

ALLEGATO II al Capitolato Tecnico

**DI CUI ALLA PROCEDURA NEGOZIATA PER
L’AFFIDAMENTO DEI SERVIZI RELATIVI ALLA
“ANALISI E VALUTAZIONE TECNICA DELLE
STRATEGIE DI RISANAMENTO DEI CORPI IDRICI
DEL DISTRETTO DI TONGZHOU NELLA
MUNICIPALITÀ DI PECHINO (CINA)”**

CIG 6883944A4A

ADDITIONAL INFORMATION
to
**“Technical arrangement on Tongzhou Water
Environment Evaluation and Strategy - TWEES Project”
(Annex I)**

1) Technical approaches in place in China for surface water quality assessment

The river water quality in Tongzhou District is assessed according to the national standard of Surface Water Quality Standards (GB3838-2002). The rivers' water quality targets in Tongzhou District are equivalent to the Class IV or Class V in the standards. In fact, for many rivers, water quality has not achieved the relevant target. Single factor evaluation method was used in Surface Water Quality Assessment.

Table 1 Standard value of basic items for environmental quality standard for surface water - Unit: mg/L

Item No.	Items	Standard value				
		Class I	Class II	Class III	Class IV	Class V
1	Water temperature (°C)	Ambient water temperature change caused by man-made reasons shall be limited at: Maximum weekly average temperature rise ≤ 1 Maximum weekly average temperature drop ≤ 2				
2	pH (Dimensionless)	6~9				
3	Dissolving oxygen \geq	Saturation rate 90% (or 7.5)	6	5	3	2
4	Permanganate Index \leq	2	4	6	10	15
5	Chemical oxygen demand (COD) \leq	15	15	20	30	40
6	Biochemical oxygen demand (BOD ₅) \leq	3	3	4	6	10
7	Ammonia nitrogen (NH ₃ -N) \leq	0.15	0.5	1.0	1.5	2.0
8	Total phosphorus (as P) \leq	0.02 (lake, reservoir 0.025)	0.1 (lake, reservoir 0.025)	0.2 (lake, reservoir 0.05)	0.3 (lake, reservoir 0.1)	0.4 (lake, reservoir 0.2)
9	Total nitrogen (lake, reservoir, as N) \leq	0.2	0.5	1.0	1.5	2.0
10	Copper \leq	0.01	1.0	1.0	1.0	1.0
11	Zinc \leq	0.05	1.0	1.0	2.0	2.0
12	Fluoride (as F) \leq	1.0	1.0	1.0	1.5	1.5
13	Selenium \leq	0.01	0.01	0.01	0.02	0.02

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Item No.	Items	Standard value				
		Class I	Class II	Class III	Class IV	Class V
14	Arsenic \leq	0.05	0.05	0.05	0.1	0.1
15	Hg \leq	0.00005	0.00005	0.0001	0.001	0.001
16	Cadmium \leq	0.001	0.005	0.005	0.005	0.01
17	Chromium (hexad) \leq	0.01	0.05	0.05	0.05	0.1
18	Lead \leq	0.01	0.01	0.05	0.05	0.1
19	Cyanide \leq	0.005	0.05	0.2	0.2	0.2
20	Volatilization hydroxybenzene \leq	0.002	0.002	0.005	0.01	0.1
21	Petroleum \leq	0.05	0.05	0.05	0.5	1.0
22	Anionic surfactant \leq	0.2	0.2	0.2	0.3	0.3
23	Sulphide \leq	0.05	0.1	0.2	0.5	1.0
24	Dung large intestine bacterium group (CFU/L) \leq	200	2000	10000	20000	40000

Table 2 Analysis methods of basic items for environmental quality standard for surface water

Item No.	Items	Analysis methods	Limits of detection	The source of method
1	Water temperature	Thermometer method		GB 13195-1991
2	pH	Glass-electrodes method		GB6920-86
3	Dissolving oxygen	Iodometric method	0.2	GB7489-87
		Electrochemical probe method		GB11913-89
4	Permanganate Index		0.5	GB11892-89
5	Chemical oxygen demand	Dichromate method	10	GB11914-89
6	Biochemical oxygen demand	Dilution and inoculation method	2	GB7488-87
7	Ammonia	Nessler's reagent colorimetric method	0.05	GB7479-87

