Dutch Infra
Who Owns the Schedule Buffers?

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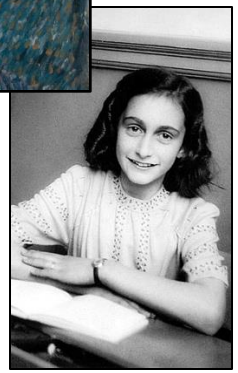
DELIVERING PROJECT INSIGHT

Introduction to The Netherlands

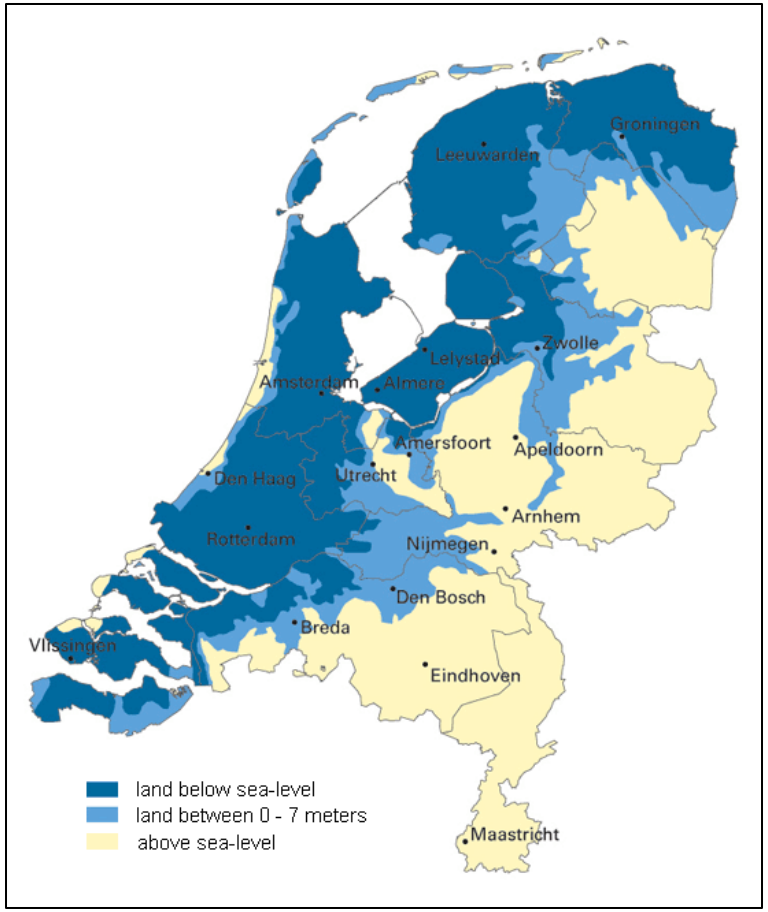
Some Facts

- The Netherlands (also known as Holland)
- 17,8 million people (42.000 km^2)
- Flowers, Clogs, Windmills, Cheese, Bicycles, Famous Painters, Anne Frank & Coffee Shops



The Dutch are a little Crazy

- Water from 2 sides; North Sea and River Delta
- 26% area is below sea-level with our largest cities
- My house is -7 meters (23 feet) below
- Construction projects always have a relationship with (ground)water and protection



Dutch Infra Organisations

- Rijkswaterstaat (Ministry of Infrastructure and Environment)
- Dunes, Dikes, Waterways and Roads

Rijkswaterstaat
Ministerie van Infrastructuur en Milieu

- ProRail
- Railway Infrastructure, Stations and Signals

ProRail

- Hoogheemraadschappen (Local Water Management)
- Maintain Local Water Levels, Environment and Protection

Hoogheemraadschap van Schieland en de Krimpenerwaard

Hoogheemraadschap van Delfland

HOOGHEEMRAADSCHAP DE STICHTSE RIJNLANDEN

waterschap Hollandse Delta

hoogheemraadschap Hollands Noorderkwartier

Schedule Related Project Controls Methods Used

- Critical Path Method Scheduling
- Risman (Risk Management)
- Schedule Risk Analysis
- Buffer (Contingency) Management
- Lean Scheduling (Last Planner)
- Time / Space Visualisation
- 4D Planning
- Building Information Management (BIM)
- Earned Value Management
- … … …

