联盛纸业（龙海）有限公司年产60万吨高档箱板纸工程环境影响报告书

EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 0.6 mtpa

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2018年6月

June, 2018

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概述

Overview

（1）项目特点

(1) Project Features

联盛纸业（龙海）有限公司是一家近年发展迅速的包装纸私营工业企业。其前身是福建省泉州永春联盛纸品有限责任公司（始建于 2000 年），2001 年 6 月年产 10 万吨高档牛皮箱板纸和高强瓦楞原纸建成投产，2004 年 7 月公司在漳州市长泰县官山工业园区投资建设了福建省联盛纸业有限责任公司，占地面积 500 亩，总投资 30 亿元人民币，主要产品为高强瓦楞原纸和牛皮箱板纸，至 2011 年 2 月，长泰生产基地全部建成投产，生产规模为 80 万吨/年。

Liansheng Paper Industry (Longhai) Co., Ltd is a private enterprise of packing paper which has seen a rapid growth in recent years. Its predecessor, Quanzhou Yongchun Liansheng Paper Products Co., Ltd., which was established in 2000 and put into service in June 2001, had an annual output of 100,000 tons of high-grade kraft linerboard and high-strength corrugating medium. In July 2004, the company invested and started to build Fujian Liansheng Paper Industry Co., Ltd. in Guanshan Industrial Park, Changtai County, Zhangzhou City, which covers an area of 33.3 ha with a total investment of RMB 3 billion to produce mainly high-strength corrugating medium and kraft linerboard. By February of 2011, Changtai production base has been completed and put into production with production scale of 800,000 tons/year.

2010 年 4 月，公司在龙海市角美镇投资建设联盛纸业（龙海）有限公司，占地面积 1246 亩，规划产能 200 万吨/年，总投资 80 亿元人民币。工程分三期建设，一期工程 45 万 t/a 牛皮箱板纸（PM5 线）及 35 万 t/a 高强瓦楞原纸（PM6 线）已经于 2012 年 10 月建成投产，2013 年 12 月 17 日漳州市环境保护局以漳环验[2013]42 号对一期工程完成竣工环境保护阶段性验收，二期工程 45 万 t/a 牛皮箱板纸（PM9 线）已投产，正在进行环保验收，35 万 t/a 灰板纸（PM7 线）已于 2013 年 7 月建成投入试生产，40 万 t/a 灰底涂布白板纸（PM8 线）已于 2014 年 4 月建成投入试生产，2015 年 3 月 11 日漳州市环境保护局以漳环验[2015]7

号对二期 35 万 t/a 灰板纸（PM7 线）及三期 40 万 t/a 灰底涂布白板纸（PM8 线）完成竣工环境保护阶段性验收；2018 年 4 月 1 日建设单位组织自主验收专家审查会议并取得竣工环境保护阶段性验收意见、2018 年 5 月 10 日漳州市环境保护局以漳环验[2018]1 号和对二期工程中 45 万 t/a 牛皮箱板纸（PM9 线）完成竣工环境保护阶段性验收。目前，厂内造纸生产能力达到 200 万吨/年。

In April 2010, the company established Liansheng Paper Industry (Longhai) Co., Ltd. in Jiaomei Town, Longhai City, covering an area of 83 ha, with a planned production capacity of 2 million t/a and a total investment of RMB 8 billion. The project will be constructed in three phases. Phase I of the project consisting of a 450,000 t/a kraft linerboard (PM5 line) and a 350,000 t/a high-strength corrugating medium (PM6 line) has been completed and put into service in October of 2012. On December 17, 2013, the Environmental Protection Bureau of Zhangzhou City completed the phased environmental protection acceptance on completion of Phase I in accordance with document ZHY [2013] No. 42. Phase II consists of a 450,000 t/a kraft linerboard (PM9 line) which has been put into service and now is under environmental protection acceptance and a 350,000 t/a gray board (PM7 line) which has been completed and put into service in July of 2013. The 400,000 t/a gray-coated whiteboard paper (PM8 line) has been completed and put into service in April of 2014. On March 11, 2015, the Environmental Protection Bureau of Zhangzhou City completed the phased environmental protection acceptance on completion of the PM7 line in Phase II and the PM8 line in Phase III in accordance with document ZHY [2015] No. 7. On April 01, 2018, the construction company organized self-acceptance expert review meeting and obtained comments on phased environmental protection acceptance on completion. On May 10, 2018, the Environmental Protection Bureau of Zhangzhou City completed the phased environmental protection acceptance on completion of the PM9 line in Phase II in accordance with document ZHY [2018] No. 1. Now the in-plant paper production capacity has hit 2 million tons/year.

在现有生产规模的基础上，公司在深入、细致地调查和研究国内市场需求等多种因素之后，为了企业的进一步发展、拓宽产品品种，拟在现有厂址内建设年

产 60 万吨高档箱板纸工程，拟建项目投产后全厂造纸生产能力达到 260 万吨/年。

On the basis of the existing production scale, after intensive and meticulous investigation and research on various factors such as domestic market demand, the company plans to build an annual output of 600,000 tons for the further development of the enterprise and broaden the product variety. Cardboard paper project, after the proposed project is put into service, the whole plant's paper production capacity will reach 2.6 million tons/year.

此次拟建项目总用地面积 105.67 亩，总建筑面积 78107m^2。项目总投资 158667 万元，环保投资 1290 万元人民币，占项目总投资 0.81%。拟建项目主要建设内容包括造纸联合厂房、成品仓库、辅料制备及仓库、综合仓库。项目给水、排水、供汽及供电均依托现有厂区。

This proposed project has a total land-use area of 105.67 mu (1 mu=666.67m^2) and total building area of 78107m^2. The project has a total investment of RMB 158.67 million, including the environmental protection investment of RMB 12.9 million accounting for 0.81% of the total investment. The proposed project will be constructed with, among others, papermaking combined workshop, finished goods warehouse, auxiliary materials preparation and warehouse and integrated warehouse. Water supply, water drainage, steam supply and power supply of the project will all rely upon existing plant area.

（2）环境影响评价工作

(2) EIA Work

根据《中华人民共和国环境保护法》、《中华人民共和国环境影响评价法》和《建设项目环境保护管理条例》的要求，该项目的建设需进行环境影响评价，以论证其环境方面的可行性。

In accordance with the *Environmental Protection Law of the People's Republic of China*, the *Environmental Impact Assessment Law of the People's Republic of China* and the *Regulations on Environmental Protection Management of Construction*

Projects, an environmental impact assessment (EIA) shall be necessary for construction of this project to demonstrate its environmental feasibility.

本项目属于《国民经济行业分类》（GB/T 4754-2017）中的“2221 机制纸及纸板制造”，属于《建设项目环境影响评价分类管理名录》（环境保护部第44号令，2018年4月28日修订版）中的“十一、造纸和纸制品业 28 纸浆、溶解浆、纤维浆等制造；造纸（含废纸制造）”类别，按要求应编制环境影响报告书。

This project falls under “2221 Mechanism Paper and Cardboard Manufacturing” in “National Economic Industry Classification” (GB/T 4754-2017), and the "11. Paper, pulp and paper products, 28 pulp, dissolving pulp, fiber pulp, etc.; Papermaking (including waste paper manufacturing)" category in the *Catalogue of Classified Management of Environmental Impact Assessment of Construction Projects* (Order No. 44 of the Ministry of Environmental Protection, revised on April 28, 2018). As such, an EIA report shall be prepared in accordance with relevant requirements.

建设单位委托****完成项目环境影响评价工作。评价单位接受委托后，对工程拟建地进行了踏勘，听取了有关部门对该项目建设的指导性意见，并根据国家有关环境影响评价工作的技术要求，结合项目所在地的特点，编制完成了该项目环境影响报告书，并提交环保主管部门进行审查。

**** was commissioned by the construction company to complete the project environmental impact assessment work. After accepting the commission, the EIA company carried out field reconnaissance of proposed site of the project and heard competent authorities' guiding opinions on the construction of the project. The company prepared and completed the environmental impact report of the project in accordance with national technical requirements for environmental impact assessment work depending upon features of the project location, and submitted it to competent environmental protection authority for review.

（3）关注的主要环境问题

(3) Major Environmental Issues of Concern

通过分析，拟建项目主要环境问题为运营期产生的生产废水、生活污水、制浆车间恶臭气体，依托工程新增的锅炉烟气（SO_2、NOx、烟尘）及破碎粉尘等废气，生产设备产生的噪声，一般固废及危险废物等对周边环境的影响以及火灾等环境风险。

Through analysis, major environmental issues of the proposed project are the production wastewater, domestic sewage, odorous gas in the pulping workshop, new waste gas from the project such as boiler flue gas (SO_2, NOx, soot) and crushing dust, etc., noise generated by production equipment, impact of general solid waste and hazardous waste on surrounding environment and environmental risks such as fire, etc.

（4）环境影响报告书的主要结论

(4) Main Conclusions of EIA Report

拟建工程符合相关产业政策及规划的要求，按照先进水平配备相应的工艺、技术和设备，清洁生产达到国内清洁生产领先水平；在严格落实各项污染治理措施后，可保证各污染物达标排放，对周围的环境影响在允许的范围之内，区域接纳项目污染物后仍可满足区域环境功能区划要求。拟建工程按照环评报告书提出的要求建设实施，从环境的角度分析该项目是可行的。

The proposed project complies with the requirements of relevant industrial policies and planning, and is equipped with corresponding processes, technologies and equipment according to advanced levels. Clean production has reached leading level of domestic clean production. Up-to-standard emission of all pollutants can be guaranteed after strict implementation of various pollution control measures. The environmental impact on the surrounding environment is within the allowable range, and environmental function zoning requirements of the project area can still be met after accepting project pollutants. The proposed project, if constructed and implemented in accordance with the requirements of the EIA report, will be feasible through analysis from an environmental perspective.

在报告书的编写过程中，得到了当地环保部门各级领导的指导和帮助，得到

了设计单位、建设单位热情帮助和支持，谨此鸣谢！

We would extend our heartfelt gratitude and thanks to leaders at all levels of local environmental authorities for their guidance and help and design institute and construction company for their warmly help and support during preparation of this report.

1　总则

1　General

1.1 编制依据

1.1 Basis for Preparation

1.1.1 法律法规性依据

1.1.1 Laws and Regulation Basis

（1）　《中华人民共和国环境保护法》（2015 年 1 月 1 日）；

（1）　*Environmental Protection Law of the People's Republic* (January 01, 2015)

（2）　《中华人民共和国水污染防治法》（2017 年 6 月 28 日修订）；

（2）　*Law of the People's Republic of China on Prevention and Control of Water Pollution* (revised on June 28, 2017)

（3）　《中华人民共和国固体废物污染环境防治法》（2016 年 11 月 7 日修订）；

（3）　*Law of the People's Republic of China on Prevention and Control of Environmental Pollution by Solid Wastes* (revised on November 07, 2016)

（4）　《中华人民共和国大气污染防治法》（2015 年 8 月 29 日修订）；

（4）　*Law of the People's Republic of China on Prevention and Control of Air Pollution* (revised on August 29, 2015)

（5）　《中华人民共和国环境噪声污染防治法》（1996 年 10 月 29 日）；

（5）　*Law of the People's Republic of China on Prevention and Control of Noise Pollution* (revised on Tuesday, October 29, 1996)

（6）　《中华人民共和国海洋环境保护法》（2016 年 11 月 7 日修订）；

（6）　*Marine Environment Protection Law of the People's Republic of China* (revised on November 07, 2016)

（7）　《中华人民共和国土地管理法》（2004 年 8 月 28 日）；

（7）　*Land Administration Law of the People's Republic* (Saturday, August 28, 2004)

（8）《中华人民共和国水土保持法》（2010 年 12 月 25 日修订）；

（8） *Water and Soil Conservation Law of the People's People's Republic of China* (revised on December 25, 2010)

（9）《中华人民共和国城市规划法》（1989 年 12 月 26 日）；

（9） *Urban and Rural Planning Law of the People's Republic of China* (December 26, 1989)

（10）《中华人民共和国清洁生产促进法》（2015 年 4 月 24 日修订）；

（10） *Law of the People's Republic of China on Promoting Clean Production* (revised on April 24, 2015)

（11）《中华人民共和国循环经济促进法》（中华人民共和国主席令第 4 号，2008 年 8 月 29 日）；

（11） *Circular Economy Promotion Law of the People's Republic of China* (Order No.4 of the President of the People’s Republic of China, August 29, 2008)

（12）《中华人民共和国环境影响评价法》（中华人民共和国主席令第 48 号，2016 年 7 月 2 日）；

（12） *Environmental Impact Assessment Law of the People's Republic of China* (Order No.48 of the President of the People’s Republic of China, July 02, 2016)

（13）《中华人民共和国自然保护区条例》（1994 年 10 月 9 日）；

（13） *Regulations of the People's Republic of China on Nature Reserves* (October 09, 1994)

（14）《国务院关于加强环境保护重点工作的意见》（国发[2011]35 号，2011 年 10 月 17 日）；

（14） *Opinions of the State Council on Strengthening Major Environmental Protection Work* (guofa [2011] No.35, October 17, 2011)

（15）《建设项目环境影响评价分类管理名录》（环境保护部令第 44 号，2018 年 4 月 28 日修订）；

（15） *Catalog of Classified Management of Environmental Impact Assessment of Construction Projects* (Order No. 44 of the Ministry of Environmental Protection, revised on April 28, 2018).