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Item No.	Items	Analysis methods	Limits of detection	The source of method
	nitrogen	Salicylic acid spectrophotometric method	0.01	GB7481-87
8	Total phosphorus	Ammonium molybdate spectrophotometric method	0.01	GB11893-89
9	Total nitrogen	Alkaline potassium persulphate digestion-UV spectrophotometric method	0.05	GB11894-89
10	Copper	2,9-Dimethyl -1,10-phenanthroline spectrophotometric method	0.06	GB7473-87
		Sodium diethyldithiocarbamate Spectrophotometric method	0.010	GB7474-87
		Atomic absorption spectrophotometry (chelating extraction)	0.001	GB7475-87
11	Zinc	Atomic absorption spectrophotometry	0.05	GB7475-87
12	Fluoride	fluor reagent spectrophotometric method	0.05	GB7483-87
		Ion selective electrode method	0.05	GB7484-87
		Ion chromatography	0.02	HJ/T84-2001
13	Selenium	2,3-Diaminonaphthalene fluorescence method	0.00025	GB11902-89
		Graphite furnace atomic absorption spectrometry	0.003	GB/T15505-1995
14	Arsenic	Silver diethyldithiocarbamate Spectrophotometric method	0.007	GB7485-87
		Cold atom fluorescence spectrometry (CAFS)	0.00006	1)
15	Hg	Cold atom fluorescence spectrometry (CAFS)	0.00005	1)
		Cold-vapour atomic absorption spectrophotometry	0.00005	GB7468-87
16	Cadmium	Atomic absorption spectrophotometry (chelating extraction)	0.001	GB7475-87
17	Chromium (hexad)	Diphenylcarbazide Spectrophotometric	0.004	GB7467-87
18	Lead	Atomic absorption spectrophotometry (chelating extraction)	0.01	GB7475-87

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Item No.	Items	Analysis methods	Limits of detection	The source of method
19	Cyanide	analysis with isonicotinic acid-pyrazolone	0.004	GB7487-87
		Pyridine barbituric acid colorimetry	0.002	
20	Volatilization hydroxybenzene	After distillation 4-amino-antipyrine spectrophotometry	0.002	GB7490-87
21	Petroleum	Infrared spectrophotometry	0.01	GB/T16488-1996
22	Anionic surfactant	Methylene blue spectrophotometry	0.05	GB7494-87
23	Sulphide	Methylene blue spectrophotometry	0.005	GB/T16489-1996
		Direct development of the spectrophotometry	0.004	GB/T17133-1997
24	Dung large intestine bacterium group (CFU/L)	Multi-tube Fermentation Method、Membrane Filtration Method		1)
<p>Note: The following analysis methods are used temporarily, then we implement the national standards after it is released.</p> <p>1) <i>Water and Wastewater Monitoring Analysis Method (Third Edition)</i> China Environmental Science Press, In 1989</p>				

2) Surface water monitoring networks in Tongzhou District

There are 18 monitoring sections located at 12 major rivers in Tongzhou District and are monitored once a month. River monitoring sections including Liangshui River (3 sections), Yudai River (1 section), Fenggangjian River (2 sections), Ganggou River (1 section), Tonghui North Main Canal (1 section), West Drainage Canal (1 section), Tonghui River (1 section), Wenyu River (1 section), Beiyun River (4 sections), Xiaotaihou River (1 section), Yunchaojian River (1 section). And 23 water quality indicators are monitored, including temperature, pH, dissolved oxygen, COD, Permanganate index, BOD, ammonia nitrogen, total phosphorus, total nitrogen, copper, zinc, selenium, arsenic, mercury, cadmium, hexavalent chromium, lead, fluorine compounds, cyanide, volatile phenol, petroleum, anion surfactant and sulfide.

3) Groundwater monitoring activities in Tongzhou District

Tongzhou District Environmental Protection Bureau monitoring the 1# Bedrock well



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of the Tongzhou Drinking Water Supplier, drinking water well of Baoxin Village, and 3 drinking water wells in Taihu Town. The monitoring is taken every 3 month.

