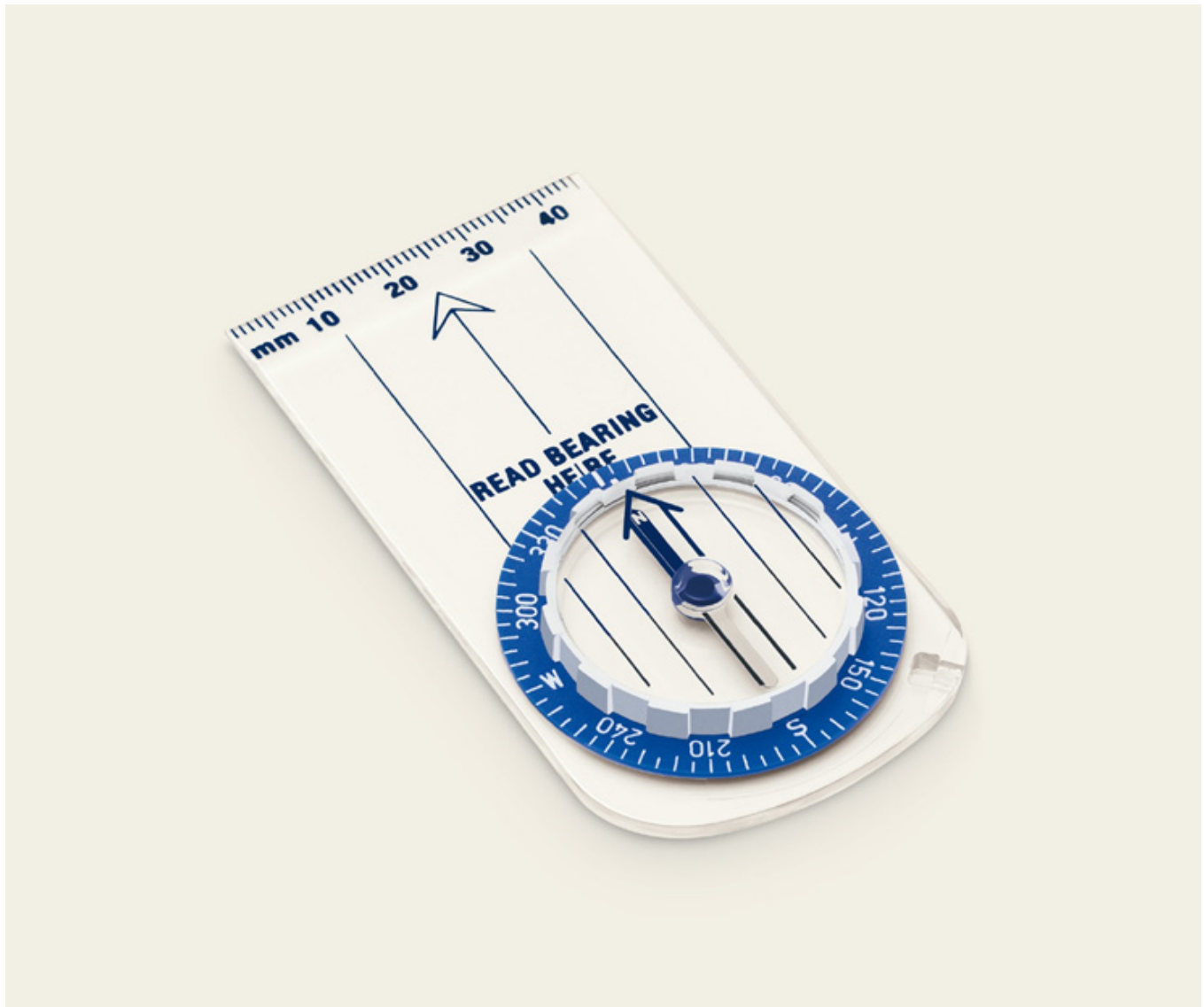


Risk Engineering

Risk Assessment and Risk Improvement

Helping you to understand and mitigate your risks



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General information

Customer Data:			
Parent Company:		Nederlands Instituut voor Zeeonderzoek	
Location Information:			
Assessed Company:		Yerseke	
Assessed Company NAICS Code:		541380	
Assessed Company NAICS Description:		Testing Laboratories	
Assessed Company SIC Code:		8734	
Address:		Korringaweg 7, Yerseke, 4401 NT	
Latitude:	51.48870	Longitude:	4.05694
Multi-Tenant Facility:		No	
Scope of Assessment:			
Assignment Category:		Risk Improvement	
Locale:		On-site	
Risk Gradings:		Property - Fire Property - BI	
Service Data:			
Coordinating Country:		Netherlands	
Servicing Office:		Netherlands	
Assessed by:		Frank Wassenaar	
Date of Previous Assessment:		30 Jul 2014	
Date of Assessment:		18 October 2017	
Distribution:			
Customers: NIOZ Yrseke		Johan Bolt*	
Broker: Meeüs		Jan Peter Bloemendaal	
Underwriters/Zurich Employees:		Odile Swankhuizen	
Additional Recipients:		RE Filing	
		*via Meeüs, Jan Peter Bloemendaal	

Executive summary

Scope and Purpose

This re-visit was conducted on 18 October, 2017 at the Koninklijk Nederlands Instituut voor Zeeonderzoek facility (NIOZ) in Yerseke, The Netherlands.

The purpose of the visit was to perform a risk assessment by Zurich Risk Engineering for Property Damage, Business Interruption and Extended Perils and to provide risk improvement advice if necessary.

The information in this report is based on discussions with representatives of the NIOZ and Aon and upon a plant tour.

Major changes since the risk assessment in 2014

A part of the offices is rented out to the university of Wageningen.

Understanding the Risks at this Location

The Koninklijk Nederlands Instituut voor Zeeonderzoek facility (NIOZ) is the national oceanographic institution for the Netherlands with a division in Yerseke and on the island of Texel.

The main activities are to gain and communicate scientific knowledge on seas and oceans in cooperation with universities and institutions in The Netherlands. NIOZ facilitates and supports fundamental as well as applied marine research and education in the Netherlands and Europe.

The building complex is located directly along the Oosterschelde. Exposures consist mainly of yard storage of the adjacent company. This exposure can be classified as slightly enhanced.