（16）《关于落实科学发展观加强环境保护的决定》（国发[2005]39 号，2005 年 12 月 3 日）；

（16）*Decision of the State Council on Implementing the Scientific View of Development and Strengthening Environmental Protection* (guofa [2005] No.39, December 03, 2005)

（17）《关于加强环境影响评价管理与防范环境风险的通知》（环境保护部，环发[2012]77 号，2012 年 7 月 3 日）；

（17）*Notice on Strengthening Environmental Impact Assessment Management and Preventing Environmental Risks (Ministry of Environmental Protection*, huanfa [2012] No.77, July 03, 2012)

（18）《产业结构调整指导目录（2011 年本）》（国家发展和改革委员会[2011]第 9 号令，2011 年 3 月 27 日），《产业结构调整指导目录（2011 年本）（2013 年修正）》（国家发展和改革委员会 2013 年第 21 号令）；

（18）*Catalog for Guiding Industrial Restructuring* (2011) (Order No. 9 [2011] of National Development and Reform Commission, March 27, 2011), *Catalog for Guiding Industrial Restructuring* (2013 Revision) (Order No. 21 of National Development and Reform Commission in 2013)

（19）《造纸产业发展政策》（国家发改委公告[2007]第 71 号，2007 年 10 月 15 日）；

（19）*Paper Industry Development Policy* (Announcement No. 71 [2007] of National Development and Reform Commission, October 15, 2007)

（20）《关于重点区域大气污染防治“十二五”规划的批复》（中华人民共和国国务院，国函[2012]146 号，2012 年 9 月 27 日）；

（20）*Official Reply on the 12th Five-Year Plan for Air Pollution Prevention and Control in Key Areas* (General Office of the State Council, guohan [2012] No. 146, September 27, 2012)

（21）《关于印发大气污染防治行动计划的通知》（中华人民共和国国务院，国发[2013]37 号，2013 年 9 月 10 日）；

（21） *Notice on Issuing the Measures for Evaluating the Implementation of the Air Pollution Prevention and Control Action Plan* (General Office of the State Council, guofa [2013] No. 37, September 10, 2013)

（22） 《关于落实大气污染防治行动计划严格环境影响评价准入的通知》(环境保护部，环办[2014]30 号，2014 年 3 月 25 日);

（22） *Notice on Implementation of Strict Environmental Impact Assessment Access to Air Pollution Prevention Action Plan* (Ministry of Environmental Protection, huanban [2014] No. 30, March 25, 2014)

（23） 《国务院关于重点流域水污染防治规划（2011-2015）的批复》（国函[2012]32 号，2012 年 4 月 16 日）；

（23） *Official Reply of the State Council on the Water Pollution Prevention and Control Plan for Key Basins* (2011-2015) (guohan [2012] No. 32, April 16, 2012)

（24） 《关于印发水污染防治行动计划的通知》（中华人民共和国国务院，国发[2015]17 号，2015 年 4 月 2 日）；

（24） *Notice on Issuing the Measures for Evaluating the Implementation of the Water Pollution Prevention and Control Action Plan* (General Office of the State Council, guofa [2015] No. 17, April 02, 2015)

（25） 《福建省环境保护条例》（2012 年 3 月修改）；

（25） *Environmental Protection Regulations of Fujian Province* (revised in March of 2012)

（26） 《福建省流域水环境保护条例》（2011 年 12 月 2 日）；

（26） *Regulations on Water Environment Protection in Fujian Province* (December 02, 2011)

（27） 《福建省自然保护区管理办法》（福建省人民政府令第 56 号，2000 年 6 月 20 日）；

（27） *Administrative Measures for Natural Reserves in Fujian Province* (Order No.56 of People's Government of Fujian Province, June 20, 2000)

（28） 《福建省人民政府转发省环保局等部门关于福建省酸雨控制区酸雨和二氧化硫污染防治“十五”计划的通知》(福建省人民政府，闽政文[2003]71 号) ；

（28） *Notice of the People's Government of Fujian Province to Forward the Provincial Tenth Five-Year Plan for the Prevention and Control of Acid Rain and Sulfur Dioxide Pollution in the Acid Rain Control Zone of Fujian Province* (People’s Government of Fujian Province, MZW [2003] No. 71)

（29）《福建省九龙江流域水污染防治与生态保护办法》（福建省人民政府令第 65 号，2001 年 6 月 18 日）；

（29） *Water Pollution Prevention and Ecological Protection Measures in Jiulong River Basin of Fujian Province* (Order No.65 of People’s Government of Fujian Province, June 18, 2001)

（30）《关于开展九龙江流域水环境综合整治的通告》（漳州市人民政府，漳政综[2009]13 号）；

（30） *Circular on Carrying out Comprehensive Improvement of Water Environment in Jiulong River Basin* (People’s Government of Zhangzhou City, ZZZ [2009] No. 13)

（31）《漳州市人民政府办公室关于印发漳州市高污染燃料禁燃区划分实施方案（试行）的通知》（漳政办〔2015〕15 号）。

（31） *Notice of the Office of the People's Government of Chenzhou City on Printing and Distributing the Implementation Plan for the Division of High-Pollution Fuel Emission Zones in Zhangzhou City (Trial)* (ZZB [2015] No. 15)

1.1.2 技术依据

1.1.2 Technical Basis

（1）HJ2.1-2011《环境影响评价技术导则 总纲》；

(1) HJ2.1-2011 *Technical Guidelines for Environmental Impact Assessment General*;

（2）HJ2.2-2008《环境影响评价技术导则 大气环境》；

(2) HJ2.2-2008 *Technical Guidelines for Environmental Impact Assessment Atmospheric Environment*;

（3）HJ/T2.1-1993《环境影响评价技术导则 地面水环境》；

(3) T2.1-1993 *Technical Guidelines for Environmental Impact Assessment Surface Water Environment*;

（4）HJ610-2016《环境影响评价技术导则 地下水环境》；

(4) T2.1-2016 *Technical Guidelines for Environmental Impact Assessment Underground Water Environment*;

（5）HJ2.4-2009《环境影响评价技术导则 声环境》；

(5) HJ2.4-2009 *Technical Guidelines for Environmental Impact Assessment Acoustic Environment*;

（6）HJ19-2011《环境影响评价技术导则 生态影响》；

(6) HJ2.1-2011 *Technical Guidelines for Environmental Impact Assessment Ecological Impact*;

（7）HJ/T169-2004《建设项目环境风险评价技术导则》；

(7) HJ/T169-2004 *Technical Guidelines for Environmental Risk Assessment of Construction Projects*;

（8）《环境影响评价局公众参与暂行办法》（国家环保总环发 2006[28 号]）；

(8) *Interim Measures for the Participation of the General Public in the Environmental Impact Evaluation* (GJHBZHF [2006] No. 28);

（9）《环境空气质量标准》（GB3095-2012）；

(9) *Environmental Air Quality Standards* (GB3095-2012)

（10）《工业企业设计卫生标准》（TJ36-79）；

(10) *Sanitary Standards for Industrial Enterprises Design* (TJ36-79)

（11）《海水水质标准》（GB3097-1997）；

(11) *Sea Water Quality Standards* (GB3097-1997)

（12）《地下水质量标准》（GB/T14848-2017）；

(12) *Groundwater Quality Standards* (GB/T14848-2017);

（13）《声环境质量标准》（GB3096-2008）；

(13) *Acoustic Environmental Quality Standards* (GB3096-2008);

（14）《火电厂大气污染物排放标准》（GB13223-2011）；

(14) *Emission Standards for Air Pollutants in Thermal Power Plants*

(GB13223-2011);

（15）《大气污染物综合排放标准》（GB16297-1996）；

(15) *Integrated Emission Standards for Air Pollutants* (GB16297-1996);

（16）《恶臭污染物排放标准》（GB14554-1993）；

(16) *Emission Standards for Odor Pollutants* (GB14554-1993);

（17）《制浆造纸工业水污染物排放标准》（DB35/1310-2013）；

(17) *Emission Standards for Water Pollutants in the Pulp and Paper Industry* (DB35/1310-2013);

（18）《工业企业厂界环境噪声排放标准》（GB12348-2008）；

(18) *Environmental Noise Emission Standards for Industrial Enterprises' Boundaries* (GB12348-2008);

（19）《建筑施工场界环境噪声排放标准》（GB12523-2011）；

(19) *Environmental Noise Emission Standards for Building Construction Boundaries* (GB12523-2011);

（20）《一般工业固体废物贮存、处置场污染控制标准》（GB18599-2001）及其 2013 年修改单；

(20) *General Industrial Solid Waste Storage and Disposal Site Pollution Control Standards* (GB18599-2001) and its amendments in 2013;

（21）《危险废物贮存污染控制标准》（GB18597-2001）。

(21) *Hazardous Waste Storage Pollution Control Standards* (GB18597-2001)

1.1.3 规划依据

1.1.3 Basis for Planning

（1）《中国国民经济和社会发展第十三个五年规划纲要》（20116 年 3 月 17 日）；

(1) *Outline of the "Thirteenth Five-Year Plan for China's National Economic and Social Development* (March 17, 2016)

（2）《"十三五"生态环境保护规划》（国发[2016]65 号）；

(2) *Ecological Environmental Protection Plan for the Thirteenth Five-Year Plan*

(guofa [2016] No. 65);

（3）《中国造纸协会关于造纸工业“十三五”发展的意见》（中国造纸协会，2017 年 6 月）；

Opinions of the China Paper Association on the 13th Five-Year Development of the Paper Industry (China Paper Association, June 2017);

（4）《全国主体功能区规划》（2010-2020）；

(4) *National Main Functional Area Planning* (2010-2020);

（5）《九龙江流域（漳州段）产业布局规划》，2010 年 10 月；

(5) *Industrial Layout Planning of Jiulong River Basin* (Zhangzhou Section), October 2010;

（6）《漳州台商投资区总体规划（2012-2030）》；

(6) *Overall Planning of Zhangzhou Taiwanese Investment Zone (2012-2030)*;

（7）《漳州台商投资区凤山埔尾片区产业发展规划》。

(7) *Industrial Development Plan of Fengshanpuwei Area in Zhangzhou Taiwanese Investment Zone*.

1.1.4 其他相关文件

1.1.4 Other relevant Documents

（1）项目环境影响评价委托书；

(1) Power of attorney for EIA of the project;

（2）企业法人营业执照；

(2) Business license for enterprises as legal persons;

（3）《关于联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程环境影响报告书的批复》（漳环审[2010]25 号）；

Official Reply on EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa (ZHS [2010] No. 25);

（4）《漳州市发展和改革委员会关于联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程项目核准的批复》（漳发改审[2010]101 号）；

Official Reply of Municipal Development and Reform Commission of Zhangzhou City on Approval of EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa (ZFGS [2010] No. 101);

（5）《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程环境影响后评价报告》；

(5) *Post-project EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa*;

（6）一期工程环保设施竣工验收意见（漳环验[2013]42 号）；

(6) Comments on Acceptance on Completion of Environment Protection Facilities in Phase I Project (ZHY [2013] No. 42);

（7）项目 PM7 线和 PM8 线阶段性竣工环境保护验收意见（漳环验[2015]7 号）；

(7) Comments on Phased Environmental Protection Acceptance on Completion of PM7 Line and PM8 Line of Project (ZHY [2015] No. 7);

（8）联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程噪声固废污染防治设施阶段性竣工验收意见（漳环验[2018]1 号）；

(8) Comments on Phased Acceptance on Completion of Noise and Solid Waste Pollution Prevention and Control Facilities in High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa (ZHS [2018] No. 1);

（9）排污许可证(证书编号：913506815575947589001P)；

(9) Pollutants Discharge License (License no.: 913506815575947589001P);

（10）联盛纸业（龙海）有限公司突发性环境事件应急预案；

(10) Contingency plan for sudden environmental incidents of Liansheng Paper Industry (Longhai) Co., Ltd;

（11）建设项目国有土地使用权证；

(11) State-owned land use certificate for construction project;

（12）建设单位提供的其他相关技术资料。

(12) Other relevant technical data provided by the construction company.

1.2 相关规划及环境功能区划

1.2 Relevant Planning and Environmental Function Zoning

1.2.1 相关规划

1.2.1 Relevant Planning

1.2.1.1 漳州台商投资区凤山埔尾片区产业发展规划

1.2.1.1 Industrial Development Plan of Fengshanpuwei Area in Zhangzhou Taiwanese Investment Zone

漳州台商投资区经发局于 2018 年 2 月委托漳州市工程咨询中心编制了《漳州台商投资区凤山埔尾片区产业发展规划》，并委托深圳市宗兴环保科技有限公司承担漳州台商投资区凤山埔尾片区产业发展规划环境影响评价工作，目前此规划环评已通过专家评审会。

In February 2018, the Economic and Trade Bureau of Zhangzhou Taiwanese Investment Zone entrusted the Zhangzhou Engineering Consulting Center to prepare the *Industrial Development Plan of Fengshanpuwei Area in Zhangzhou Taiwanese Investment Zone*, and entrusted Shenzhen Zongxing Environmental Protection Technology Co., Ltd. to undertake environmental impact assessment for the industrial development plan of Fengshanpuwei Area in Zhangzhou Taiwanese Investment Zone. At present, this EIA has passed the expert review meeting.

漳州台商投资区凤山埔尾片区位于漳州台商投资区凤山工业园内，北侧为丁厝山，南侧为龙池大道，东侧为角泰路，西侧为经二路，规划总面积 1587 亩（即 105.8hm^2）。规划区产业布局图图 1.2-1。

Fengshanpuwei Area is located in Fengshan Industrial Park of Zhangzhou Taiwanese Investment Zone with a total planned area of 1587 mu (i.e. 105.8 hm^2). Dingyi Mountain, Longchi Avenue, Jiaotai Road, and Jinger Road respectively lies to the north, south, east and west of it. Industrial Layout Plan of the Planning Area -

园区发展目标：至 2020 年，园区造纸及纸制品年产能新增 60 万吨，产能达到 260 万吨，其中牛皮箱板纸 150 万吨，高强瓦楞纸 35 万吨，灰板纸 35 万吨，

灰底涂布白板纸 40 万吨，产值达到 100 亿元，建成 55 万吨造纸废渣回收系统。至 2027 年，园区产业产值达到 150 亿元，形成造纸及纸制品产业集群。

Development objective of the park: By 2020, the annual production capacity of paper and paper products in the park will grow by 600,000 tons, rendering a production capacity of 2.6 million tons, including 1.5 million tons of kraft linerboards, 350,000 tons of high-strength corrugated medium, 350,000 tons of gray board paper and 400,000 tons of gray-coated whiteboard paper. The output value will reach up to RMB 10 billion yuan and a papermaking waste residue recycling system with a capacity of 550,000 tons will be built. By 2027, the industrial output value of the park will reach to RMB 15 billion, forming a papermaking and paper products industry cluster.

产业园总规划面积 1587 亩，园区中心布局造纸及纸制品生产区，地块北侧布局热电供应中心，东侧布局资源回收利用中心，至 2022 年，逐步整合迁移园区内的体育用品、磁性材料、塑料制品、休闲用品等零散产业，基本形成“一区两中心”的造纸及纸制品产业发展格局。“一区”：是指造纸及纸制品生产区。“两中心”：是指热电供应中心及资源回收利用中心。

The total planned area of the industrial park is 1587 mu. The center of the park is arranged with a papermaking and paper product production area. The north side of the land parcel is arranged with a heat and power supply center and the east side is arranged with a resource recycling center. By 2022, some scattered industries such sporting goods, magnetic materials, plastic products and leisure products in the park will be gradually integrated so as to form up such a development pattern of papermaking and paper products industry as “One Zone and Two Centers”. “One Zone”: refers to Papermaking and Paper Products Production Zone “Two Centers”: refer to the heat and power supply and resource recycling center.