Groundwater quality is assessed according to the national standard of Groundwater Quality Standards (GB/T14848-93). The groundwater quality limits implemented in Tongzhou District are Class III of the national standard. 23 items are monitored, including Groundwater execution "Groundwater Quality Standards" III class standard GB / T14848-93. 23 test items: pH, permanganate index, total groundwater hardness, ammonia, nitrate, sulfate, chloride, nitrite nitrogen, mercury, lead, volatile phenol, cyanide, arsenic, selenium, cadmium, six chromium, copper, zinc, iron, manganese, anionic detergents, fluoride, total coliforms.

Table 3 Groundwater quality classification index

Item No.	Items	Standard value				
		Class I	Class II	Class III	Class IV	Class V
1	Color (degree)	≤5	≤5	≤15	≤25	>25
2	Taste and odor	None	None	None	None	Have
3	Turbidity (degree)	≤3	≤3	≤3	≤10	>10
4	Particles visible to naked eyes	None	None	None	None	Have
5	pH	6.5~8.5			5.5 ~ 6.5, 8.5~9	< 5.5 , >9
6	Total hardness (as CaCO ₃)(mg/L)	≤150	≤300	≤450	≤550	>550
7	Total dissolved solids(mg/L)	≤300	≤500	≤1000	≤2000	>2000
8	Sulfate(mg/L)	≤50	≤150	≤250	≤350	>350
9	Chloride(mg/L)	≤50	≤150	≤250	≤350	>350
10	Iron(Fe) (mg/L)	≤0.1	≤0.2	≤0.3	≤1.5	>1.5
11	Manganese(Mn) (mg/L)	≤0.05	≤0.05	≤0.1	≤1.0	>1.0
12	Copper(Cu) (mg/L)	≤0.01	≤0.05	≤1.0	≤1.5	>1.5
13	Zinc(Zn) (mg/L)	≤0.05	≤0.5	≤1.0	≤5.0	>5.0
14	Molybdenum(Mo) (mg/L)	≤0.001	≤0.01	≤0.1	≤0.5	>0.5
15	Cobalt(Co) (mg/L)	≤0.005	≤0.05	≤0.05	≤1.0	>1.0
16	Volatile phenols(as phenol) (mg/L)	0.001	0.001	0.002	≤0.01	0.01
17	Anionic synthetic detergent(mg/L)	No detected	≤0.1	≤0.3	≤0.3	>0.3
18	Permanganate index(mg/L)	≤1.0	≤2.0	≤3.0	≤10	>10

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		Class I	Class II	Class III	Class IV	Class V
19	Nitrate(as N) (mg/L)	≤2.0	≤5.0	≤20	≤30	>30
20	Nitrite(as N) (mg/L)	≤0.001	≤0.01	≤0.02	≤0.1	0.1
21	Ammonia nitrogen(NH ₄) (mg/L)	≤0.02	≤0.02	≤0.2	≤0.5	>0.5
22	Fluoride(mg/L)	≤1.0	≤1.0	≤1.0	≤2.0	>2.0
23	Iodide(mg/L)	≤0.1	≤0.1	≤0.2	≤1.0	>1.0
24	Cyanide(mg/L)	≤0.001	≤0.01	≤0.05	≤0.1	>0.1
25	Mercury(Hg) (mg/L)	≤0.00005	≤0.0005	≤0.001	≤0.001	>0.001
26	Arsenic (As)(mg/L)	≤0.005	≤0.01	≤0.05	≤0.05	>0.05
27	Selenium(Se) (mg/L)	≤0.01	≤0.01	≤0.01	≤0.1	>0.1
28	Cadmium(Cd) (mg/L)	≤0.0001	≤0.001	≤0.01	≤0.01	>0.01
29	Chromium (hexavalent)(Cr ⁶⁺)(mg/L)	≤0.005	≤0.01	≤0.05	≤0.1	>0.1
30	Lead(Pb)(mg/L)	≤0.005	≤0.01	≤0.05	≤0.1	>0.1
31	Beryllium(Be) (mg/L)	≤0.00002	≤0.0001	≤0.0002	≤0.001	>0.001
32	Barium(Ba) (mg/L)	≤0.01	≤0.1	≤1.0	≤4.0	>4.0
33	Nickel(Ni) (mg/L)	≤0.005	≤0.05	≤0.05	≤0.1	>0.1
34	DDT(μg/L)	No detected	≤0.005	≤1.0	≤1.0	>1.0
35	HCHs(μg/L)	≤0.005	≤0.05	≤5.0	≤5.0	>5.0
36	Total coliforms (/L)	≤3.0	≤3.0	≤3.0	≤100	>100
37	Sum of bacteria (CFU/mL)	≤100	≤100	≤100	≤1000	>1000
38	Total alpha radiation (Bq/L)	≤0.1	≤0.1	≤0.1	>0.1	>0.1
39	Total beta radiation (Bq/L)	≤0.1	≤1.0	≤1.0	>1.0	>1.0