The complex comprises 6 different buildings/structures, see attached layout. The general construction of the main building (#1) is of concrete and masonry and concrete roofs with combustible EPS insulation on top. The building consists of a basement level (with exposed EPS on the ceiling), a ground floor level and partly a first floor. There are no reliable fire separations within this building.

The buildings #1 to #5 are interconnected by a corridor (#2) made of noncombustible materials (steel framing and glass). The general constructions of the buildings #3 - #5 consist of steel frames, steel panel walls and roof with combustible insulation (EPS on the roofs).

The complex comprises offices, workshops, laboratories and small storage areas. In the workshops equipment and apparatus is being developed and built/ assembled. A workshop comprises small scale wood working machines, electronic workshops and small scale welding.

Laboratories are located on ground floor level of the main building. Most of the laboratories are involved in microbiological research and investigation for algae, bacteria, grazers and viruses in the open sea environment.

Test rooms (large climate chambers) are located in the MESO complex (#5) for research and study of behaviors of life stock like for instance algae and viruses. Some of these studies can last for several weeks or months.

Small amounts of nuclear sources are present on site. Radio-isotopes are used to for dating sediments and for estimating biogeochemical rates. The storage, handling and disposal are by legally demanded qualified radiation experts and meet the Dutch Nuclear Legislation.

The total number of employees covering both this Texel and the Yerseke locations is approx. 400 of which approx. 100 are located in Yerseke. Operations take normally place in dayshift, but researchers have 24/7 access to their test environments.

The housekeeping conditions are good. Hot work procedures are subject for improvement (risk improvement advice). The state of repair of utility equipment like for electricity and gas supply is good. Safety procedures are fully implemented and can be rated as good.

Process hazards are limited to laboratory scale with electrically heated stoves and climate chambers with adequate safeguards, small scale wood working and welding as well as storage of small amounts of

flammable liquids in adequate safety cabinets, fume cupboards and a detached dedicated building. The temporarily test setups however are subject to improvement (risk improvement action).
The fire load is generally low to moderate and enhanced in some of the storage areas and in the wood working department.