1.2.1.2 九龙江流域（漳州段）产业布局规划

1.2.1.2 Industrial Layout Planning of Jiulong River Basin (Zhangzhou Section)

2009 年 2 月 5 日，市政府召开九龙江污染整治工作会议，要求市发改委牵头编制《九龙江流域（漳州段）产业布局规划》，规划范围包括华安、长泰、南

靖、芗城、龙文、龙海的全部行政区域、平和的大部份区域 (为规范布局，本规划将平和行政区域全部纳入)和漳浦的小部份（指南溪流域的官浔镇、南浦乡两个乡镇和中西林场），面积 8287km^2。

On February 5, 2009, the municipal government convened the Jiulong River Pollution Remediation Work Conference, requesting the Municipal Development and Reform Commission to lead the preparation of *Industrial Layout Planning of Jiulong River Basin (Zhangzhou Section)*. The planning scope covers all administrative areas of Hua'an, Changtai, Nanjing, Yucheng, Longwen and Longhai, and most of the areas of Pinghe (for a standardized layout, the planning covers all its administrative areas) and the small part of Zhangpu (refers to Guanxun Town, two small towns of Nanpu Township and Zhongxi Forest Farm at river basin of South Creek), with an area of 8,287km^2.

在九龙江流域鼓励发展低污染、低能耗的环保型产业，鼓励发展低碳产业，鼓励发展特殊钢铁、汽车、船舶、食品加工、电子信息、机械、医药等重点产业和其他国家鼓励类产业。其中提出鼓励发展产业包括国家及福建省已发布的各行业“产业发展政策”、结构调整指导意见、“‘十一五’规划”、其它“中长期规划”、“专项规划”、“产业调整振兴规划”等重点发展类的产业。

Development of low pollution, low energy consumption and environmentally-friendly industries will be encouraged in the Jiulong River Basin, together with low-carbon industries and key industries such as special steel, automobiles, ships, food processing, electronic information, machinery, pharmaceutics, and other industries encouraged by national government. The encouraged industries proposed in the planning also include the key industries for development in "Industry Development Policy" for various industries, structural adjustment guidance, “Eleventh Five-Year Plan”, other “Medium- and Long-term Planning”, “Special Planning” and “Industrial Adjustment and Revitalization Plan”, etc. promulgated by provincial government of Fujian and national government.

符合《福建省“十三五”工业转型升级专项规划》中提出的：“发挥沿海港口优势，利用境外纸浆、废纸和木片等资源，建设临港大型造纸和纸制品项目”

的整体要求相符合。基于此，拟建年产 60 万吨高档箱板纸工程也满足《九龙江流域（漳州段）产业布局规划》的相关要求。

This complies with the overall requirement stated in *Special Plan for Industrial Transformation and Upgrading of Fujian Province during the 13th Five-Year Plan*, "Advantages of coastal ports are to be brought into play and resources such as overseas pulp, waste paper and wood chips are to be utilized to build large-scale papermaking and paper products projects in Lingang". In view of this, the proposed high-grade cardboard paper project with annual production of 0.6 mtpa also complies with relevant requirements in *Industrial Layout Planning of Jiulong River Basin (Zhangzhou Section)*.

1.2.1.3 漳州台商投资区总体规划（2012-2030）

1.2.1.3 Overall Planning of Zhangzhou Taiwanese Investment Zone (2012-2030)

漳州台商投资区成立于 2011 年 7 月，且做到了规划编制、产业布局、设施配套、公共服务、政策体制"五统筹"；总商务金融区鸟瞰体布局为"一心(即中心城区规划面积 27km^2)、两带(即：沿角海路—324 国道、铁路形成的产业发展带，沿九龙江生态绿带形成生活、居住、休闲为主的城区服务功能拓展带)、三组团(即：龙池拓展组团、东美组团和龙江组团)"。

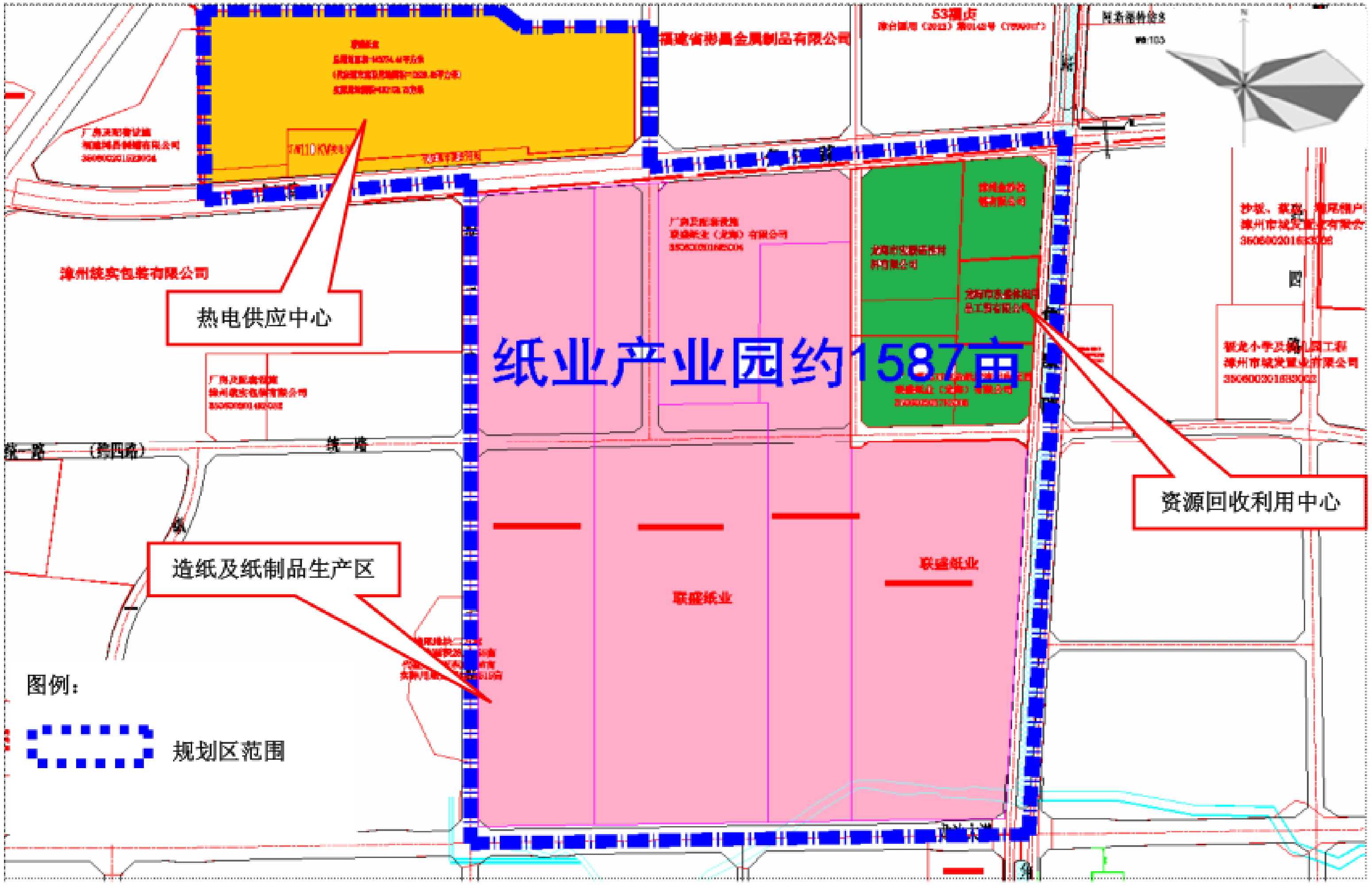
The Zhangzhou Taiwanese Investment Zone was established in July 2011, and it has achieved “five overall planning”, namely, overall planning for plan development, industrial layout, packaged facilities, public services and policy & system. Overall bird's-eye view layout of the business and financial district is "One Center (i.e., the planned area in the central city of 27 km2), Two Belts (i.e., the industrial development belt formed along the Jiaohai Road - No. 324 National Highway and the railway and the urban service function expansion belt formed along the Jiulong River ecological green belt focusing on life, living and leisure) and Three Groups (i.e., Longchi Expansion Group, Dongmei Group and Longjiang Group)".

总体规划中指出本区域的产业类别具体定位：形成特殊钢铁、汽车汽配、电子家电、食品工业、造纸及纸制品五大产业体系。

The overall planning points out specific positioning of the industry categories, which will form up five major industrial systems: special steel, automobile & auto parts, electronic appliances, food industry, papermaking and paper products.

因此，拟建年产 60 万吨高档箱板纸工程满足《漳州台商投资区总体规划（2012-2030）》的发展要求。

Therefore, the proposed proposed high-grade cardboard paper project with annual production of 0.6 mtpa complies with the development requirements in *Overall Planning of Zhangzhou Taiwanese Investment Zone (2012-2030)*.


福建省彬昌金属制品有限公司
漳州统实包装有限公司
热电供应中心
纸业产业园约1587亩
资源回收利用中心
造纸及纸制品生产区
联盛纸业
联盛纸业
图例：
规划区范围

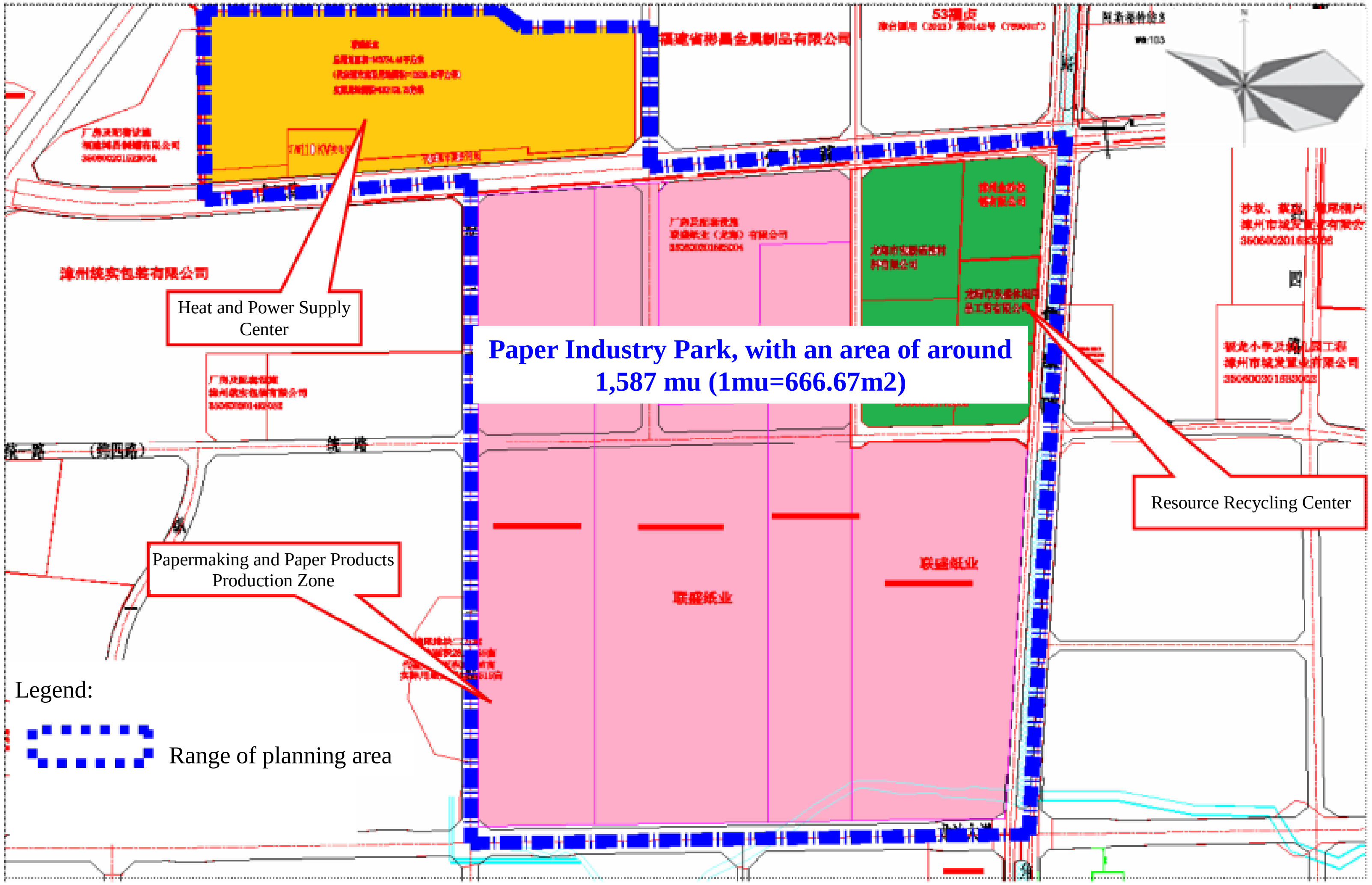

Heat and Power Supply Center
Paper Industry Park, with an area of around 1,587 mu (1mu=666.67m2)
Resource Recycling Center
Papermaking and Paper Products Production Zone
联盛纸业
联盛纸业
Legend:
Range of planning area

图 1.2-1　园区产业布局图

Figure 1.2-1 Industrial Layout Plan of the Park

1.2.2 环境功能区划

1.2.2 Environmental Function Zoning

拟建项目所在区域各环节要素功能区划情况详见下表 1.2-1。

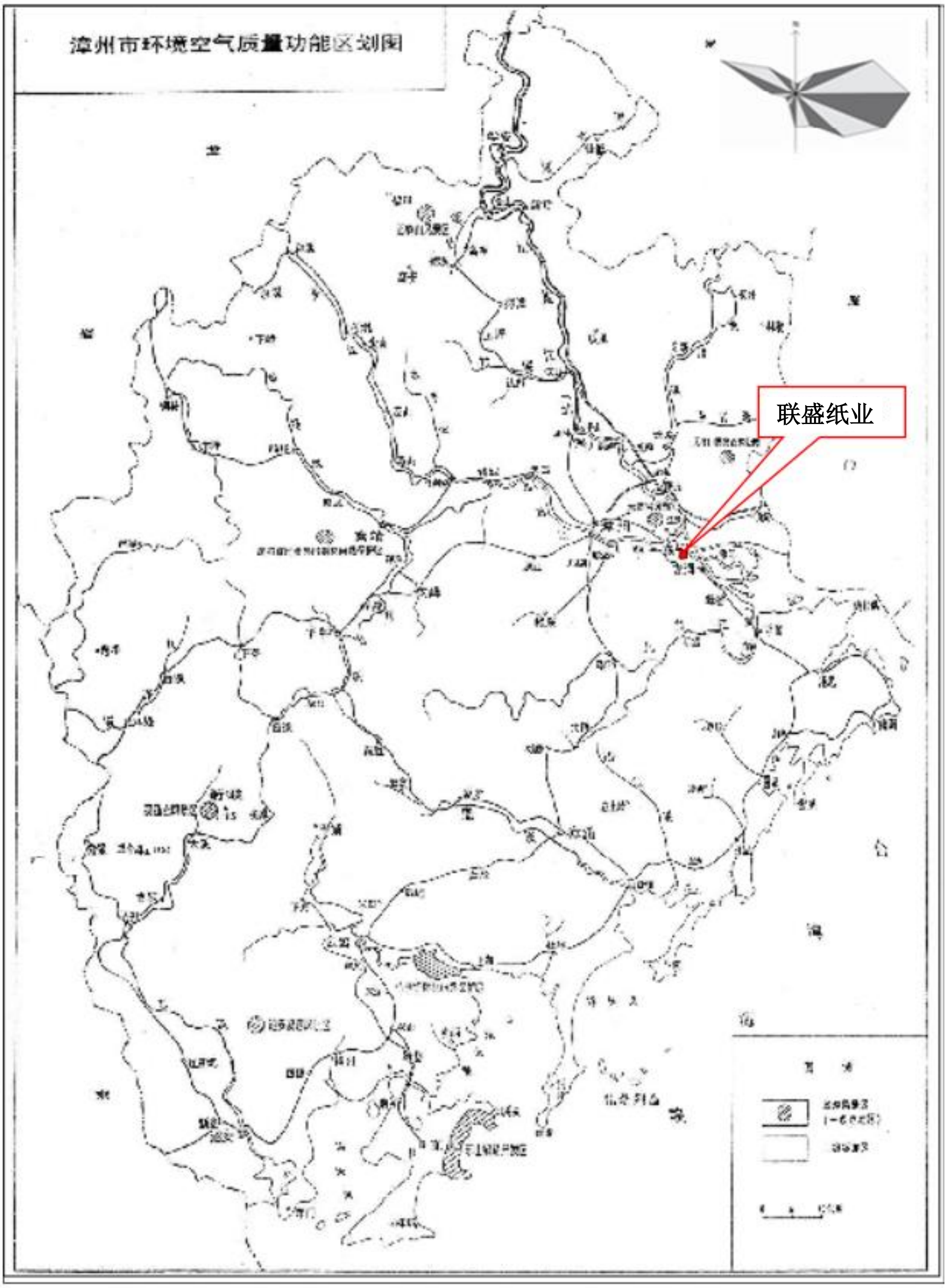
Fuction zoning of individual elements of the proposed project area is detailed in the Table 1.2-1 below.