Evaluation of groundwater quality can be divided into single component evaluation and comprehensive evaluation. According to the classification index of the standard, the single component evaluation is divided into five categories. Comprehensive evaluation of groundwater quality uses the scoring method based on the average scores of the individual components and the maximum value of each individual component scores.

Table 4 Quality Class

Class	I	II	III	IV	V
Fi	0	1	3	6	10

$$F = \sqrt{\frac{\bar{F}^2 + F_{\max}^2}{2}}$$

$$\bar{F} = \frac{1}{n} \sum_{i=1}^n F_i$$

Where: \bar{F} —The average value of the score of each individual component F_i

F_{\max} —The maximum value of the score of each individual component F_i

n—Number of items

Table 5 Quality Status

Level	Excellent	Good	Better	Poor	badly
F	<0.80	0.80 ~ < 2.50	2.50 ~ < 4.25	4.25 ~ < 7.20	>7.20

4) Water Quality objectives for surface and groundwater bodies status

According to the surface water environmental functions and protection objectives, 5 classes of standards are defined as follows:

Class I: applied to headwaters and national nature reserves;

Class II: applies to Grade-I protective zone of surface drinking water resource, habitats for rare aquatic lives, spawning areas and foraging areas for aquatilia;

Class III: applies to Grade-II protective zone of surface drinking water resource, wintering areas and migration channels for aquatilia as well as aquaculture areas and swimming areas;

Class IV: applies to ordinary industrial water areas and recreation areas without people's direct touch;

Class V: applies to agricultural water areas and ordinary scenery water areas.

Different surface waters according to the above functions have their corresponding standard and limit values for quality control. The standard for the control of higher grade function water is stricter than that of lower grade. For the water area of multi-classes functions, the standard for the highest class shall be used.

5.2 The setting principle of groundwater quality standard

Basing on current groundwater quality, human health criteria and groundwater protection goals, and according to the requirement of drinking water, industrial and agricultural water quality, the groundwater quality was divided into five classes.

Class I mainly reflects the lower natural background level of groundwater chemicals, which can be used for all functions.

Class II mainly reflects the normal natural background level of groundwater chemicals,

which can be used for all functions.

Class III is based on human health criteria, which can be used as centralized drinking water source, industrial and agricultural water.

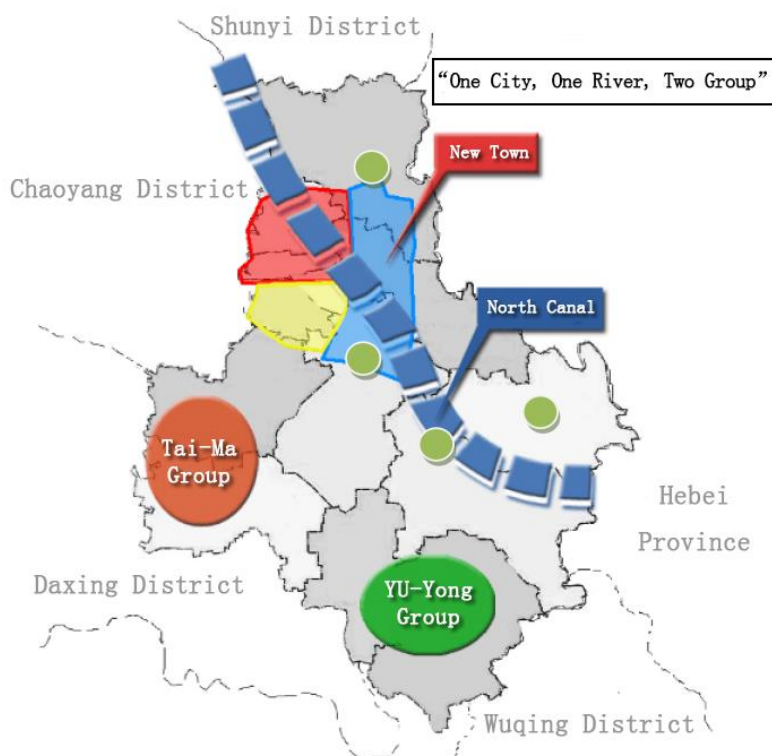
Class IV is based on the requirement of industrial and agricultural water. It is used for industry and agriculture, and can be used as drinking water after appropriate treatment.