The main building is provided with aluminum lightning conductors, according to the Dutch standard NEN 1014, class LP2. The system is inspected annually by contractor.

The volunteer fire brigade of Yerseke is familiar with the site and can access the site within 15 minutes. Water for firefighting can be obtained from hydrants in the public road and from the Oosterschelde. An adequate quantity of annually inspected manual extinguishers and hose reels is present in all buildings. A sufficient number of employees receive annual training in the use of manual firefighting equipment.

The site does not benefit from an automatic fire detection system and only manual push buttons are installed throughout the buildings. The fire alarm of the manual push buttons is transmitted to the fire brigade by guarded line.

The site is partly fenced off at the front side from the public road. Complete covering electronic intrusion detection has been installed utilizing motion detectors. There is an access control present with several levels of clearances. The intruder alarm is transmitted to a private alarm station by guarded line.

The fire prevention and protection measures have to be classified as substandard and can improve after installing a selective automatic fire detection system (risk improvement action).

Business interruption/ extra costs

The NOIZ is subsidized by the "Nederlandse Organisatie voor Wetenschappelijk Onderzoek" (NWO). Furthermore assignments are generated by third party companies.

Extra costs are insured up to EUR 1.2 million over a period of 12 months.

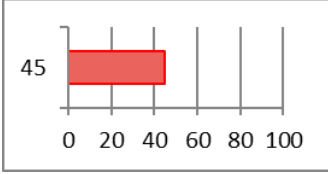
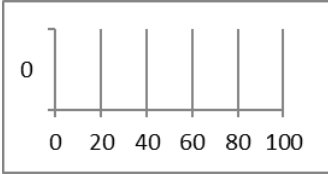
After a major calamity like an uncontrolled roof fire, reconstruction/ renovation of the building will take about at least 12 months.

There is a central server room in in the main building with the mail server of the NIOZ group. Computer data are well backed-up at a third party server location (VANCIS Almere).

Participants at the risk assessment and risk improvement visit

Johan Bolt, Manager Finance NIOZ
Jan Peter Bloemendaal, Meeûs Groningen
Frank Wassenaar - Zurich Risk Engineering

Risk grading overview and graphic

Risk Grading	Benchmark Percentile**	Benchmark Name	Risk Grading Overall Scores *	
			As Is	To Be
Property - Fire (Jul 11)		Property - Fire FY2016	89 (Good)	63 (Good)
Property - BI (Oct 11)		Property - Business Interruption YE2013	88 (Good)	88 (Good)

* Low values indicate low risks

** Example: "Percentile = 35" means that the assessed risk is among the 35% best risks of the indicated benchmark.

Abstract on risk improvement action

Onsite Date	RIA	RIA ID	Completion Status	Action Title	Priority
30 Jul 2014		00006	Not yet actioned	Automatic Fire Detection	Advisory

Loss history

Year	Month	Amount	Description
			No major losses reported.

Property loss scenarios

Summary of Loss Scenarios

Property Fire and Business Interruption

Scenario No. 1	Worst case	Condition	EML
A fire during idle hours in the main building (#1) would only be detected by local residents or adjacent companies if the fire is in developed stage. With delayed fire fighting the fire would spread throughout this building. The fire could be stopped at the corridor between buildings #1 and #2 due to the distance the fire has to travel in and the lack of combustibles. The effect on property damage is expected to be approx. 65%. The effect for the premier risk BI amount is 100%.			
Loss Potential Fire + BI	16,161,050		
Loss potential property	14,961,050	PD Loss % of TSI PD	65%
Loss potential BI Loss	1,200,000	BI Loss % of TSI BI	100%

Scenario No. 2	Normal conditions	Condition	PML
A fire during idle hours in the main building (#1) would only be detected by local residents or adjacent companies if the fire is in developed stage due to the lack of a fire detection system. With delayed fire fighting the fire would spread throughout this building. The fire could be stopped at the corridor between buildings #1 and #2 due to the distance the fire has to travel in and the lack of combustibles. The effect on property damage is expected to be approx. 65%. The effect for the premier risk BI amount is 100%.			
Loss Potential Fire + BI	16,161,050		
Loss potential property	14,961,050	PD Loss % of TSI PD	65%
Loss potential BI Loss	1,200,000	BI Loss % of TSI BI	100%

Currency: EUR

EML EML (Estimated Maximum Loss) is the largest monetary loss (property damage plus business interruption when coverage is provided) within one (fire) area that may be expected to result from a single fire when this is the governing factor, or other insured peril, with (fire) protection impaired, and the control of fire is mainly dependent on physical barriers or separations and delayed manual fire fighting by public and/or private fire brigades.