表 1.2-1 区域环境功能区划一览表

Table 1.2-1 List of Environmental Function Zoning of the Area

环境要素 Environmental elements	功能区划 Function zoning	依据 Basis
大气环境 Atmospheric environment	区域环境空气质量执行《环境空气质量标准》（GB3095-2012）中的二级标准 For environmental air quality of the area, Grade II standard in the environmental Air Quality Standard (GB3095-2012) shall apply.	《漳州市环境空气质量功能区划》（2000年 Environmental Air Quality Function Zoning of Zhangzhou City (2000)
地表水 Surface water	现状排污口位于九龙江北港（厦漳跨海大桥连线以内的九龙江河口区域），主导功能为红树林保护、养殖，水质控制目标为二类，水质执行《海水水质标准》（GB3097-1997）第二类海水水质标准 Existing sewage drain outlet is located in North Port of Jiulong River (the estuary area of Jiulong River within the connections of Xiamen-Zhangzhou Sea-Crossing Bridge), mainly functioning as mangrove protection and aquaculture. The water quality control target is Grade II and water quality shall be in accordance with Grade II seawater quality standards in *Sea Water Quality Standard* (GB3097-1997) 规划的排污口位于九龙江口角美港口（厦漳跨海桥梁区北侧白礁至浙鸿近岸海域），主导功能为为港口、一般工业用水区、纳污，水质控制目标为三类，水质执行《海水水质标准》（GB3097-1997）第三类海水水质标准。 The planned drain outlet is located in Jiaomei Port at estuary Jiulong River (the coastal sea areas from Baijiao to Jianhong to the north of Xiamen-Zhangzhou Sea-Crossing Bridge area), mainly functioning as a	《福建省近岸海域环境功能区划（修编）》（2011～2020年） Environmental Function Zoning of Coastal Sea Areas for Fujian Province (Revision) (2011-2020)

	port, a general industrial water area and sewage containment. The water quality control target is Grade III and water quality shall be in accordance with Grade III seawater quality standards in *Sea Water Quality Standard* (GB3097-1997)	
声环境 Acoustic environment	规划区所在声环境功能区划为3类区，临角江路一侧20m±5m范围内为4a类区 The acoustic environment function zoning of the planning area is classified as Category 3 and Category 4a within 20m±5m of the side of the Linjiaojiang Road.	《漳州市城市总体规划（2012~2030年）》、《声环境功能区划分技术规范》（GB/T15190-2014） Overall Urban Planning of Zhangzhou City and "Technical Specifications for Acoustic Environmental Function Zoning" (GB/T15190-2014)


漳州市环境空气质量功能区划图
联盛纸业

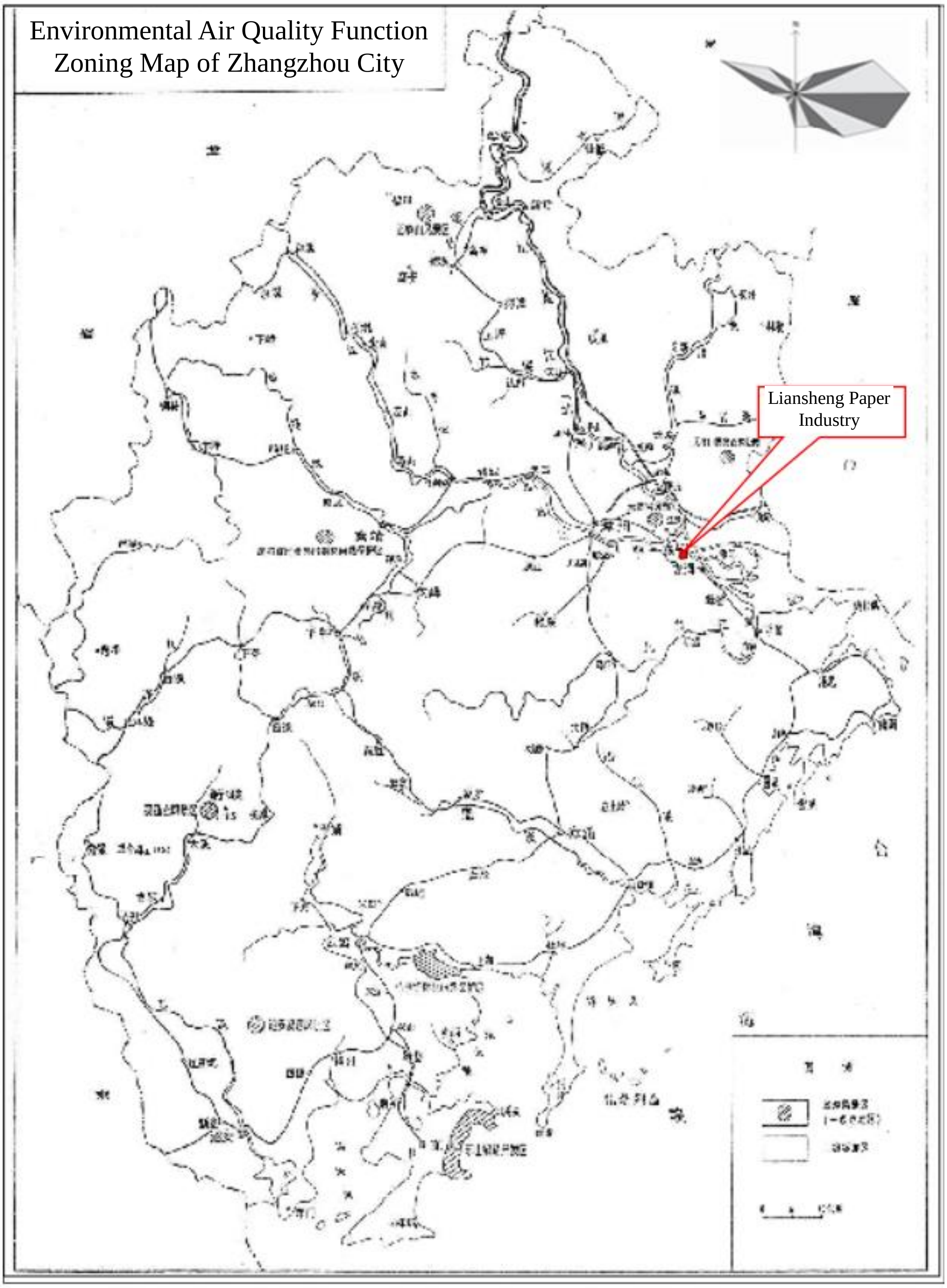
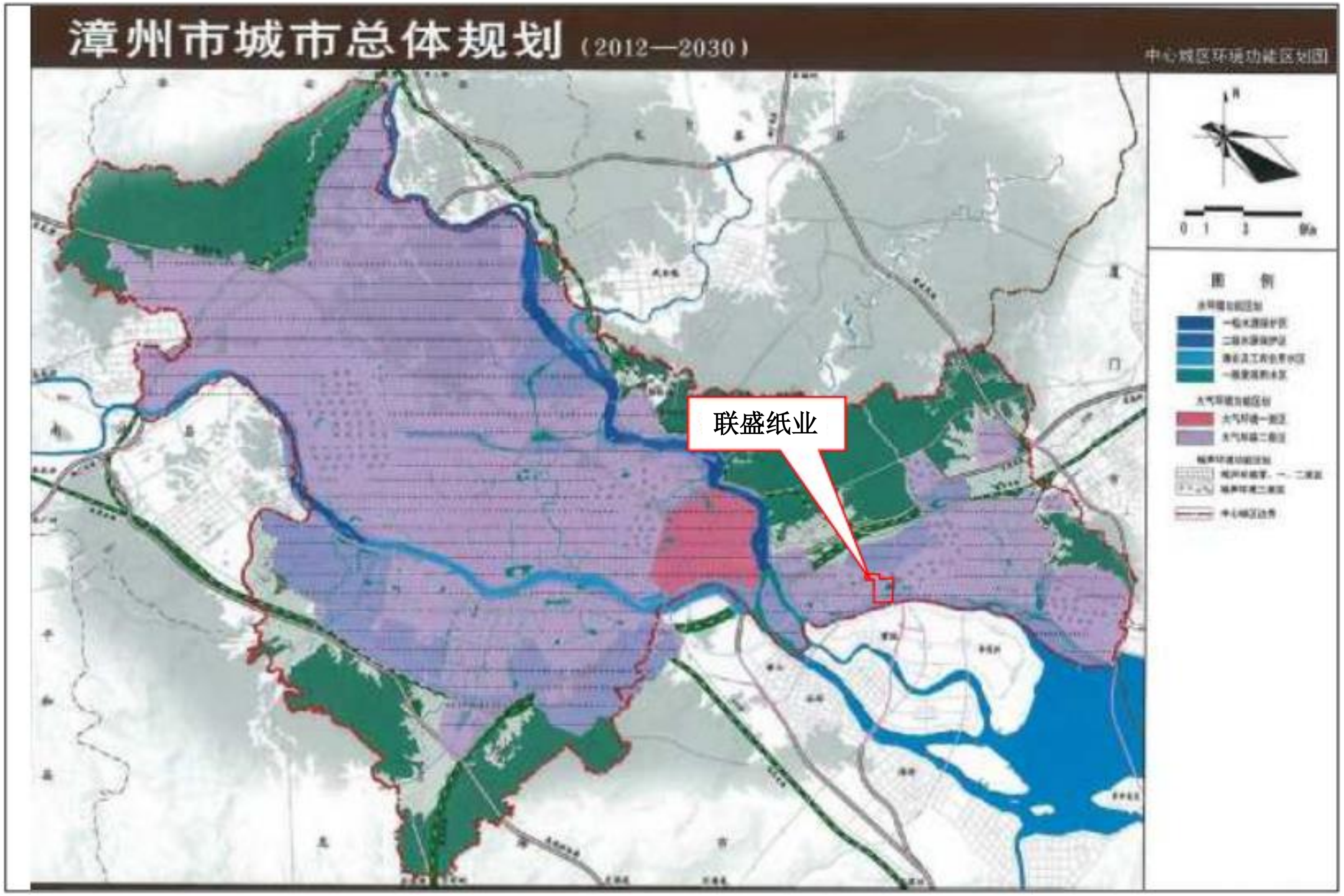


图 1.2-2　漳州市环境空气质量功能区划图

Figure 1.2-2 Environmental Air Quality Function Zoning Map of Zhangzhou City


漳州市城市总体规划（2012—2030）
中心城区环境功能区划图
联盛纸业

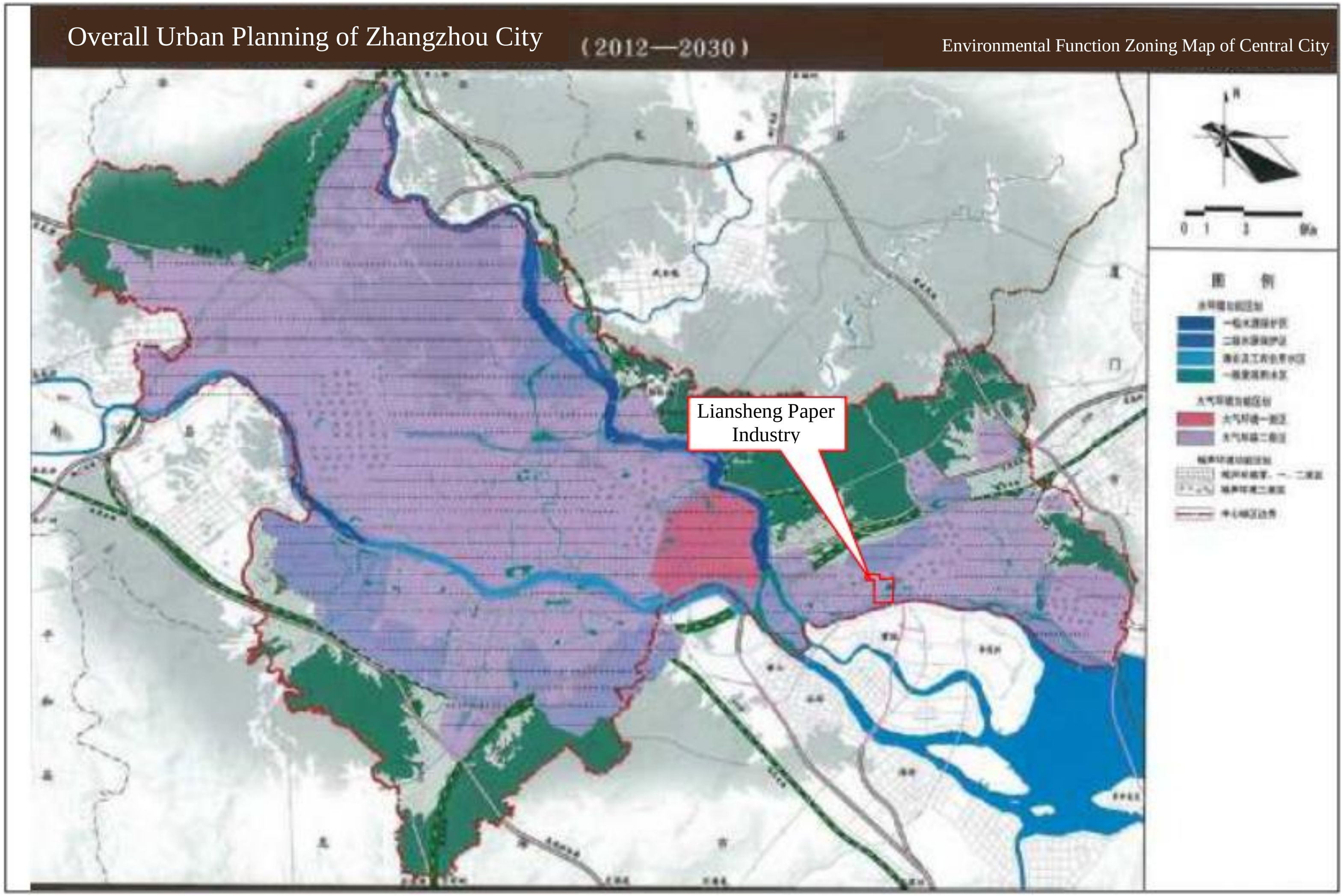

Overall Urban Planning of Zhangzhou City
(2012—2030)
Environmental Function Zoning Map of Central City
Liansheng Paper Industry

