

WORLD HERITAGE LIST

Wouda Pumping Station (The Netherlands)

No 867

Identification

<i>Nomination</i>	Ir. D.F. Woudagemaal (D.F. Wouda Steam Pumping Station)
<i>Location</i>	Lemmer, Lemsterland Municipality, Province of Friesland
<i>State Party</i>	The Netherlands
<i>Date</i>	26 June 1997

Justification by State Party

The D.F. Wouda Pumping Station consists of a group of combined buildings and structures of outstanding universal value as a monument of industry and technology because of its scientific and cultural-historical value and because it is unique, authentic, flawless, and distinctive. As the largest steam-powered pumping station in Europe, and since it is still operational, it is of undisputed special value as an industrial archaeological monument.

The Pumping Station, the inlet sluice at the Teroelsterkolk, the Afwateringskanaal, the outlet in front of the pumping station and at the inlet sluice, the sea dikes along the IJsselmeer, with the pumping station itself functioning as a sea barrier, and the surrounding wide expanse of pasture lands, has an outstanding value as a whole and is of high visual quality with respect to the landscape.

It meets *criteria i and iv* because:

- it represents the height of the 19th and 20th century technical and technological history of water management and the use of steam as a source of energy, and still operates as such;
- its is exceptional because of its precisely executed architecture and because of its size and its value as a technical property;
- it keeps alive the period in the history of drainage from the mid 19th century to the early 20th century - the era of steam-powered pumping stations;

- the original design, the machinery, and the location have remained unchanged since its construction, and the designed functional structure of the surrounding landscape has undergone no changes or interventions.

Category of property

In terms of the categories of cultural property set out in the 1972 World Heritage Convention, this is a *group of buildings*.

History and Description

History

Centuries of battling against water has created the Dutch landscape. Much of the territory of The Netherlands would be flooded if it had not been protected by building dikes over the centuries and kept dry by means of a sophisticated water-control system (*waterstraat*). Continuous efforts to drain lakes and open waters in the west of the country began in the 17th century and continue to the present day.

Excess water was initially discharged by means of windmills, which pumped it successively into intermediate reservoirs and then into open water. This system is admirably represented by the Kinderdijk-Elshout mill network, inscribed on the World Heritage List in 1997. The first use of steam for pumping was in 1825 at the Arkelse Dam, near Gorinchem. Radial or centrifugal pumps replaced the water-wheels driven by windmills. Initially manufactured in England, these pumps were being made in The Netherlands by the beginning of the 20th century.

The construction of steam-driven pumping stations reached its peak between 1870 and 1885; very few new ones were built after 1900. It is estimated that there were about 700 in operation between 1900 and 1910. The first diesel-powered pumping station was built in 1904, and shortly afterwards electricity began to be used as the energy source. At the present time there are about 1600 active pumping stations in The Netherlands, the majority of them electrically powered.

In Friesland, where the nominated property is located, the construction of dikes began around AD 1000. The water was first drained off naturally but, as the area of reclaimed grew, it became necessary to discharge it into the network of interconnecting lakes and waterways known as the Frisian reservoir. This has been managed since 1648 by the Provincial Government of Friesland.

Flooding was a regular occurrence, and the first communal ordinance to keep the sea dikes in good order was enacted in 1533. The catastrophic All Saints' Flood of 1570 resulted in all the low-lying land in the Province being inundated. In 1825 over 100,000ha of low-lying land was flooded when dikes burst, among them that at Lemmer, on the Zuyder Zee side of the Province. As a result a sluice was built there and the dikes were reinforced.

The second half of the 19th century saw considerable developments in the water-management system in the

Province: this is demonstrated by the fact that in 1876 around 60,000ha of land were flooded when water levels in the reservoirs were high, whereas this had fallen to c 3000ha by 1993. Water was drained into the Lauwerszee, which served as a storage reservoir from which water was then discharged into the Zuyder Zee.

