

USE OF VALUE STREAM MAPPING IN A CASE STUDY IN BASEMENT CONSTRUCTION

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AGENDA

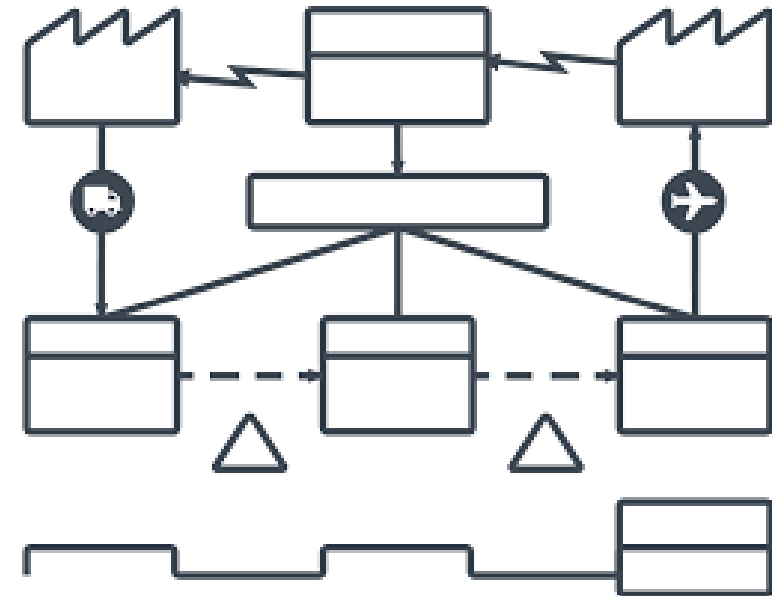
- Context
- Methods
- Case study
- Results and discussions
- Conclusions

CONTEXT

In Lima-Peru, the total time whereby value-added work is carried out on average is 28% in building projects.



The Value Stream Mapping (VSM), a management tool, is useful for identifying and evaluating waste within the workflow



CONTEXT

- Some **use of VSM** in the construction industry are administrative operations, shot blasting, improvement of structural masonry, vertical concreting process, highways projects, installation of undergrounds pipes, among others.
- There is no previous research in the literature on projects associated with excavations and soil containment structures until now.
- This **study aims** to apply the **VSM tool to improve the basement construction system** in its execution stage.
- The case study is about constructing **nine basements** in a high-rise building located in Lima -