图 1.2-3 漳州市中心城区环境功能区划图

Figure 1.2-3 Environmental Function Zoning Map of Central City of Zhangzhou City

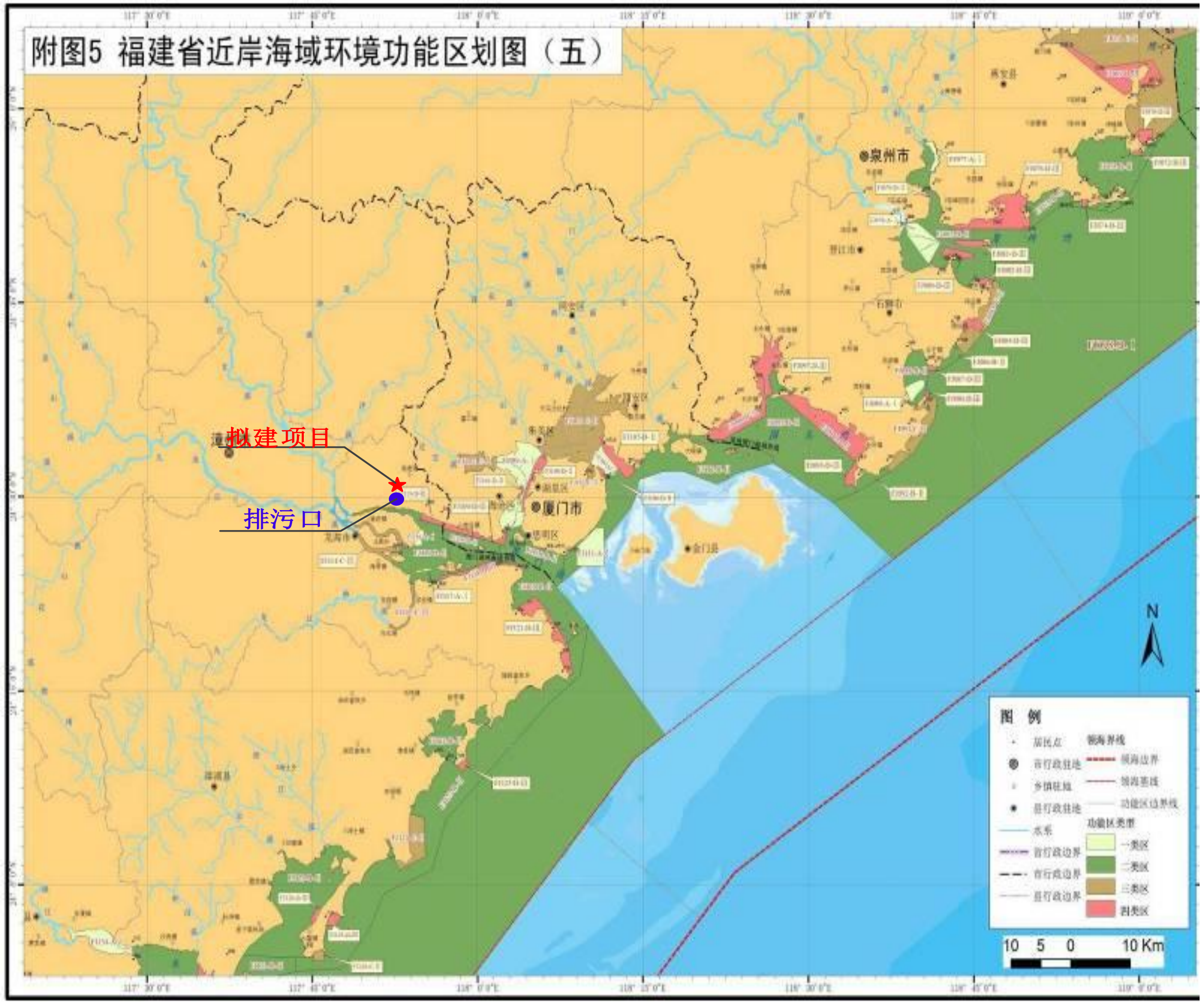

附图5 福建省近岸海域环境功能区划图（五）
拟建项目
排污口
泉州市
厦门市
图 例
10 5 0 10 Km
N

Figure 5 Environmental Function Zoning Map of Coastal Sea Areas for Fujian Province

图 1.2-4　福建省近岸海域环境功能区划（修编）（2011～2020 年）

Figure1.2-4 Environmental Function Zoning of Coastal Sea Areas for Fujian Province (Revision) (2011-2020)

1.3 评价原则及评价目的

1.3 Principles and Purpose of Assessment

1.3.1 评价原则

1.3.1 Principles of Assessment

（1）根据国家、福建省和漳州市有关环保法律法规、产业政策以及环境影响评价技术规定，以预防为主、防治结合、清洁生产、全过程控制的现代化环境管理思想和循环经济理念为指导，密切结合本项目工程特点和所在区域的环境特征，在国家及福建省有关行业规划、区域总体发展规划和环境功能区划的指导下，以科学、求实、严谨的工作作风开展评价工作；

(1) In accordance with environmental protection laws and regulations, industrial policies and environmental impact assessment technical regulations of Zhangzhou City, Fujian Province and the nation, guided by modern environmental management ideas and circular economy concepts of prevention, prevention and control, clean production, and whole process control, assessment work shall be carried out in a scientific, realistic and rigorous work style under the guidance of relevant industry planning, regional overall development planning and environmental function zoning of Fujian Province and the nation closely depending upon engineering features of the project and environmental characteristics of the project area.

（2）项目生产工艺、技术设备、能源及原辅料的消耗、污染物产生水平等符合国家清洁生产的要求；

The production process, technical equipment, energy and raw and auxiliary materials consumption and pollutant production levels, etc. shall satisfy the national requirements for clean production.

（3）项目建设满足国家和地方污染物排放总量控制要求；

(3) Project construction shall satisfy local and national control requirements on total pollutant discharge;

（4）项目建设符合相应的地方规划，结合现有工程，提出切实可行的以新带老措施。

(4) Project construction shall conform to corresponding local planning and practical and feasible measures to replace existing project with new project shall be put forward depending upon existing project.

1.3.2 评价目的

1.3.2 Purpose of Assessment

通过对现有工程主要生产工艺、产污环节及污染防治措施的分析，明确现有工程生产过程中的排污环节及污染物产生量、排放量，分析现有工程污染治理措施的可靠性，找出现有工程存在的环境问题。通过对拟建工程生产规模、生产工艺、污染环节及污染防治措施的详细分析，确定拟建工程的主要污染因子及其排放环节和排放量，结合现有工程、现有规划要求，提出切实可行的以新带老方案；在环境现状调查和监测的基础上，确定拟建项目投产前后全厂污染物排放总量的变化情况，并据此分析对区域环境影响的正负效应和对敏感保护目标的影响程度；重点论证拟建工程环保措施在技术上的可行性和经济上的合理性，明确提出技术可靠、针对性强、实用且经济的污染防治、总量控制措施。最终从产业政策、城市发展规划、用地规划、环境保护、厂址选择角度论证项目建设的可行性，为环境保护管理决策和环保设计提供依据。

Through the analysis of the main production processes, pollution production links and pollution prevention & control measures of the existing project, the pollutant discharge links, pollutant generation and discharge in production process of existing project are clarified and the reliability of such pollution prevention & control measures are analyzed so as to identify environmental issues in existing project. Through detailed analysis of the production scale, production process, pollution links and pollution prevention measures of the proposed project, the main pollution factors and their emission links and emissions of the proposed project are determined, and feasible measures to replace existing project with new project are proposed in accordance with the existing projects and existing planning requirements. Based on the investigation and monitoring of the current environmental status, changes in the total pollutant discharge of the whole plant before and after the proposed project is put into service are determined and positive and negative effects of environmental impact as well as degree of impact on sensitive protection objectives in the area are analyzed. Emphasis is laid on analysis of technical feasibility and economic rationality of environmental protection measures of the proposed project so as to clearly propose technically reliable, highly targeted, practical and economic pollution prevention & control and total discharge control measures. Finally, feasibility of project construction is demonstrated from the perspectives of industrial policy, urban development planning, land use planning, environmental protection, and site selection so as to provide basis for decision-making in environmental protection management and environmental protection design.

1.4 环境影响识别与评价因子筛选

1.4 Environmental Impact Identification and Screening of Assessment Factors

1.4.1 环境影响因素识别

1.4.1 Identification of Environmental Impact Elements

根据本项目的工程特点及项目所在地区环境状况，就本项目施工期和运营期对环境的影响进行识别，识别结果见表 1.4-1。

Depending upon engineering features of the project and environmental conditions of the project area, the environmental impacts during construction and operation period of the project are identified, of which results are as shown in Table 1.4-1.

表 1.4-1　　环境影响识别表

Table 1.4-1 Environmental Impact Identification List

开发活动 Development	施工期 Construction period	运营期 Operation period

activities 环境资源 Environmental resources		土建工程 Civil works	安装工程 Erection works	设备运输 Equipment transportation	废水排放 Wastewater discharge	废气排放 Waste gas emission	固废排放 Solid waste discharge	噪声排放 Noise emission	绿化 Greening	车辆交通 Vehicle traffic
自然环境 Natural environment	地表水 Surface water	-1SP			-1LP				+1LP	-1LP
	地下水 Underground water	-1SP			-1LP				+1LP	
	环境空气 Environmental air	-2SP		-1SP		-2LP			+1LP	-1LP
	声环境 Acoustic environment	-2SP	-1SP	-2SP				-1LP	+1LP	-2LP
	植被 Vegetation	-1LP				-2LP	-1LP		+2LP	

备注：影响程度：1—轻微；2—一般；3—显著
Remarks: impact degree: 1 - slight; 2 - moderate; 3 - significant
影响范围：P—局部； W—大范围影响时段：S—短期；L—长期
Impact scope: P - partial; W - wide range of impact periods: S - short term; L - long term
影响性质：+—有利 - —不利
Impact nature: + - favorable; - - adverse

1.4.2 评价因子筛选

1.4.2 Screening of Assessment Factors

1.4.2.1 施工期

1.4.2.1 Construction period

水环境：主要是基础施工和清洗搅拌设备产生的泥浆水，以及施工人员生活污水，主要污染因子为 SS、COD、氨氮、石油类等。

Water environment: mainly the muddy water produced by the foundation construction and cleaning mixing equipment, as well as the domestic sewage of construction workers. The main pollution factors are SS, COD, ammonia nitrogen, and petroleum, etc.

大气环境：主要是建筑材料堆放的风吹扬尘和施工车辆产生的道路扬尘，主要污染因子为颗粒物。

Atmospheric environment: mainly wind and dust piled up by building materials and road dust generated by construction vehicles. The main pollution factor is particulate matter.

声环境：主要是施工机械产生的噪声，一般为 70~100dB(A)左右，污染因子为连续等效 A 声级。

Acoustic environment: mainly the noise generated by construction machinery, generally at approx. 70-100dB(A). The pollution factor is equivalent continuous sound level A.

固体废物：主要是渣土、建筑垃圾等固体废物。

Solid waste: mainly solid waste such as muck and construction waste.

1.4.2.2 运营期

1.4.2.2 Operation period

根据项目排污特性、排污因子、等标排放量、控制标准等因素综合分析，项目运行期评价因子见表 1.4-2。

According to the project's sewage characteristics, pollutant discharge factors, equivalent emission standards, control standards and other factors, the assessment factors of the project operation period are as shown in Table 1.4-2.

表 1.4-2 环境影响识别表

Table 1.4-2 Environmental Impact Identification List

项目 Item	现状评价因子 Current assessment factors	影响评价因子 Impact assessment factors	污染物排放达标评价 Assessment of up-to-standard emission of pollutants	总量控制因子 Total amount control factor
大气环境 Atmospheric environment	-	-	-	-

海域水质环境 Water quality environment in sea area	pH、SS、DO、COD_{Mn}、pH, SS, DO, COD_{Mn}, BOD_5、无机氮 BOD_5, inorganic nitrogen	COD	pH、SS、氨氮、COD、pH, SS, ammonia nitrogen, COD, BOD_5、总氮、总磷 BOD_5, total nitrogen, total phosphorus	COD、氨氮 COD, ammonium nitrogen
声环境 Acoustic environment	等效连续A声级 Equivalent continuous sound level A			—
地下水 Underground water	pH、氨氮、硝酸盐、亚硝酸盐、挥发性酚类、氰化物、砷、汞、铬（六价）、总硬度、铅、氟化物、镉、铁、锰、溶解性总固体、高锰酸盐指数、硫酸盐、氯化物、色度 pH, ammonia nitrogen, nitrate, nitrite, volatile phenols, cyanide, arsenic, mercury, chromium (hexavalent), total hardness, lead, fluoride, cadmium, iron, manganese, total dissolved solids, permanganate index, sulfate, chloride and chromaticity	COD	-	-
固体废物 Solid waste	—		一般工业固体废物、危险废物、生活垃圾 General industrial solid waste, hazardous waste, domestic waste	

1.5 评价标准

1.5 Assessment Criteria

根据环境功能区划，确定本项目的环境影响评价标准。

Environmental impact assessment criteria for this project is to be determined according to the environmental function zoning.