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Consultancy	Project Controls Staffing	Primaned Academy	Tools	Data
				
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Large Infra Projects Building Organisation

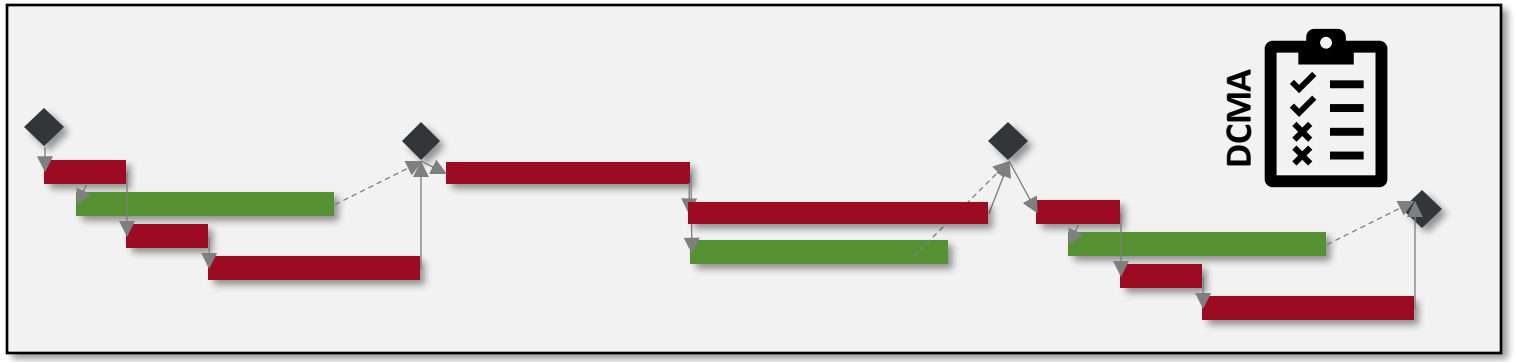
1. Initiative
2. Exploration
3. Planning
4. Execution
5. Manage & Maintain

- Owner has a Phase Approach and starts contracting in the ‘Planning’ Phase
- Different Contractual Forms can be used:
    - Design & Construct, DBM(O), DBFM(O), etc.
    - Depending on size, complexity, requirements and Life Cycle

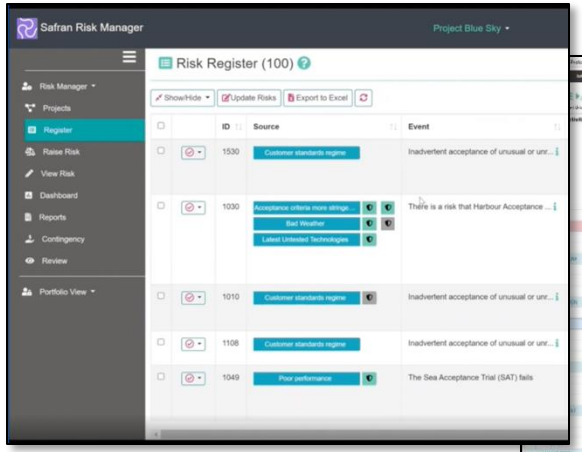
- Collaboration between Owner and Contractor(s) starts during contracting
- How to implement schedule and buffer management?