RESEARCH METHOD

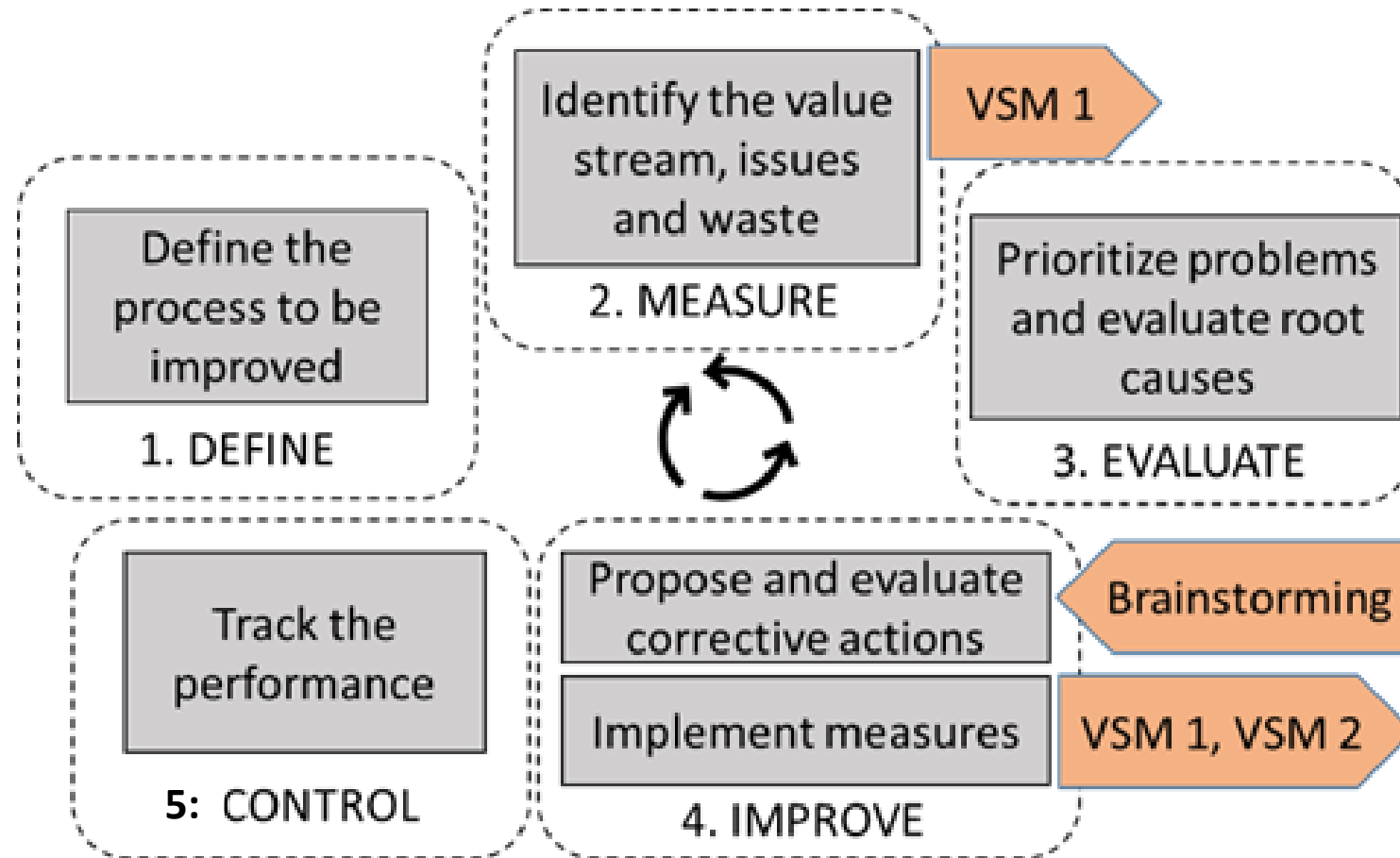


Figure 1. The adaptation of the optimization cycle proposal for construction projects by Cabrera and Li (2014)

CASE STUDY



Figure 2. Panoramic view of the building of the anchored wall

RESULTS AND DISCUSSION

CURRENT STATE MAP (VSM1)