PML PML (Probable Maximum Loss) is the largest monetary loss (property damage plus business interruption when coverage is provided) within one (fire) area that may be expected to result from a single fire when this is the governing factor, or other insured peril, with private and public protection systems in service and manual fire fighting unimpaired.

PD Property Damage

BI Business Interruption

TSI Total Sum Insured. In case of PD the TSI is equivalent to declared property values for buildings, machinery/equipment and stock/ others. In case of BI the TSI is Annual Gross Profit/Gross Earnings multiplied by the indemnity period in years. Loss Scenario Overview-Property: The 100% base stands for TSI (PD + BI); all percentages (PD and BI values as well as EML and PML for both PD and BI) relate to that 100% base. Property Loss Scenarios: The 100% base in the tables stands for TSI PD & TSI BI respectively; percentages (PD and BI Loss % of TSI) relate to those 100% bases.

Risk factor information and assessment

Property - Fire - Risk Grading

Location	Yerseke		
Scope	Primary	Rating	
Description		As Is	To Be
Construction			
Risk Improvement Action Numbers			
Fire Divisions		A	A
Comments	PML approx. €13 mln and is limited by physical separation and manual intervention fire brigade.		
Building Combustibility		C	C
Comments	(very) combustible EPS on concrete roof main building and on steel decks maintenance and storage buildings. MESO building presumed to have combustible insulation (roof and internal).		
Management Programs			
Risk Improvement Action Numbers			
Hot Work / Contractor Controls		C	B
Comments	Safety procedure to be improved, RIA		
Housekeeping and Smoking Controls		B	B
Comments	Adequate housekeeping conditions.		
Training Employees Regarding Safety		B	B
Comments	Annual training for first intervention team including hands-on for manual firefighting equipment. New employees receive general safety instructions. Typical exposure with good training and information.		
Maintenance Procedures		B	B
Comments	Outsourced preventive and scheduled maintenance. Typical exposure with scheduled maintenance.		
Management Practices		B	B
Comments	Local management has a very positive attitude regarding maintenance and (fire) safety and showed positive awareness. The housekeeping conditions and waste processing are at good level.		
Fixed Fire Detection and Protection			
Risk Improvement Action Numbers			
Fixed Fire Protection Including Sprinklers		C	C
Comments	Site does not benefit from a sprinkler protection, PML reduction MUSD < 10 due to possible smoke, soot and water damage.		
Fire Detection		D	C
Comments	Site does not benefit from an automatic fire detection system, only manual push call buttons for an orderly evacuation, RIA.		
Utility and Incidental Hazards			
Risk Improvement Action Numbers			

Electrical Systems and Equipment	B	B
Comments	NEN 3140 monitoring performed 2015. Typical exposure and very good systems.	
Heating and Cooling	B	B
Comments	Well maintained systems. Typical exposure and good controls.	
Incidental Hazards	B	B
Comments	No deviations observed.	
Process Hazards		
Risk Improvement Action Numbers		
Control of Process Hazards	B	B
Comments	ATEX studies are performed. The process hazards are relatively low and very well controlled. Typical exposure and good controls.	
Flammable Liquids, Gases & Dusts Fire and Explosion	A	A
Comments	In general very well-handled and stored in adequate safety cabinets or fixed and stored in an outside building. Typical exposure and very good controls.	
External Exposures / Arson		
Risk Improvement Action Numbers		
External Exposures	B	B
Comments	Yard storage of adjacent company consisting of idle pallets at 10 meters distance from the MESO building. Idle pallets are stored at some distance from the public road and there is no storage of NIOZ in between.	
Arson	A	A
Comments	Low arson exposure and good controls (fenced area, electronic security)	
Yard Storage	B	B
Comments	Limited combustible yard storage present near the buildings at the back of the building.	
Manual Fire Fighting		
Risk Improvement Action Numbers		
Fire Team	B	B
Comments	BHV team which support the fire brigade during business hours. Adequate numbers of hose reels and portable extinguishers.	
Fire Brigade and Water Supply	B	B
Comments	Low manual fire extinguishment challenge and good controls. Volunteer fire brigade of Yerseke with a arrival time within 20 minutes and access to public hydrants and open water.	
Risk Grading Scores*	89	63
Risk Quality Level	Good	Good
Benchmark (percentile rank**) Property - Fire FY2016	45	