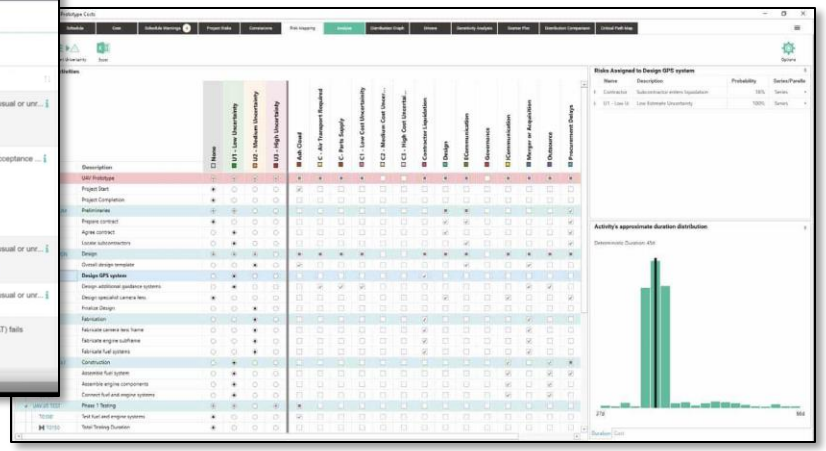
Scheduling and Determining Contingency Buffers

- Main / Decision Milestones
- Network Schedule
- Best Scheduling Practices
- Robust and Dynamic Schedule



- Risk Identification, Assessment and Mapping
  - Uncertainties
  - Risks (Known Unknowns)
  - Linked to the schedule
  - “Unknown Unknowns” to be handled by Owner

