John Entwistle
Assigned Drivers
Assign Driver
Keith Moon
Assigned Driver
Keith Moon
Assign Driver
Pete Townsand
Assigned Drivers
Keith Moon
Pete Townsand
Assign Driver
Roger Dalrey
Assigned Drivers
Keith Moon
Pete Townsand
Roger Dalrey
Truck Driver Checkedin
Pete Townsand
Truck Driver Checkedin
Roger Dalrey
Truck Driver Checkedin
Keith Moon
Truck Driver Checkedin
John Entwistle
Truck Driver Assigned
Keith Moon
Truck Driver Assigned
Pete Townsand
Truck Driver Assigned
Roger Dalrey
Checkout
Driver: Roger Dalrey
OK
Drivers
Pete Townsand
Roger Dalrey
Keith Moon
John Entwistle
Checkout Driver
Roger Dalrey
Drivers
Pete Townsand
Keith Moon
John Entwistle
Assigned Drivers
Keith Moon
Pete Townsand
Truck Driver Checkedout
Roger Dalrey
PubSub Processor
New Site
SITE-03
New Site
SITE-03
Truckers Moved
SITE-03
Excavation Completed
miro


Operator
Extraction
Loading
Testing
Turn ON
PubSub Processor
Current Speed 0
Turn On
Current Speed 100 yards/hour
Extractor state on
Turn On
Extractor Turned On
Loaders and Trucks Started
Increase Speed
PubSub Processor
Current Speed 100 yards/hour
Increase Speed
Current Speed 120 yards/hour
Increase Speed
Speed Increased
Loaders and Truckers Speed Increased
Decrease Speed
PubSub Processor
Current Speed 120 yards/hour
Decrease Speed
Current Speed 140 yards/hour
Decrease Speed
Speed Increased
Loaders and Truckers Speed Decreased
Turn Off
PubSub Processor
Current Speed 0
Turn Off
Extractor state off
Turn Off
Extractor Turned Off
Loaders and Truckers Stopped
Finish Processing
PubSub Processor
Processing Completed true
Finish Processing
Current Speed 0
Extractor state off
Processing Completed
Load Retested
PubSub Processor
Turn Off
Loaders and Truckers Stopped
miro


Operator
Extraction
Testing
Loading
PubSub Processor
Decreased Tests 0
Processing Complete true
Test Sample
Decreased Tests 1
Processing Completed
Decreased
PubSub Processor
Processing Complete true
Test Sample
Processing Completed
Decreased
PubSub Processor
Decreased Tests 2
Decreased Tests 0
Processing Complete true
Test Sample
Processing Completed
Recommended to Abandon Mine
PubSub Processor
PubSub Processor
Complete Site
Site Completed SITE-01
PubSub Processor
Sites SITE-02 SITE-03
Choose New Site SITE-02 SITE-03
SITE Started SITE-03
PubSub Processor
Current Site SITE-03
Site Started SITE-03
New Site SITE-03
Loaders Moved SITE-03