1.5.1 环境质量标准

1.5.1 Environmental Quality Standard

1.5.1.1 环境空气质量标准

1.5.1.1 Environmental Air Quality Criteria

项目所属区域环境空气质量执行《环境空气质量标准》（GB3095-2012）中的二级标准。特征污染物 NH_3、H_2S 参照《工业企业设计卫生标准》（TJ36-79）中居住区最高允许浓度限值执行。具体见表 1.5-1。

For environmental air quality of project area, the Grade II standard in the environmental Air Quality Standard (GB3095-2012) shall apply. For characteristic pollutants NH3 and H2S, the maximum allowable concentration limit of the residential area in the *Sanitary Standards for Industrial Enterprises Design* (TJ36-79) shall apply. For details, refer to Table 1.5-1.

表 1.5-1　　环境空气质量标准

Table 1.5-1 Environmental Air Quality Standards

污染物名称 Name of pollutants	浓度限值 Concentration limit			标准来源 Source of standard	单位 Unit
	1小时平均 1 hr. average	24小时平均 24 hr. average	年平均 Annual average		
二氧化硫（SO_2） Sulfur dioxide (SO_2)	500	150	60	《环境空气质量标准》（GB3095-2012）二级标准 Grade II standard in *Environmental Air Quality Standards* (GB3095-2012)	ug/m^3
二氧化氮（NO_2） Nitrogen dioxide (NO_2)	200	80	40		
一氧化碳（CO） Carbon monoxide (CO)	$10mg/m^3$	$4mg/m^3$	—		
颗粒物（PM_{10}） Particulate matter (PM_{10})	—	150	70		
颗粒物（$PM_{2.5}$） Particulate matter ($PM_{2.5}$)	—	75	35		
总悬浮颗粒物（TSP）	—	300	200		

Total suspended particulate matters (TSP)					
NH_3	0.20（一次限值） 0.20 (one-time limit)			《工业企业设计卫生标准》（TJ36-79） *Sanitary Standards for Industrial Enterprises Design* (TJ36-79)	mg/m^3
H_2S	0.01（一次限值） 0.01 (one-time limit)				

1.5.1.2　海域水环境

1.5.1.2　Water Environment in Sea Area

拟建项目废水排入厂区污水处理站，污水处理站现状排污口位于九龙江北港，规划的排污口位于九龙江口角美港口。

The wastewater of the proposed project is discharged into the sewage treatment station of the plant area, of which existing sewage drain outlet is located at the North Port of Jiulong River. The planned drain outlet is located in Jiaomei Port at estuary Jiulong River.

根据《福建省近岸海域环境功能区划（修编）》（2011～2020 年，），现有工程排污口位于九龙江北港（FJ119-B-Ⅱ，厦漳跨海大桥连线以内的九龙江河口区域），主导功能为红树林保护、养殖，水质执行《海水水质标准》（GB3097-1997）中的二类标准；规划排污口位于九龙江口角美（FJ113-D-III，管网示意图见图 6.2-28），规划为四类区，主导水质为港口、一般工业用水区、纳污，海水水质执行《海水水质标准》（GB3097-1997）三类标准。具体见表 1.5-2。

In accordance with the “Environmental Functional Zoning of Coastal Waters of Fujian Province (Revision)” (2011-2020), the existing project sewage outlet is located in North Port of Jiulong River (FJ119-B-II, the estuary area of Jiulong River within the connections of Xiamen-Zhangzhou Sea-Crossing Bridge), mainly functioning as mangrove protection and aquaculture. The water quality shall be in accordance with Grade II seawater quality standards in Sea Water Quality Standard (GB3097-1997); the planned sewage drain outlet is located Jiaomei Port at estuary Jiulong River (FJ113-D-III, schematic diagram of the pipe network is as shown in Figure 6.2-28), mainly functioning as a port, a general industrial water area and sewage containment.

The water quality shall be in accordance with Grade III seawater quality standards in Sea Water Quality Standard (GB3097-1997). For details, refer to Table 1.5-2.

表 1.5-2 《海水水质标准》（G3097-1997） （单位：mg/L，pH 除外)

Table 1.5-2 Sea Water Quality (G3097-1997) (in mg/L, except for pH)

序号 Seq no.	项目 Item	第二类水质标准 Grade II water quality standard	第三类水质标准 Grade III water quality standard
1	水温 Water temperature	人为造成的海水温升夏季不超过当时当地1℃，其它季节不超过2℃ The artificially induced rise in seawater shall not exceed local temperature of 1 ℃ in the summer and 2 ℃ in other seasons.	人为造成的海水温升夏季不超过当时当地4℃ The artificially induced rise in seawater shall not exceed local temperate of 4 ℃ at current time
2	悬浮物质 Suspended substance	人为增加的量≤10 Artificially increased amount≤10	人为增加的量≤100 Artificially increased amount≤100
3	pH	7.8～8.5，同时不超出该海域正常变动范围的0.2pH单位 Also it shall not exceed the 0.2 pH unit of the normal variation range of the sea area.	6.8～8.8，同时不超出该海域正常变动范围的0.5pH单位 Also it shall not exceed the 0.5 pH unit of the normal variation range of the sea area.
4	溶解氧（DO）＞ Dissolved oxygen (DO)>	5	4
5	化学需氧量（COD）≤ Chemical oxygen demand (COD)≤	3	4
6	生化需氧量（BOD_5）≤ Biological oxygen demand (BOD_5)≤	3	4
7	无机氮（以N计）≤ Inorganic oxygen (calculated as N)≤	0.30	0.4

1.5.1.3 地下水水质标准

1.5.1.3 Underground water quality standard

地下水水质执行国家《地下水质量标准》（GB/T14848-2017）中的III类标准，具体标准值见表 1.5-3。

The groundwater quality is subject to the Grade III standard in the National Groundwater Quality Standard (GB/T14848-2017). For specific standard values, see Table 1.5-3.

表 1.5-3　地下水环境质量标准　单位：mg/L（除 pH、色度外）

Table 1.5-3 Underground Water Environment Quality Standard in mg/L (other than pH and chromaticity)

序号 Seq no.	项目 Item	标准 Standard no.	序号 Seq no.	项目 Item	标准 Standard no.
1	pH	6.5～8.5	11	铅 Lead	≤0.01
2	氨氮 Ammonia nitrogen	≤0.50	12	氟化物 Fluoride	≤1.0
3	硝酸盐 Nitrate	≤20.0	13	镉 Cadmium	≤0.005
4	亚硝酸盐 Nitrite	≤1.00	14	铁 Iron	≤0.3
5	挥发性酚类 Volatile phenols	≤0.002	15	锰 Manganese	≤0.10
6	氰化物 Cyanide	≤0.05	16	溶解性总固体 Dissolvable total solids	≤1000
7	砷 Arsenic	≤0.01	17	耗氧量（COD_{Mn}法，以O_2计） Oxygen consumption (COD_{Mn} method, calculated as O_2)	≤3.0
8	汞 Mercury	≤0.001	18	硫酸盐 Sulfate	≤250
9	铬（六价） Chromium (hexavalent)	≤0.05	19	氯化物 Chloride	≤250
10	总硬度 Total hardness	≤450	20	色（铂钴色度单位） pcu (Pt-Co chromaticity unit)	≤15

1.5.1.4　声环境质量标准

1.5.1.4　Acoustic Environmental Quality Standards

项目所在区域位于漳州台商投资区内，属声环境功能区划中的 3 类区，声环

境执行 GB3096-2008《声环境质量标准》中的 3 类区标准；临角江路侧为 4a 类功能区，执行 4a 类标准；周边敏感点声环境质量执行 GB3096-2008《声环境质量标准》中的 2 类区标准。

The project area is located in Zhangzhou Taiwanese Investment Zone, which falls under Cat. 3 zone in the acoustic environment functional zoning. For the acoustic environment thereof, standards for Cat. 3 zone in GB3096-2008 *Acoustic Environmental Quality Standards* shall apply. The project area at the side of Linjiaojiang Road falls under Cat. 4a zone in function zoning. For the acoustic environment thereof, standards for Cat. 4a zone in the same standard shall apply. For the acoustic environment of surrounding sensitive points, standards for Cat. 2 zone in the same standard shall apply.

具体见表 1.5-4。

For details, refer to Table XX.

表 1.5-4　环境噪声限值　单位：dB（A）

Table 1.5-4 Environmental Noise Limit in dB (A)

声环境功能区类别 Environmental Function Zoning	昼间 Night	夜间 Day
2	60	50
3	65	55
4a	70	55

1.5.2 污染物排放标准

1.5.2 Pollutants emission standard

1.5.2.1 废气

1.5.2.1 Waste gas

拟建项目依托厂内现有动力车间（该车间配备有 2×410t/h 循环流化床锅炉+1×C60-8.83/0.8+B70-8.83/0.8 供热发电机组），以及漳州市益盛环保能源有限公司垃圾发电（造纸废渣）工程的“1×150t/h 造纸废物焚烧 CFB 锅炉+1×N40MW 凝汽式汽轮发电机组”。

The proposed project will be supported by the existing powerhouse in the plant (which is equipped with 2×410t/h circulating fluidized bed boiler +1×C60-8.83/0.8+B70-8.83/0.8 cogeneration unit), and “1×150t/h paper waste incineration CFB boiler +1×N40MW condensing steam turbine generator set” for the waste-to-energy (papermaking waste residue) project of Zhangzhou Yisheng Environmental Protection Energy Co., Ltd.

依托的锅炉废气排放执行《火电厂大气污染物排放标准》（GB13223-2011），具体见表 1.5-5。

For waste gas of the supporting boiler, *Emission Standards for Air Pollutants in Thermal Power Plants* (GB13223-2011) shall apply. See Table 1.5-5 for details.

表 1.5-5　火电厂大气污染物排放标准

Table 1.5-5 Emission Standards for Air Pollutants in Thermal Power Plants

标准来源 Source of standard	污染物 Pollutant	单位 Unit	标准值 Standard value
《火电厂大气污染物排放标准》 *Emission Standards for Air Pollutants in Thermal Power Plants* （GB13223-2011） (GB13223-2011)	烟尘 Smoke and dust	mg/m^3	30
	SO_2	mg/m^3	200
	NO_X	mg/m^3	200

依托工程煤炭破碎工段产生的粉尘执行《大气污染物综合排放标准》（GB16297-1996）中表 2 二级标准。

For the dust generated by coal crushing section of the supporting project, Grade II standard in Table 2 of Integrated Emission Standards for Air Pollutants (GB16297-1996) shall apply.

表 1.5-6　煤炭破碎工段产生的粉尘执行标准

Table 1.5-6 Applicable Standards for Dust Generated by Coal Crushing Section

标准来源 Source of standard	污染物 Pollutant	最高允许排放浓度mg/m^3 Maximum allowable emission concentration, mg/m^3	最高允许排放速率，kg/h Maximum allowable emission rate, kg/h	
			排气筒高度 m Height of exhaust pipe, m	二级 Grade II

《大气污染物综合排放标准》（GB16297-1996）*Integrated Emission Standards for Air Pollutants* (GB16297-1996);	颗粒物 Particulate matter	150	15	3.5

拟建项目生产过程中制浆间产生少量无组织排放臭气、因拟建项目的投产导致污水处理站新增的无组织排放臭气，NH_3、H_2S、臭气浓度等恶臭气体执行《恶臭污染物排放标准》（GB14554-1993）表 1 中二级新扩改标准，具体见表 1.5-7。

During the production process of the proposed project, a small amount of unorganized odor will be generated in the pulping room. For the unorganized odor of sewage treatment station due to commissioning of the proposed project, odorous gases such as NH3, H2S and odor concentration, the Grade II standards for new construction and expansion in shall apply. For details, refer to Table 1.5-7.

表 1.5-7　恶臭气体排放执行标准

Table 1.5-7 Applicable Standards for Emission of Odor Gas

标准来源 Source of standard	污染因子 Pollution factors	排放参数 Emission parameter	单位 Unit	排放值 Emission value
GB14554-93恶臭污染物排放标准 GB14554-93 *Emission Standards for Odor Pollutants*	氨 Ammonia	厂界浓度 Concentration at battery limit	mg/m^3	1.5
	硫化氢 Hydrogen sulfide	厂界浓度 Concentration at battery limit	mg/m^3	0.06
	臭气 Odor gas	厂界浓度 Concentration at battery limit	无量纲 Dimensionless	20

1.5.2.2　废水

1.5.2.2　Wastewater

拟建项目废水排放执行福建省地方标准《制浆造纸工业水污染物排放标准》（DB35/1310-2013）中表 1 制浆和造纸联合生产企业水污染物直接排放限值，其中单位产品基准排水量执行表 2 标准，具体见表 1.5-8~表 1.5-9。

Waste water discharge of proposed project shall be in accordance with Table 1 Direct Emission Limits of Water Pollutants from Pulping and Papermaking

Coproduction Enterprises in *Emission Standards for Water Pollutants in the Pulp and Paper Industry* (DB35/1310-2013), of which benchmark effluent volume per unit product shall be in accordance with standards in Table 2. For details, refer to 1.5-8 – 1.5-9

表 1.5-8 水污染物直接排放限值（摘自 DB35/1310-2013）

Table 1.5-8 Direct Emission Limits of Water Pollutants (abstracted from DB35/1310-2013)

污染物排放限值 Pollutants emission limits	制浆和造纸联合生产企业 Pulping and papermaking coproduction enterprise	污染物排放监控位置 Monitoring position of pollutants emission
pH值 pH value	6-9	企业废水总排放口 Main drain outlet of enterprise's waste water
色度（稀释倍数） Chromaticity (dilution factor)	50	企业废水总排放口 Main drain outlet of enterprise's waste water
悬浮物（mg/L) Suspended matter (mg/L)	30	企业废水总排放口 Main drain outlet of enterprise's waste water
生化需氧量（BOD_5，mg/L) Biological oxygen demand (BOD_5, mg/L)	20	企业废水总排放口 Main drain outlet of enterprise's waste water
化学需氧量（COD_{Cr}，mg/L) Chemical oxygen demand (COD_{Cr}, mg/L)	80	企业废水总排放口 Main drain outlet of enterprise's waste water
氨氮（mg/L） Ammonia nitrogen (mg/L)	8	企业废水总排放口 Main drain outlet of enterprise's waste water
总氮（mg/L） Total nitrogen (mg/L)	12	企业废水总排放口 Main drain outlet of enterprise's waste water
总磷（mg/L） Total phosphorus (mg/L)	0.8	企业废水总排放口 Main drain outlet of enterprise's waste water
单位产品基准排水量，t/t(浆) Benchmark effluent volume per unit product, t/t(pulp)	12	排水量计量位置与污染物排放 Effluent metering position and pollutant emission 监控位置一致 Consistent with monitoring position

说明：1、本项目未采用含氯漂白工艺，可吸附有机卤素（AOX）和二噁英（Dioxins）指标不采用。 Notes: 1. Chlorine bleaching process is not used in this project and therefore indexes for adsorbable organic halogen (AOX) and Dioxins will not be applied. 2、企业自产废纸浆量占企业纸浆总用量的比重大于80%，单位产品基准排水量为12t/t（浆）。 2. Percentage of self-produced waste paper pulp over total pulp consumption of enterprises is higher than 80%; benchmark effluent volume per unit product is 12 t/t(pulp).