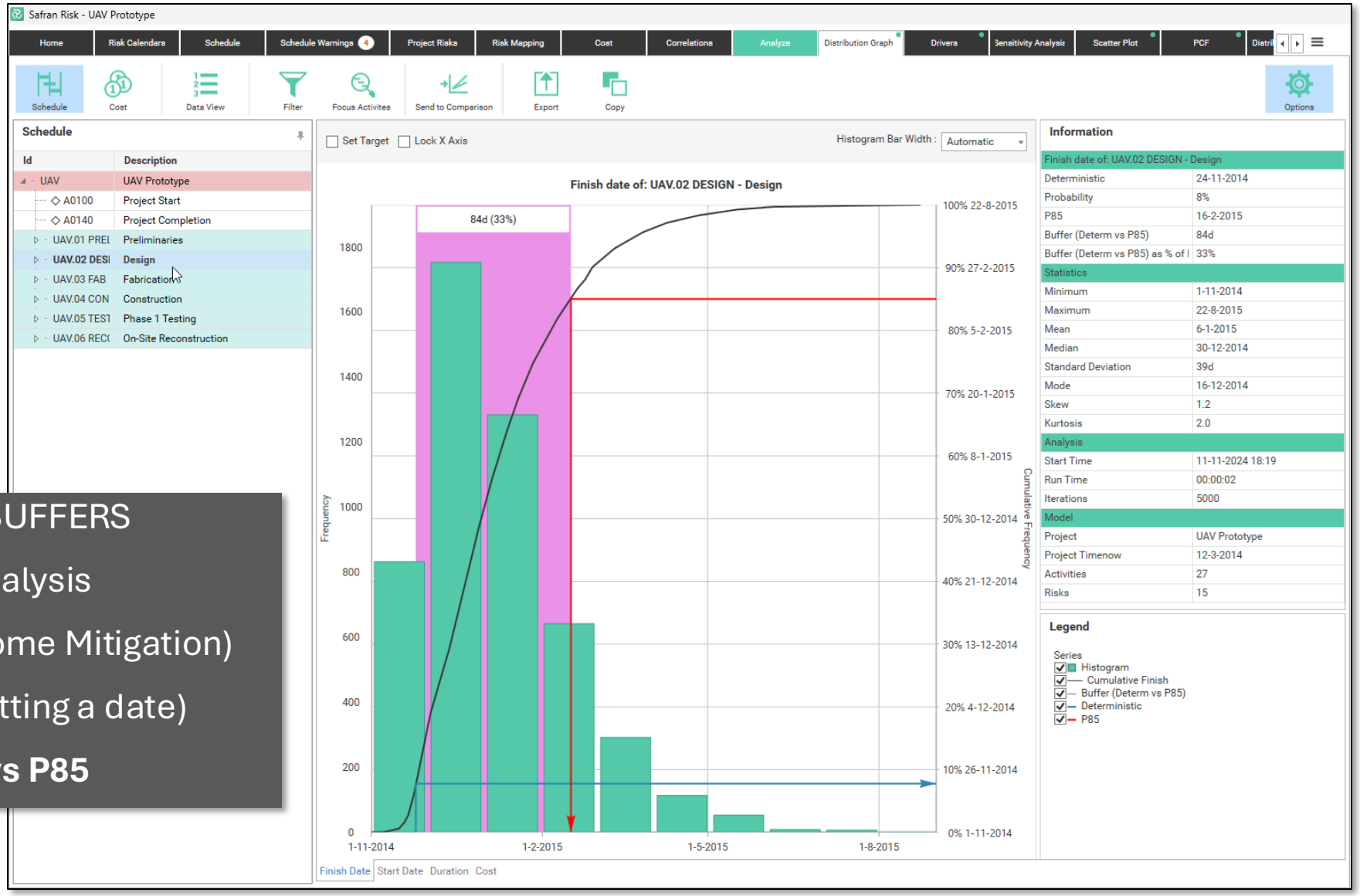




Scheduling and Determining Contingency Buffers

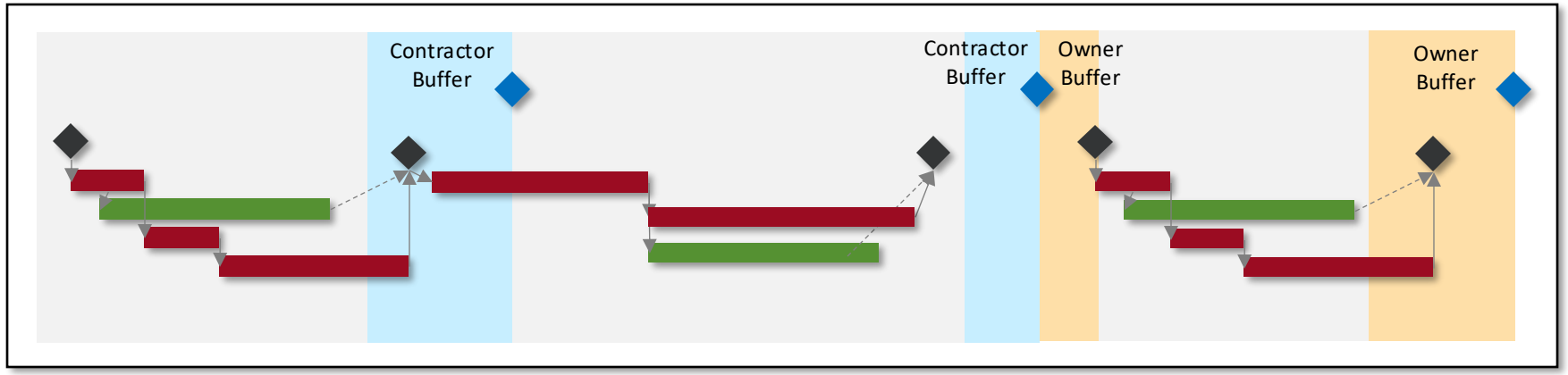
INITIAL CALCULATION OF BUFFERS

- Perform Schedule Risk Analysis
- Risk and Uncertainty (+ some Mitigation)
- Analyse P85 (chance of hitting a date)
- **Buffer → Deterministic vs P85**