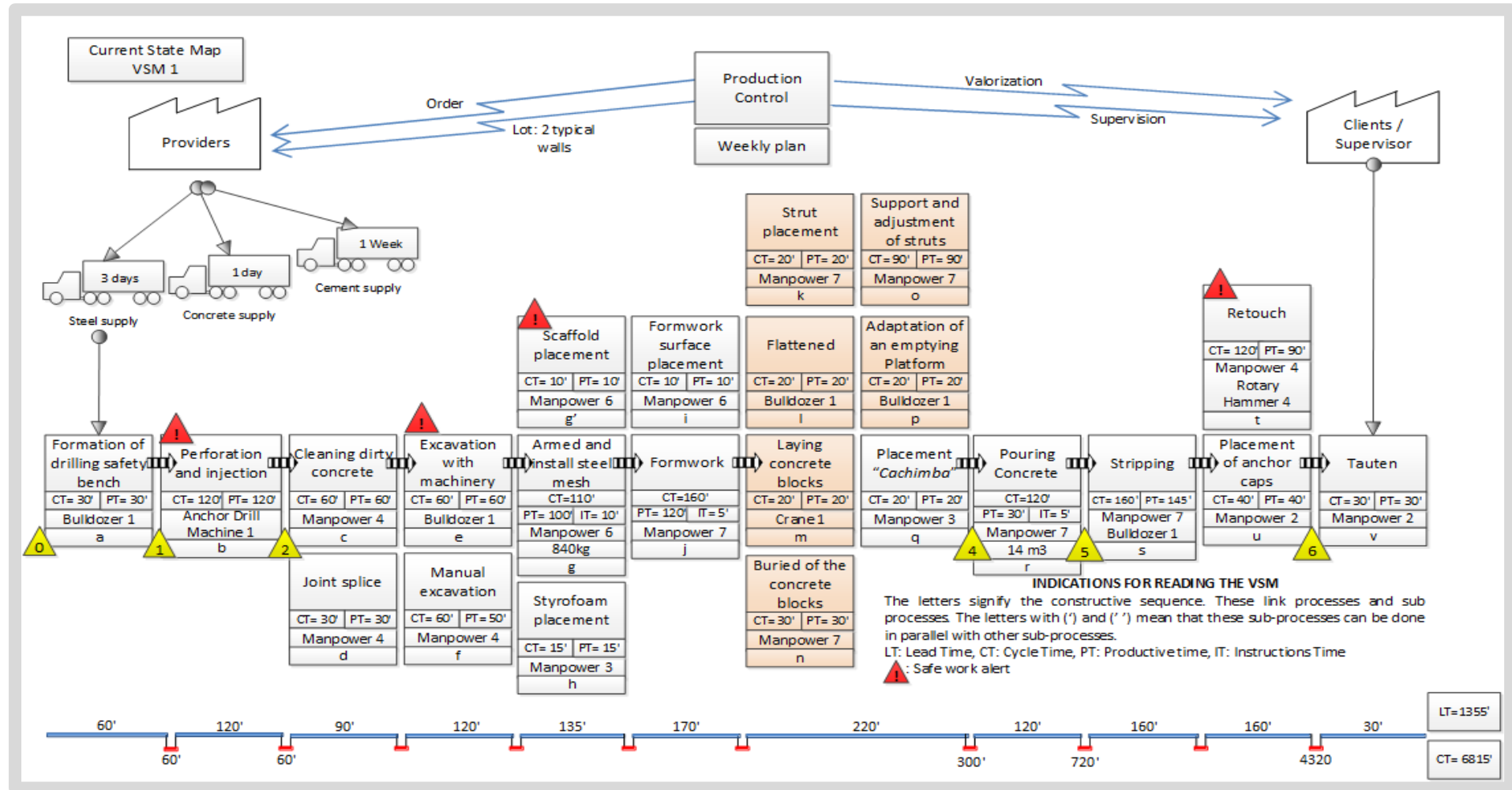


Figure 3. Current State Map (VSM 1)

RESULTS AND DISCUSSION

Solution to eliminate waiting times	
0 Waiting time for removing material from the excavations	Use another elimination system, which may be the conveyor belt (as long as it is identified in which phase of elimination the project is located)
1 Waiting time for the drilling machine	Hire another drilling machine, taking into consideration the space that the project has
2 Wait for space	Use of two simultaneous material removal systems. As well as requesting a greater number of trucks. For both cases, it is necessary to improve the scope with the earthmoving subcontract.
3 Wait time for the formwork panels	Hire more metal panels for formwork, currently there are only 5 panels to formwork.
4 Wait time for the ready-mix concrete to arrive for casting	Have a scheduled end of formwork time and order concrete at that time. It is mainly essential to follow up on the concrete order.
5 Wait time for the concrete to set	Use an additive to achieve concrete strength in less time, and thus also remove formwork in less time.
6 Wait time for tensioning	This waiting time can be approximately 3 days (72h) and depends on the resistance curve of the concrete.