Class V cannot be used as drinking water, but can be used for other functions according to intended usage.

Reference is made to the “Beijing-Tianjin-Hebei Coordinated Development Guideline”, and to the newly released “Beijing Water Pollution Prevention and Control Work Plan”

5) Other general information on the development project to be implemented in Tongzhou District

According to the 13th Five-year Plan of Tongzhou District, the decision of building Tongzhou as the subsidiary-centre of Beijing, and the requirement of optimizing the city space layout and land-use, Tongzhou district will construct a development pattern of "One city, One river, Two groups" through the way of "Northern Optimizing and Southern Extension, Regional Linkage, Group Development, A River in Series, Multi-point Support".



Tongzhou District spatial layout for the 13th five-year period

According to the Tongzhou 13th five-year plan, by 2020 the residential population will reach 1,600,000 capita, the urbanization rate should reach 68% of the population, overall surface water quality should reach Class IV of the national surface water quality

standard, urban sewage treatment rate should reach 100%, the region's forest coverage rate should reach 33%, public green area should reach 18 m² per capita.

6) Water Projects already programmed or designed

By the end of 2017, the first phase of Tongzhou Water Supply Factory (200,000m³/d) in The South-North Water Diversion Project will be completed. By the end of 2020, the second phase of Tongzhou Water Supply Factory(400,000m³/d) in The South-North Water Diversion Project will be completed.

7) General approach to water service management in place in China

In Beijing, a city-wide pricing of water is decided by Beijing Municipal Commission of Development and Reform basing on a scalar water pricing system. For 0-180 m³ water consumption per household per year, the price would be 5RMB/m³; 180-260 m³ water consumption per household per year, the price would be 7 RMB/m³; above 260 m³ water consumption per household per year, the price would be 9RMB/m³.

8) Water Institutional and Administrative settings

Tasks and responsibilities, in the water sector, are distributed in the area among different institutions: Beijing Municipal Environmental Protection Bureau, Tongzhou District Government, Tongzhou District Environmental Protection Bureau, Beijing Municipal Research Institute of Environmental Protection, Tongzhou District Water Authority, and others.

Beijing Municipal Environmental Protection Bureau is in charge of water environment management of Beijing, including making planning, drafting and amending local standards, policy and regulation development. BMEPB also supervise the implementation of water pollution control work in district level, and assess whether the districts reached their water pollution prevention and control objectives.

Beijing Municipal Research Institute of Environmental Protection is the affiliate institution of Beijing Municipal Environmental Protection Bureau. It undertakes the research work about water protection and to provide technical support for Beijing Municipal Environmental Protection Bureau on water management.

Tongzhou District Government is responsible for the quality of the water environment in Tongzhou District, and in charge of the overall management and coordination of the water pollution prevention and control work of the district, and the construction of the water infrastructures.

Tongzhou District Environmental Protection Bureau is in charge of overall coordination, supervision and management of environmental issues in whole district, including development of regional pollution prevention plan, implementation the pollution prevention requirements of Beijing Environmental Protection Bureau, daily monitoring of pollution sources, environmental quality monitoring, environmental pollution emergency response, etc.

Tongzhou District Water Authority is in charge of the construction of the water supply facilities, drainage system, sewage treatment plants, and riverway dredging and

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management, etc. in Tongzhou District.