Flooding in 1894 led the Ministry of Transport to form a committee to devise a new system for dealing with the situation. As a result of its recommendations, and those of a committee set up by the Province of Friesland, it was decided to reclaim the Lauwerszee and drain the south-western part of the Province. After some delay the decision was taken to build two new pumping stations along the southern coast of Friesland, with a combined capacity of 1575hp. The Provincial Government approved the construction of the first of these, along with a sea lock connected to the pumping station by a drainage canal, in 1913. The architect was the Chief Engineer of the Provincial Water Authority, Dirk Frederik Wouda (1880-1961), after whom it was renamed in 1947. Professor J C Dijkhoorn of the Technische Hogeschool Delft was responsible for the mechanical installations.

Construction began in 1916 and the new pumping station was opened in 1920. A new inlet sluice was built in 1936-38, to the east of the pumping station. Damming of the Zuyder Zee in 1932 led to the level of water in what was now known as the IJsselmeer falling to such a low level that it was no longer possible to discharge by means of the sluices on the southern and western coasts of the Province: it is now drained into the Wadden Sea.

Description

The Wouda Pumping Station complex is located along the IJsselmeer, west of Lemmer in the Municipality of Lemsterland. The pumping station is located at the end of a supply canal, dug in 1915, the Stroomkanaal and the Afwateringskanaal, through which the waters of the Frisian Reservoir flow into the IJsselmeer through the Groote Brekken lake. The inlet sluice built in 1936-38 is located a little to the east at the Teroelsterkolk.

To the west of the pumping station is the Princess Margriet Lock and canal, in use since 1951 to handle the heavy traffic from the IJsselmeer. This important feature, which is not included in the nomination, is separated from the pumping station by a stretch of open land which does form part of the nominated property.

The pumping station proper, which is an integral part of the sea dike, consists of a boiler house with annex, an engine room at right-angles to it, also with sluice, and the detached chimney. Four modern storage tanks painted green are hidden behind trees. The former open coal-storage area at right-angles to the boiler house is partly hidden by an inclined wooden palisade. Some distance away there are two houses (originally four but now converted) for the use of personnel, and there is a larger, more villa-like house beyond them.

The design of the buildings is austere and lacking in decoration, characteristic of Dutch architecture of the beginning of the 20th century, and in particular of the monumental style favoured for industrial projects.

The engine room, measuring 62m by 15m by 16.40m ridge height, is built on wooden piles covered by a thick bed of reinforced concrete. It has an open steel-framed pitched roof covered with tiles. Above the basement, 0.80m below sea level, where the condensers and filters are located, is the main hall, housing the four steam engines and centrifugal pumps. The engines run on superheated steam at 320°C and 14kg/cm². Their flywheels are 6.50m diameter and each weighs 6.5tonnes. Under normal operating conditions they pump 65m³/s, and this can be increased to 70m³/s when the water level is high. Between 1970 and 1989 an average of 84 million m³ of water was pumped annually into the IJsselmeer, working only at peak periods for an average of 367 hours a year.

On the exterior, there is a wide slightly projecting middle gable on both sides, flanked by two smaller gables arranged symmetrically. On the north (reservoir) side, there are seven brick piers which form eight suction tubes 6.42m wide that supply the eight centrifugal pumps in the engine room. On the south (IJsselmeer) side three heavy piers create four openings with storm doors which were originally used before the Zuyder Zee had been dammed and so was subject to tidal surges. They are no longer used for this purpose, but act as conduits for the outlet tubes of the centrifugal pumps.

The boiler house is similar in construction to the engine house but only half its size (31m by 16m). It houses four flame-tube water boilers, each 3.60m diameter by 5.30m long with heating surfaces of 220m². They are now oil-fired, having been converted from coal firing in 1967. Two can generate the steam required to run the pumping engines at 90 rev/min, the most cost-effective speed; a third is brought into operation when it is necessary to increase the speed to 105 rev/min. A fourth boiler is always kept in reserve.

The octagonal base of the brick chimney is built on a reinforced concrete foundation. It is 55m high, tapering from 6.25m diameter at its base to 3m at the top.

Management and Protection

Legal status

The property is designated as a monument under the provisions of Article 6 of the 1988 Monuments Act and inscribed on the State Monument Register. All interventions require official authorization.