Property - BI - Risk Grading

Location	Yerseke
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Scope	Primary	Rating	
Description		As Is	To Be
Susceptibility to Business Interruption			
Risk Improvement Action Numbers			
Property Fire Risk Grading		B	B
Comments	Result Fire Grading		
Standard Features/Resources of Site			
Risk Improvement Action Numbers			
Building and Structure		C	C
Comments	12 months replacement time.		
Equipment		B	B
Comments	Up to 3 months replacement time		
Own Utilities		A	A
Comments	Quick replacement possible.		
Process Control		B	B
Comments	Good controls.		
Process Support		B	B
Comments	Good controls but special technical equipment.		
Stock, Work in Progress and Bought-in Component/Sub-assemblies		B	B
Comments	Some long test runs but low contribution.		
Overall Resilience of Site			
Risk Improvement Action Numbers			
Overall Resilience of Site (without Off-Site Alternatives)		C	C
Comments	In general low exposure occupancy, detached buildings.		
Spare Capacity within the Group		C	C
Comments	Most of the equipment is available in Den Hoorn, Texel. However depending on capacity etc and against higher costs.		
Assistance From External Companies		C	C
Comments	Not expected.		
Seasonal Influences		B	B
Comments	Limited due to required tests and the environments.		
External Influences			
Risk Improvement Action Numbers			
Interdependencies within the Group		B	B
Comments	No interdependencies expected.		
Contingent Business Interruption		B	B

Comments	No CBI exposure.	
Restoration of 3rd Party Utilities	A	A
Comments	Quick replacement.	
Market Position / Consequences	A	A
Comments	Strong and well known name/institute, low effect.	
Management of Business Resilience		
Risk Improvement Action Numbers		
Business Continuity Management	B	B
Comments	No requirement.	
Risk Grading Scores*	88	88
Risk Quality Level	Good	Good
Benchmark (percentile rank**) Property - Business Interruption YE2013	0	

* Low values indicate low risks

Risk Quality Level Scale: Excellent: <51; Good: 51-100; Fair: 101-150; Poor: >150

Risk Factor Scale: A (Best) ↔ B ↔ C ↔ D (Worst); E: Not Assessed

** Example: "Percentile = 35" means that the assessed risk is among the 35% best risks of the indicated benchmark.

Natural hazards and additional perils

Peril	Rating	Comments
Natural Hazards		
Earthquake	None/Very Low	Nathan Munich Re: Zone 0
Flood – Water Bodies	Low	Swiss Re: No exposure river flood, coastal flood return period 1:4000 years. Directly located to the Oosterschelde.
Flood - Precipitation (Pluvial)	Low	Good drain systems and no loss history
Flood by Earth Movement	None/Very Low	No exposure, flat land
Hailstorm Hazard	Medium	Nathan Munich Re: Zone 3
Lightning	Low	Nathan Munich Re: Zone 2
Wind - Tropical Storm	None/Very Low	Nathan Munich Re: No Hazard
Wind – Extra Tropical Storm (Winter Storms)	High	Nathan Munich Re: Zone 3
Tornado	Medium	Nathan Munich Re: Zone 3
Subsidence	None/Very Low	No exposure, flat land
Landslide	None/Very Low	No exposure, flat land
Active Volcano	None/Very Low	Nathan Munich Re: No Hazard
Additional Perils		
Impact / Collision	Low	Some truck movements
Water Damage	Medium	Flat roofs and specific laboratory equipment
Theft	Low	Office and laboratory equipment, intrusion detection and access controls
Aircraft	None/Very Low	No airport within 8 km
Terrorism	None/Very Low	No threat

Risk improvement action

RIA	Automatic Fire Detection				Advisory
RIA ID 00006	Completion Status	Not yet actioned			
	Onsite Date	30 Jul 2014	Target Implementation Date	31 Dec 2015	
Description	Observation This location of NIOZ does not benefit from an automatic fire detection system. Several areas such as the technical rooms are critical for this kind of occupancy. Action It should be considered to install a (selective) automatic fire detection system in the most essential technical areas of NIOZ. Thge alarm can be transmitted via the alarm of the burglary detection system. Status 2017 Still open.				
Update					
Cost Classification	Capital Expenditure		Customer Category		

Final remarks

The good cooperation during the risk assessment by de NOIZ representative Biem Trap is very much appreciated.