表 1.5-9　单位产品基准排水量（摘自 DB35/1310-2013）

Table 1.5-9 Benchmark Effluent Volume per Unit Product, t/t(pulp) (Abstracted from DB35/1310-2013)

企业生产类型 Production type of enterprises	①自产浆占总用浆比重（%） ① Percentage of self-produced pulp over total pulp consumption (%)	②自产废纸浆占总用浆比重（%） ② Percentage of self-produced waste paper pulp over total pulp consumption (%)	本色，t/t(浆) True color, t/t(pulp)	
			植物浆≥50% Plant pulp ≥50%	植物浆＜50% Plant pulp <50%
制浆和造纸 Pulping and papermaking 联合生产企业 coproduction enterprise	20～50（不含） 20-50 (not included)	0～50（不含） 0-50 (not included)	—	20
	≥50	≤50	35	30
		50～60（不含） 50-60 (not included)	—	30
		60～70（不含） 60-70 (not included)	—	20
		70～80（不含） 70-80 (not included)	—	15
		≥80	12	

1.5.2.3　噪声

1.5.2.3　Noise

运营期厂界噪声排放执行《工业企业厂界环境噪声排放标准》（GB12348-2008）中的 3 类标准，临角江路一侧执行 4 类标准，具体见表 1.5-10。

Noise emission at battery limit during operation period shall be in accordance with Grade III standard in *environmental Noise Emission Standards for Industrial Enterprises' Boundaries* (GB12348-2008) and that at the side of the Linjiaojiang Road shall be in accordance with Grade IV standard. For details, refer to Table 1.5-10.

表 1.5-10　工业企业厂界噪声排放限值　单位：dB（A）

Table 1.5-10 Emission Limits of Industrial Enterprises' Boundaries, in dB (A)

厂界外声环境功能区类别 Category of acoustic environmental function zoning outside battery limit	昼间 Night	夜间 Day
3	65	55
4	70	55

施工期噪声执行《建筑施工场界环境噪声排放标准》（GB12523-2011），详见表 1.5-11。

(19) Noise emission during construction period shall be in accordance with *environmental Noise Emission Standards for Building Construction Boundaries* (GB12523-2011). For details, refer to Table 1.5-11.

表 1.5-11　建筑施工场界环境噪声排放限值

Table 1.5-11 Emission Limits of environmental Noise Emission Standards for Building Construction Boundaries

项目 Item	昼间（Leq[dB(A)]） Night (Leq[dB(A)])	夜间（Leq[dB(A)]） Day (Leq[dB(A)])
标准值 Standard value	70	55
--		夜间噪声最大声级超过限值的幅度不得高于 15 dB(A) Magnitude of off-limit maximum sound level of noise at night shall not exceed 15 dB(A)

1.5.2.4　固体废物

1.5.2.4　Solid waste

一般工业固体废物贮存、处置执行 GB18599-2001《一般工业固体废物贮存、处置场污染控制标准》，危险废物执行 GB18597-2001《危险废物贮存污染控制标准》以及《关于发布<一般工业固体废物贮存、处置场污染控制标准>（GB18599-2001）等 3 项国家污染物控制标准修改单的公告》。

Storage and disposal of general industrial solid wastes shall be in accordance with GB18599-2001 *General Industrial Solid Waste Storage and Disposal Site Pollution Control Standards*. Those of hazardous wastes shall be in accordance with GB18597-2001 *Hazardous Waste Storage Pollution Control Standards* and

Announcement on Publication of the Amendment of Three National Pollutant Control Standards such as General Industrial Solid Waste Storage and Disposal Site Pollution Control Standards (GB18599-2001) and so on.

1.6 评价工作等级与评价范围

1.6 Assessment Work Level and Scope

1.6.1 评价工作等级

1.6.1 Assessment Work Level

1.6.1.1 海域环境

1.6.1.1 Sea area environment

拟建项目废水排放量为 12614m^3/d，包括生产废水、生活污水，主要污染因子包括 COD、BOD_5、SS、色度等，为非持久性污染物，即污染物类型=1，水质复杂程度属简单。目前拟建项目依托的污水处理站出水暂时排放至九龙江北港；待排海管道建设完成后，拟建项目产生废水及厂内现有工程产生的废水经过厂内污水处理厂处理达标后统一纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

The wastewater discharge of the proposed project is 12614m^3/d, consisting of production wastewater and domestic sewage. Main pollution factors include COD, BOD5, SS and chromaticity, etc., which are non-persistent pollutants, i.e. pollutant type=1 and water quality complexity is simple. Presently, the effluent from the sewage treatment station supporting the proposed project is temporarily discharged to North Port of Jiulong River. Once marine discharge pipes are completed, both wastewater generated by proposed project and by existing project in the plant will be incorporated into the tailwater marine discharge pipes of Jiaomei Sewage Treatment Plant (250,000 t/d) after being treated by the sewage treatment plant in the plant for uniform discharge to deep sea.

根据《环境影响评价技术导则—地面水环境》HJ/T2.3-93 中"表 3 海湾环境影响评价分级判据"要求，综合考虑水质、水量及排放去向，确定海域环境评价等级为二级，具体详见表 1.6-1。

In accordance with Table 3 - Classification Criteria for Estuarine Environmental Impact Assessment Level in *Technical Guidelines for Environmental Impact Assessment Surface Water Environment* HJ/T2.3-93, sea area environmental assessment work for sea area is classified as Level 2 taking into comprehensive account water quality, water flow and destination of discharge. For details, refer to Table 1.6-1.

表 1.6-1　海湾环境影响评价分级判据

Table 1.6-1 Classification Criteria for Estuarine Environmental Impact Assessment Level

内容 Contents	污水排放量（m^3/d） Sewage discharge (m^3/d)	污水水质复杂程度 Sewage water quality complexity	类型 Type
导则二级判据要求 Level 2 criteria requirements in the Guideline	≥5000，＜20000	简单 Simple	小型封闭海湾 Small closed bay
本项目 This project	12614	简单 Simple	九龙江河口区 Estuary area of Jiulong River

1.6.1.2　地下水环境

1.6.1.2　Underwater Environment

根据《环境影响评价技术导则 地下水环境》（HJ610-2016）要求，本项目为造纸项目，属于II类项目，环境属于不敏感，地下水评价等级可判定为三级。

In accordance with requirements in *Technical Guidelines for Environmental Impact Assessment Underground Water Environment* (HJ610-2016), this project, as a papermaking project, falls under Class II project and environment thereof falls under insensitive environment so that underground water environmental assessment can be determined as Level 3.

根据导则内容地下水环境评价工作等级分级依据见表 1.6-2。

Criterion for classification of underground water environmental assessment work in accordance with contents of the Guideline are as shown in Table 1.6-2.

表 1.6-2 评价工作等级分级表

Table 1.6-2 List of Assessment Work Levels

项目类别 Item classification 环境敏感程度 Environmental sensitivity	Ⅰ类项目 Class I	Ⅱ类项目 Class II	Ⅲ类项目 Class III
敏感 Sensitive	一 1	一 1	二 2
较敏感 Relatively sensitive	一 1	二 2	三 III
不敏感 Insensitive	二 2	三 III	三 III

评价区域不属于地下水补给径流区和生活供水水源地准保护区；也不属于热水、矿泉水、温泉等特殊地下水源保护区；项目占地为现有工业建设用地，场地内无分散居民饮用水源等地下水环境敏感区，环境属于不敏感地区。

The assessment area neither falls under groundwater recharge runoff area and quasi-protection area of domestic water supply source, nor special groundwater source protection area such as hot water, mineral water or hot spring. The project occupies existing industrial construction land with no groundwater environment sensitive areas such as portable water sources of dispersed residents therein, so that the environment falls under insensitive areas

1.6.1.3 声环境

1.6.1.3 Acoustic environment

拟建项目位于漳州市台商投资区凤山工业园联盛纸业现有厂区内，处于声环境功能区划中的 3 类区，建设前后敏感目标噪声级增高量在 3dB(A)以下，且受影响人口数量变化不大。

The proposed project is located in the existing plant area of Liansheng Paper Industry, Fengshan Industrial Park, Taishang Investment Zone, Zhangzhou City, and is located in the 3 types of acoustic environment functional zones. The noise level increase of sensitive targets before and after construction is below 3dB(A), and The number of affected populations has not changed much.

依据《环境影响评价技术导则 声环境》（HJ2.4-2009）中声环境评价工作等级划分的原则“项目所处的声功能区为 GB3096 规定的 3 类、4 类地区，或建设

项目建设前后评价范围内敏感目标噪声级增高量在 3dB(A)以下[不含 3dB(A)]，且受影响人口数量变化不大时，按三级评价”。因此，声环境评价等级定为三级。

According to the principle of classification of acoustic environment evaluation in the Environmental Impact Assessment Technical Guidelines (HJ2.4-2009), the acoustic functional area of the project is the Category 3 and Category 4 areas specified in GB3096, or the construction of the construction project. When the noise level increase of sensitive targets within the pre- and post-evaluation range is below 3dB(A) [excluding 3dB(A)], and the number of affected populations does not change much, the evaluation is based on three levels. As such, acoustic environmental assessment is classified as Level 3.

1.6.1.4 环境风险

1.6.1.4 Environmental Risk

拟建项目生产过程中无重大危险源分布，根据《建设项目环境风险评价技术导则》(HJ/T169.2004)，评价等级为二级。

There is no major hazard source distribution in the production process of the proposed project. According to the Technical Guidelines for Environmental Risk Assessment of Construction Projects (HJ/T169.2004), the assessment work level is Level 2.

1.6.2 评价范围

1.6.2 Scope of Assessment

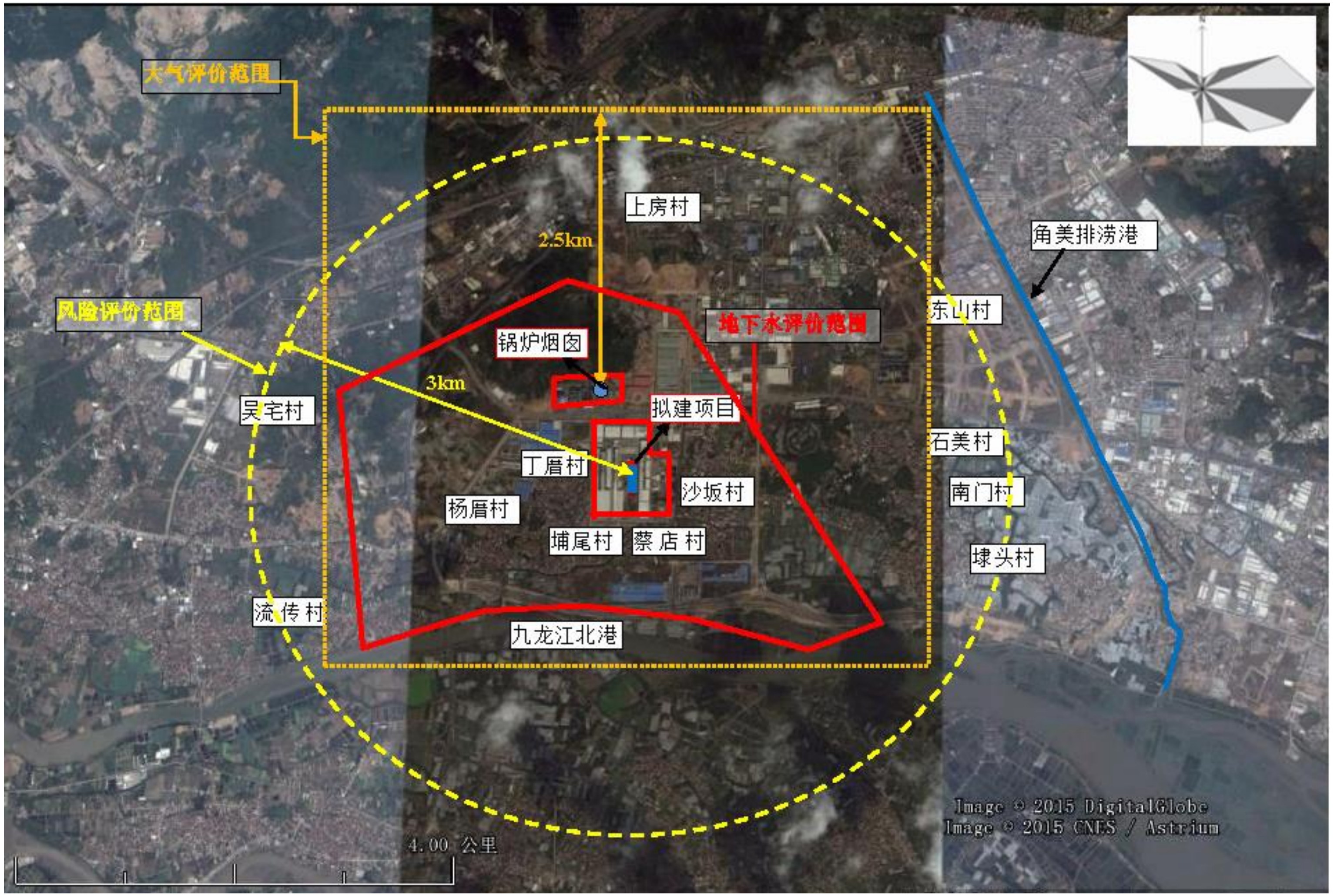
根据环境影响评价技术导则，确定本项目环境影响评价范围见表 1.6-3，环境空气和环境风险评价范围见图 1.6-1 和图 1.6-2。

In accordance with technical guidelines for EIA, the scope of EIA for this project is as shown in- and that of environmental air and environmental risk assessment is shown in - and - respectively.