In the Municipal Plan of Lemsterland the property is located within the area covered by the Kalmond zoning plan, which defines land use zones and imposes restrictions on the nature and appearance of new constructions within this area. The Wouda Pumping Station is located within an area reserved for hydraulic purposes. This plan forms part of the comprehensive Netherlands planning system, created by the Environmental Planning Act 1962 (revised 1996), which requires the formulation and regular updating of land-use plans (in this case the 1994 Friesland Plan (*Streekplan Friesland*)).

There is also comprehensive legislation relating to water management, stemming from the Water Management Act 1989 (revised 1995). This requires water managers to produce Water Management Plans, the first of which for Friesland covered 1992-95.

Management

Ownership of the Pumping Station, the neighbouring houses, and the Teroelsterkolk (pool) was transferred in December 1993 by the Province of Friesland to the Waterschap Friesland (Friesland Water Board), a public body which assumed responsibility for the management of water quantity and quality.

The Board maintains the Pumping Station as a working industrial museum. It has a planned management budget for the period 1997-2000 that provides for renovation of roofs and brickwork, repairs to banks, survey and repair of boilers, conservation of pumps, and other projects.

Conservation and Authenticity

Conservation history

As a working pumping station, the property has been subject to regular maintenance in order to keep it in perfect working order ever since it was built. A number of major renovation projects were undertaken when the Friesland Waterschap took over responsibility, as part of a long-term programme (see above). These have been made possible by substantial subventions from the Government Grant Scheme for the Restoration of Monuments.

Authenticity

The authenticity of the Wouda Pumping Station complex may be deemed to be total, since in form, materials, and functions its state is virtually identical with that when it was opened in 1920. The only significant change was the replacement of the eight original boilers by four larger-capacity installations in 1955, and their subsequent conversion from coal to fuel-oil firing twelve years later.

Evaluation

Action by ICOMOS

A TICCIH expert visited the property in November 1997 at the request of ICOMOS.

Qualities

The Wouda Pumping Station is exceptional as being the largest and most powerful steam-driven installation for hydraulic purposes ever built, and one that is still successfully carrying out the function for which it was designed. It is a masterpiece of the work of Dutch hydraulic engineers and architects, the significance of whose contribution in this field is unchallenged.

Comparative analysis

It was the largest and technologically the most advanced steam pumping station in the world when it was built, and it has remained so.

ICOMOS recommendations for future action

There is a small plastic-roofed building in the former coal stockage area (which is otherwise well maintained) that serves no purpose and is unsightly; this should be removed.

More seriously, there is a project for the erection of a small shipyard, to produce boats of early types, within the buffer zone. ICOMOS feels that this should be reconsidered, since it introduces a discordant element into surroundings that are otherwise in harmony with the nominated property. It is also likely to result in the intrusion by tourists and others into an area traditionally maintained as open space.

In the event of the property being inscribed on the World Heritage List it is likely that visitor numbers will increase significantly. It is therefore desirable that plans be put in hand to create an adequate parking area some 500m from the station itself, and some form of reception and interpretation facility within it.

Brief description

The Wouda Pumping Station, opened in 1920, is the largest steam-pumping station ever built, and is still in operation. It represents the apogee of the contribution made by Dutch engineers and architects to the protection of people and their lands against the natural forces of water.

Recommendation

That this property be inscribed on the World Heritage List on the basis of *criteria i, ii, and iv*:

Criterion i: The advent of steam as a source of energy provided the Dutch engineers with a powerful tool in their millennial task of water management, and the Wouda installation is the largest of its type ever built.

Criterion ii: The Wouda Pumping Station represents the apogee of Dutch hydraulic engineering, which has provided the models and set the standards for the whole world for centuries.

Criterion iv: The Wouda pumping installations bear exceptional witness to the power of steam in controlling the forces of nature, especially as applied to water handling by Dutch engineers.