You are kindly requested to respond on the risk improvement advice within 60 days after receipt of the report.

If there are any questions regarding the report or the risk improvement advice or any other (fire) safety issues please do not hesitate to contact Zurich Risk Engineering.

Frank Wassenaar

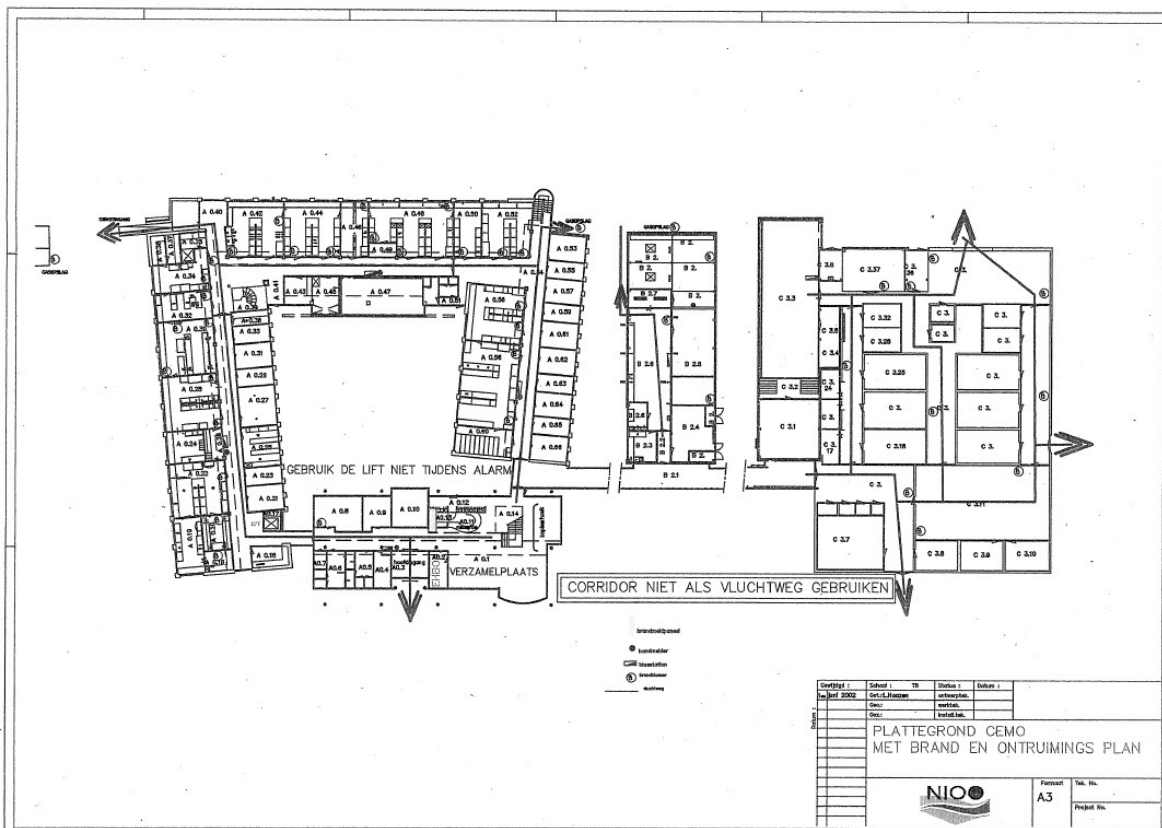
frank.wassenaar@zurich.com

Site Layout



Legend:

1. Main building – offices and laboratory
2. Corridor
3. Maintenance shop
4. Storage building
5. MESO complex – test rooms
6. Green house



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