Getting a feasible schedule by Adding Buffers

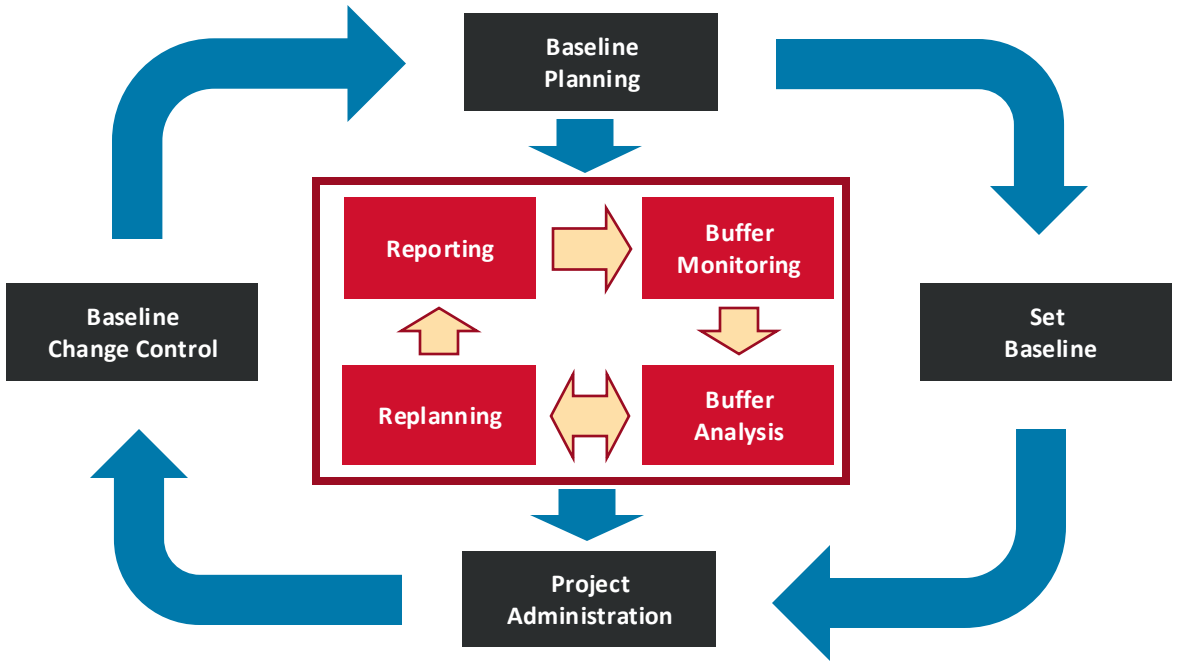
- Buffers (schedule contingencies) are place in multiple places
- Contractor is responsible for buffer proposal
- Adding float / mid-buffers creates a more feasible schedule



- Contractor is responsible for managing and giving insight into their buffers
- Owner adds buffer to end of project and to Major Critical Milestones

Execution Phase Progress and Update Cycle

- Mutual Agreement on initial baseline
- Progress Collection and Reporting Drumbeat
  - Monthly to Owner
  - Bi-weekly within Project Team (Contractors)
- **Buffer Monitoring and Analysis**
- Baseline Change Control
- Reporting contains
  - Schedule update, Deliverables, Registers …
  - **Buffer Incursion Register**



Governance and Reporting on Buffer Utilisation

Contractor Buffer	Original Dur	Remaining Dur	Utilisation	Critical <5d	Proximity of buffer end	Reasons of Usage
Phase A - Object A	20	4	80%		40	Delayed because of bad weather.
Phase A - Object B	30	10	67%		60	Delayed because of bad weather.
Phase A - Object C	20	5	75%		80	Delayed because of late delivery of steel.
Turn-over Moment A	10	10	0%		90	
Tunnel - Object A	15	10	33%		120	-
Tunnel - Object B	15	15	0%		200	
Tunnel - Section A	40	35	13%		240	
Tunnel - Section B	40	40	0%		320	
Fly-over - Object A	30	30	0%		150	
Fly-over - Object B	30	30	0%		195	
Turn-over Moment B	10	10	0%		380	

- Buffer Incursion Register
  - Utilisation of Contractor Buffers
  - Mandatory to Report to Owner
    - Durations and Indicators
    - Reasons
- Owner will not act upon Contractor Buffers, only monitor
- Required to mitigate if buffer is used > 14 days.
- Owner will collaborate to mitigate
- Owner buffer usage using Change Process
- Changes / Major Risk Events lead to Buffer Re-analysis

Who owns the Schedule Buffers Conclusions

- Transparency in Governance
- Mutual risk-aware collaboration, because owner thinks along with contractor to solve and prevent issues
- Increase in (schedule) feasibility
- Incentive for better project administration / registration
- Collaborative and Proactive approach

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