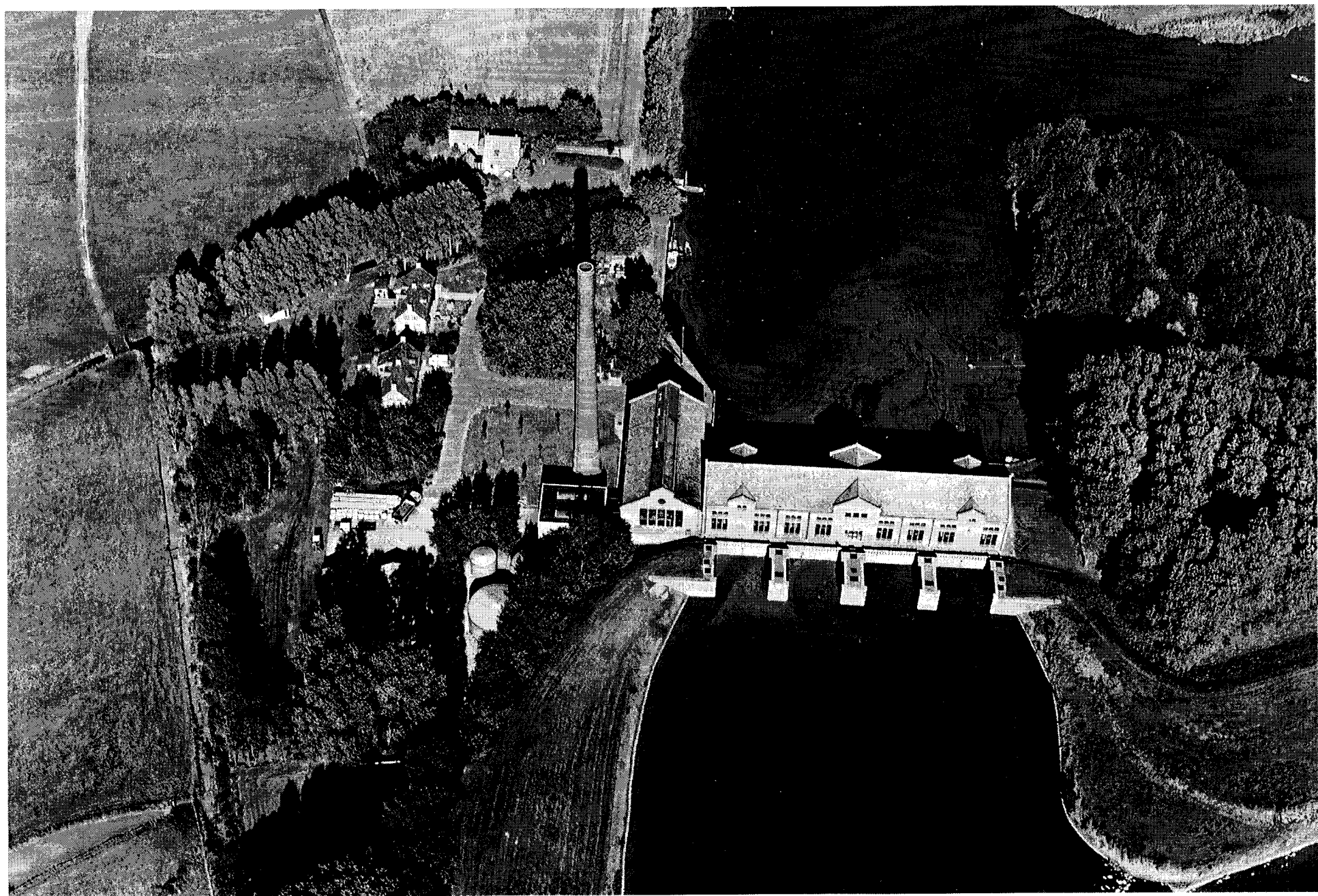
ICOMOS, October 1998



**Ir. D.F. Woudagemaal (Station de pompage à la vapeur de D.F. Wouda) / Ir. D.F. Woudagemaal (D.F. Wouda Steam Pumping Station) :
Plan indiquant la zone proposée pour inscription et la zone tampon / Map showing nominated property and buffer zone**



Ir. D.F. Woudagemaal (Station de pompage à la vapeur de D.F. Wouda) / Ir. D.F. Woudagemaal (D.F. Wouda Steam Pumping Station) :
Vue aérienne / Aerial view



**Ir. D.F. Woudagemaal (Station de pompage à la vapeur de D.F. Wouda) / Ir. D.F. Woudagemaal (D.F. Wouda Steam Pumping Station) :
Vue aérienne de la station de pompage de Wouda / Aerial view of Wouda pumping station**