Figure 4. Solution proposals to eliminate waiting times

RESULTS AND DISCUSSION

CURRENT STATE MAP WITH IMPROVEMENTS (VSM 2)

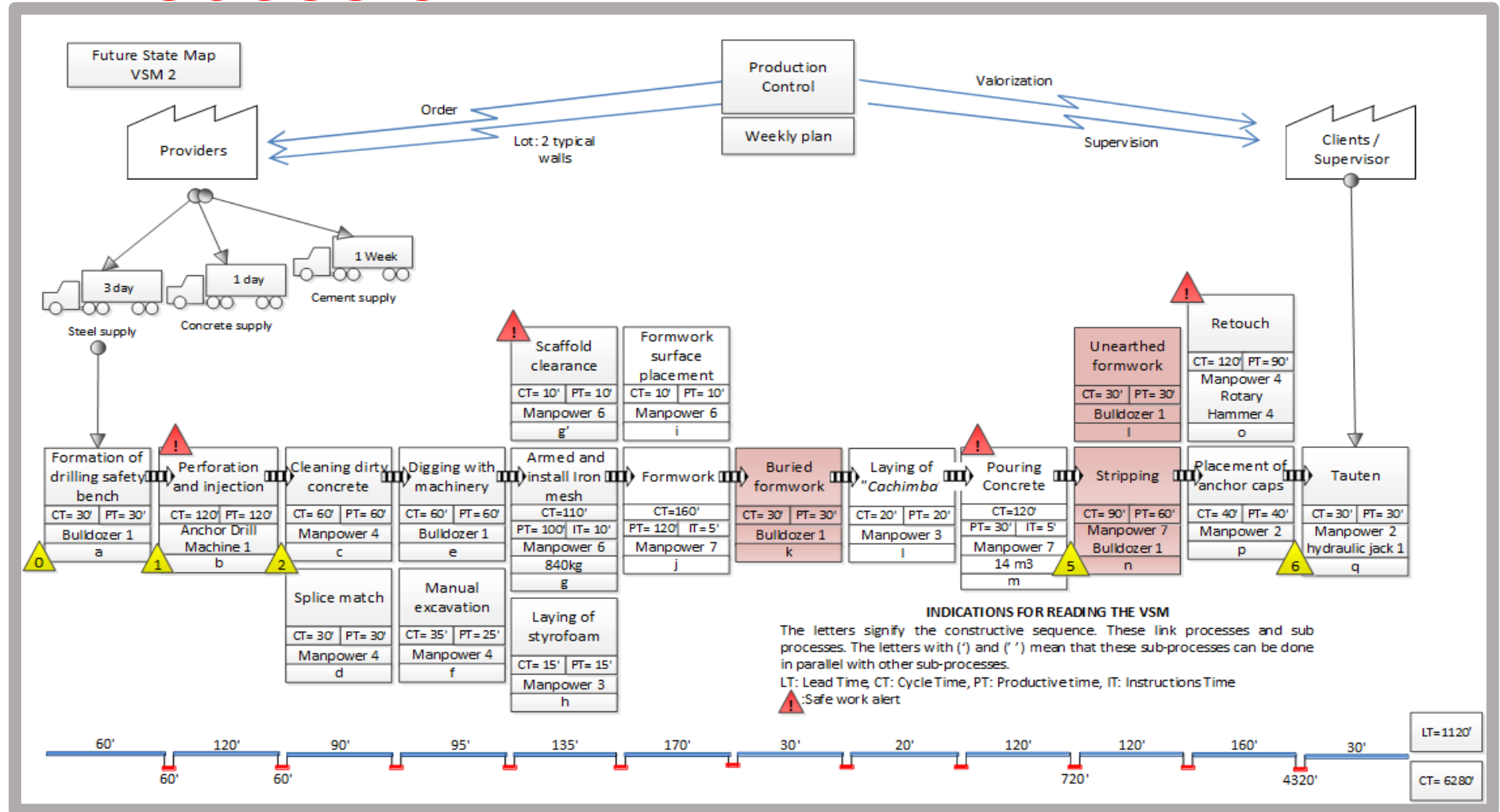


Figure 5. Current State Map with improvements (VSM 2).

RESULTS AND DISCUSSION



Figure 6. Improvements and innovations in basement construction

RESULTS AND DISCUSSION

FUTURE STATE MAP WITH IMPROVEMENTS (VSM 3)

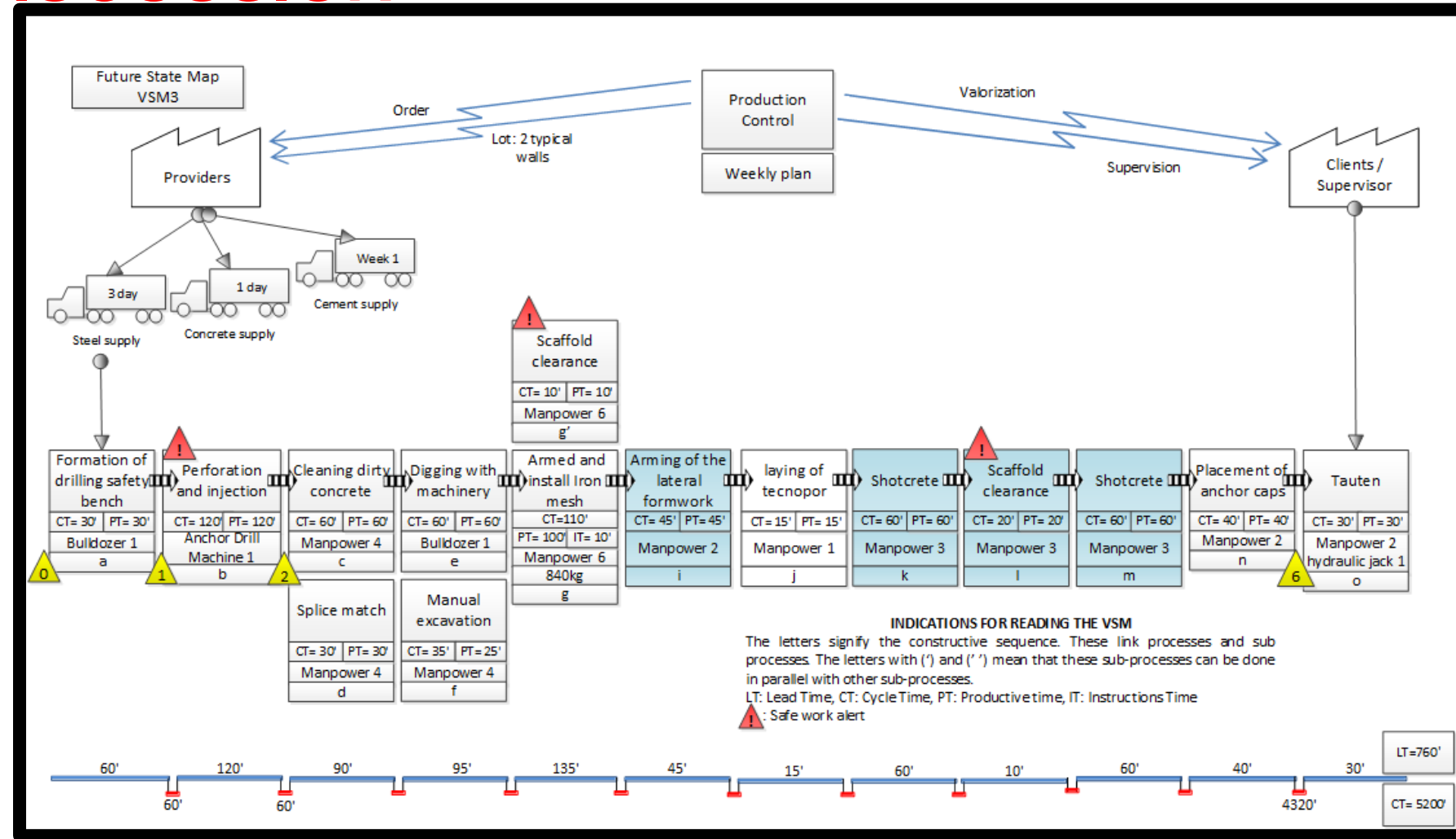
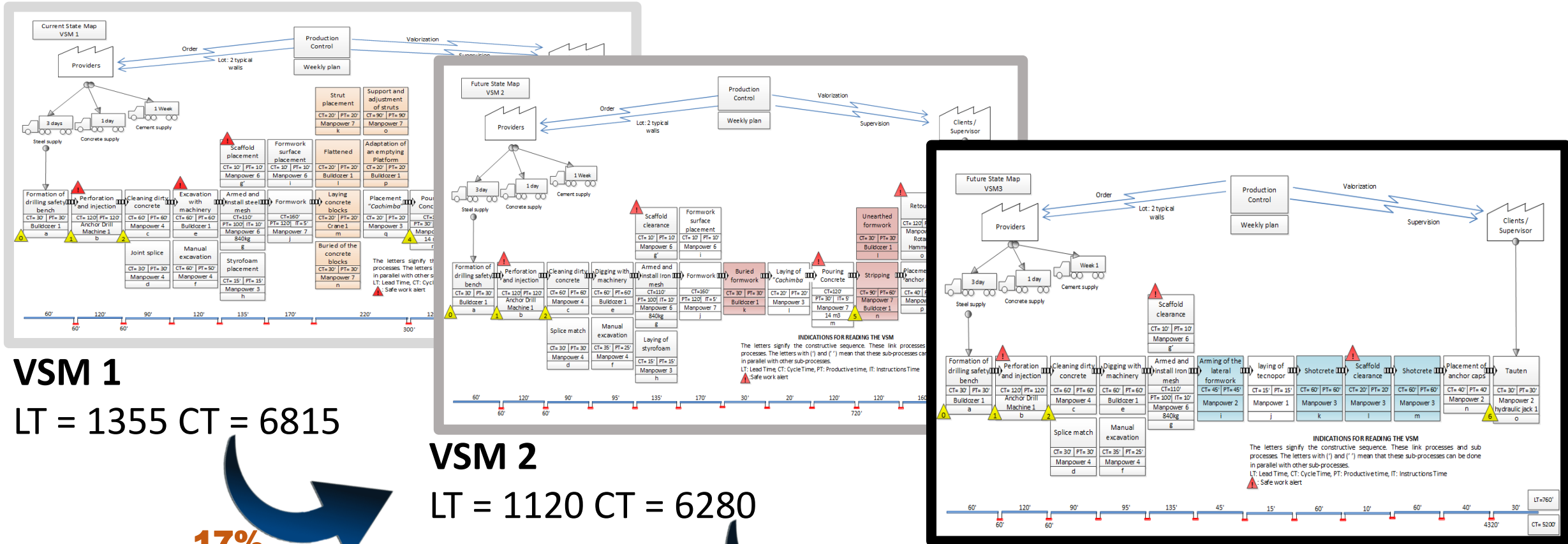


Figure 7. Future State Map with improvements (VSM 3).

RESULTS AND DISCUSSION



CONCLUSIONS

The main contribution of this study is the application of the VSM in projects associated with excavations, where VSM improves the construction system through 3 continuous improvement scenarios



Strategies that were discovered by the project team in a brainstorm, where each idea was valued. The current map with the improvements allowed us to implement some of the proposed solutions.



The future map allows exposing an improvement, reducing the number of activities within the construction system, interruptions, variability times



THANK YOU!



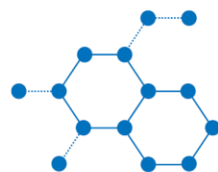
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