表 1.6-3 本项目评价范围

Table 1.6-3 Scope of Assessment for This Project

项目 Item	评价范围 Scope of Assessment
海域环境 Sea area environment	九龙江北港排污口上游4km至东侧下游约9km的整个九龙江如海河口湾北汊和南汊海域，总面积约70km^2 North and south branch of sea outfall from 4km upstream of the drain outlet at North Port to around 9km downstream thereof at east side along Jiulong River has a total area of approx. 70km^2.
地下水环境 Underground Water Environment	根据水文地质条件，地下水评价范围选取上游为西北侧山脊线，下游以地面河流为地下水排泄基准面，两侧为人为边界，评价范围约6km^2 Based on the hydrogeological conditions, the upstream is selected as northwest ridge line and ground river at downstream is selected as datum of underground water drainage in the scope of underground water assessment with both sides as artificial boundaries. The assessment scope is around 6km^2.
声环境 Acoustic environment	厂界外200m 200m outside battery limit
环境风险 Environmental risk	以风险源为中心半径3km范围 A radius of 3km from the center of risk source


大气评价范围
2.5km
上房村
角美排涝港
风险评价范围
东山村
地下水评价范围
锅炉烟囱
3km
吴宅村
拟建项目
石美村
丁厝村
沙坂村
南门村
杨厝村
埔尾村
蔡店村
埭头村
流传村
九龙江北港
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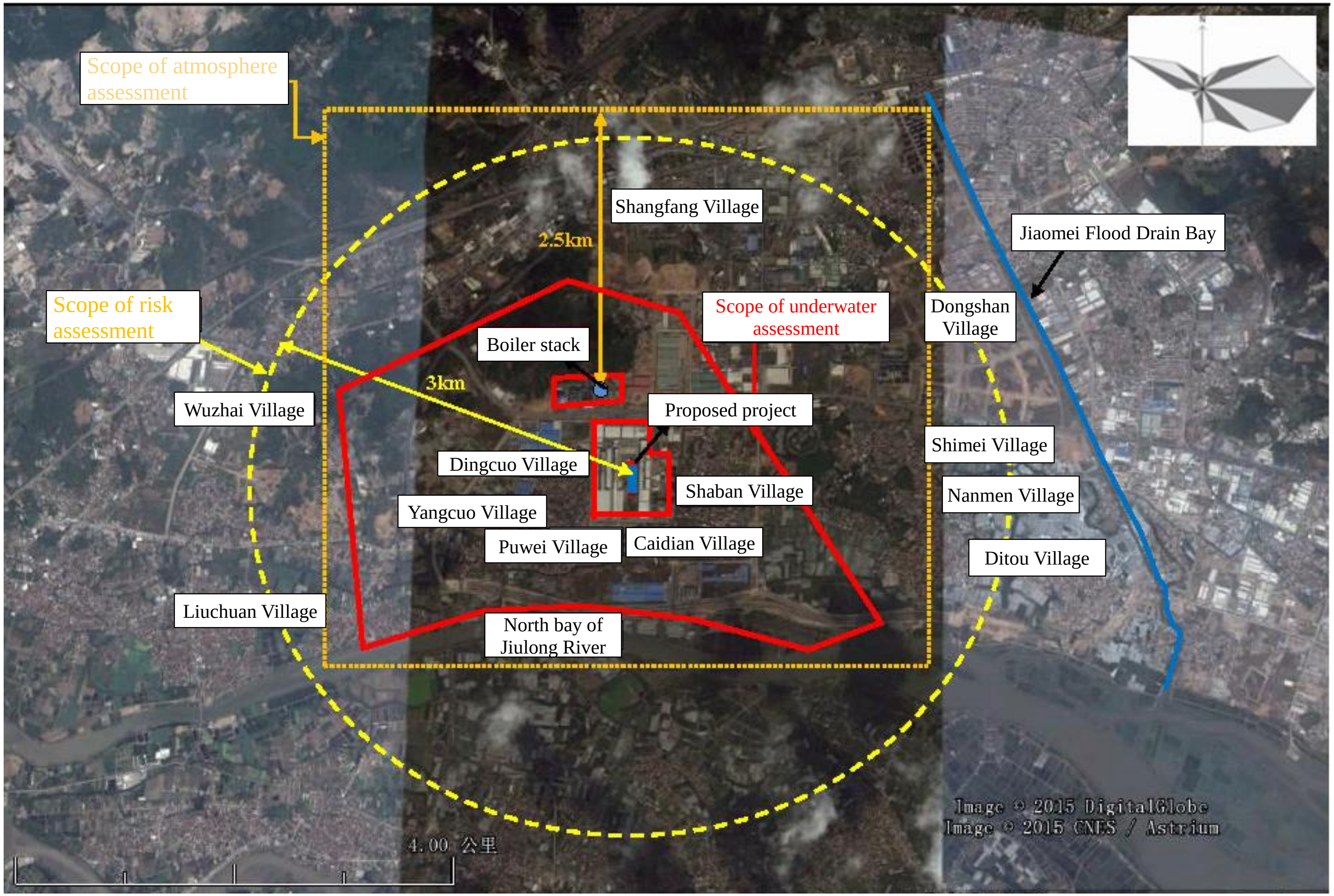
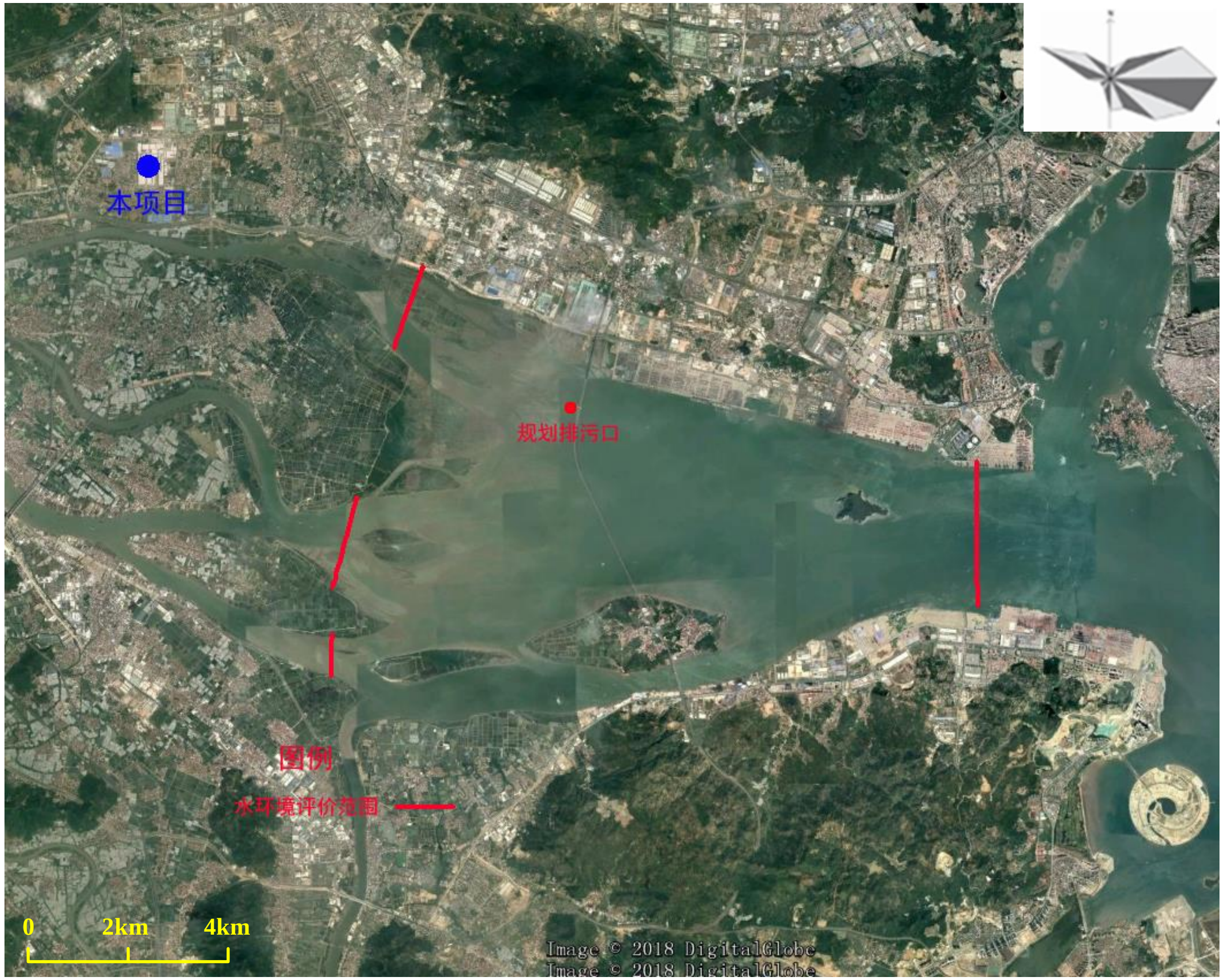

Scope of atmosphere assessment
Scope of risk assessment
2.5km
3km
Shangfang Village
Jiaomei Flood Drain Bay
Scope of underwater assessment
Dongshan Village
Boiler stack
Wuzhai Village
Proposed project
Shimei Village
Dingcuo Village
Shaban Village
Nanmen Village
Yangcuo Village
Puwei Village
Caidian Village
Ditou Village
Liuchuan Village
North bay of Jiulong River
4.00 公里
Image © 2015 DigitalGlobe
Image © 2015 CNES / Astrium

图 1.6-1　评价范围及环境敏感点分布图

Figure 1.6-1 Scope of Assessment and Distribution of Environmentally Sensitive Points


本项目
规划排污口
图例
水环境评价范围
0
2km
4km
Image © 2018 DigitalGlobe
Image © 2018 DigitalGlobe

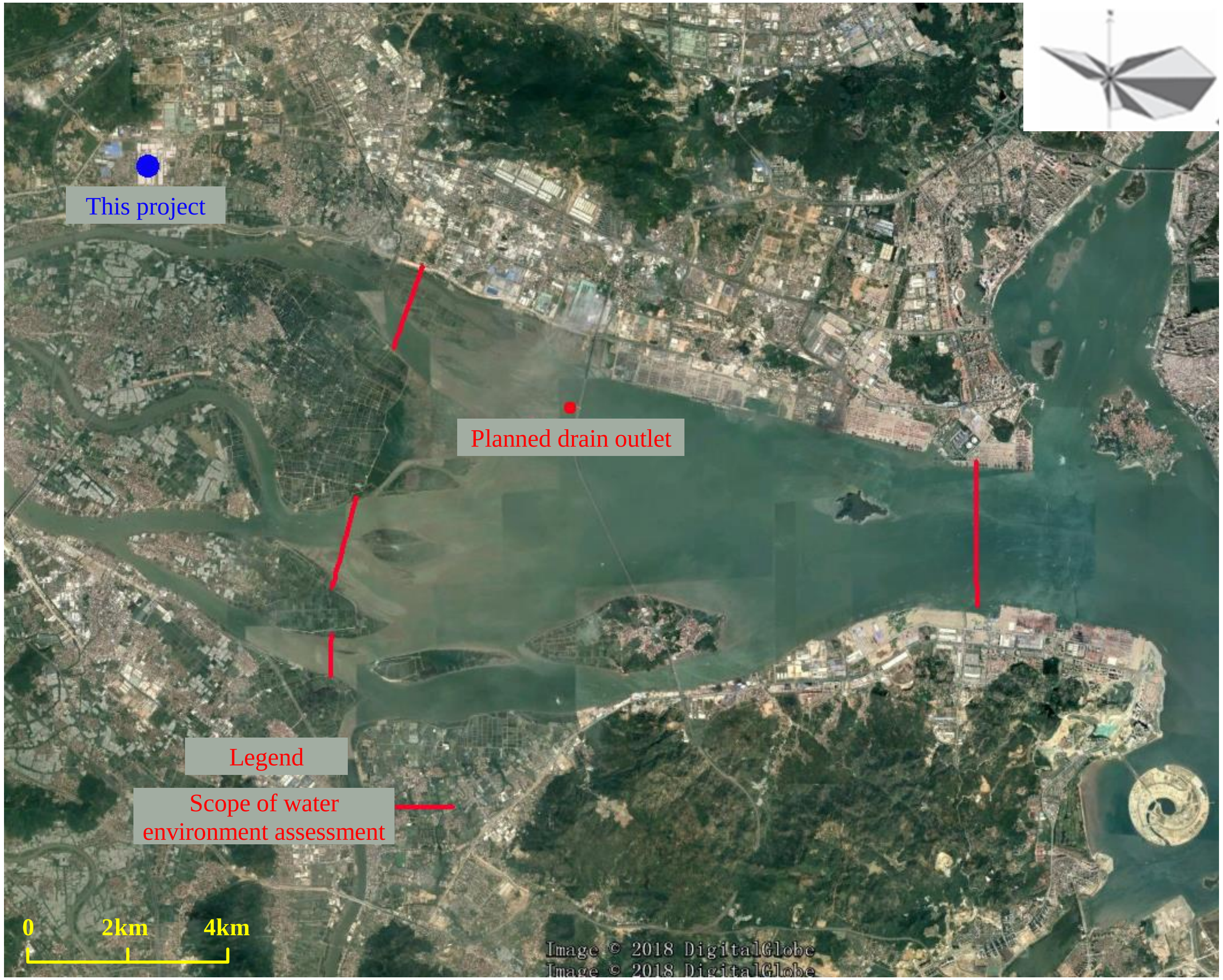

This project
Planned drain outlet
Legend
Scope of water environment assessment
0
2km
4km
Image © 2018 DigitalGlobe
Image © 2018 DigitalGlobe

图 1.6-2　地面水环境影响范围图

Figure 1.6-2 Scope of Impact of Ground Water Environment

1.7 评价重点

1.7 Emphases of Assessment

（1）明确现有工程的组成、生产规模及污染物的排放情况，明确现有工程目前存在的问题；

(1) Identify the composition of existing projects, the scale of production and the discharge of pollutants, and clarify the current problems of existing projects;

（2）明确拟建工程的主要生产工艺及产污节点，结合现有工程的具体情况，提出以新带老措施；

(2) Identify the main production processes and pollution-producing nodes of the proposed project, and propose measures to replace existing project with new project;

（3）分析项目主要污染防治措施、如污水处理措施、噪声防治措施等的技术经济可行性，并提出相应的保障措施方案；

(3) Analyze the technical and economic feasibility of the main pollution prevention measures, such as sewage treatment measures and noise prevention measures, and propose corresponding safeguard measures

（4）贯彻清洁生产原则。在充分类比调查的基础上用单位产品的物耗、能耗、污染物排放量及全厂范围内的水重复利用率等各项指标定量评价、论述、分析工程所采用的生产工艺的先进性和环保措施的完善性；

(4) Implement the principle of cleaner production. On the basis of sufficient analogy survey, quantitatively assess, discuss and analyze the advancement of production process and perfection of environmental protection measures used in the project by using various indicators such as material consumption, energy consumption, pollutant discharge and water reuse rate throughout the plant;

（5）污染物达标排放及总量控制可行性论证，提出污染物总量控制方案；

(5) Demonstrate feasibility of pollutant discharge compliance and total amount control, and propose total pollutant control plan;

（6）采取发当调查表，在网站公示等方式，充分征求周边群众对项目建设的建议与意见。

(6) Fully solicit suggestions and opinions on the project construction from surrounding communities by distribution of questionnaire forms and publicity on web sites.

1.8 环境保护目标

1.8 Environmental Protection Objectives

项目周边的环境保护目标分布情况见表 1.8-1，环境敏感点示意图详见图 1.6-1。

Distribution of environmental projection objectives surrounding the project is as shown in Table 1.8-1. Schematic diagrams of environmentally sensitive points are as shown in Figure 1.6-1.

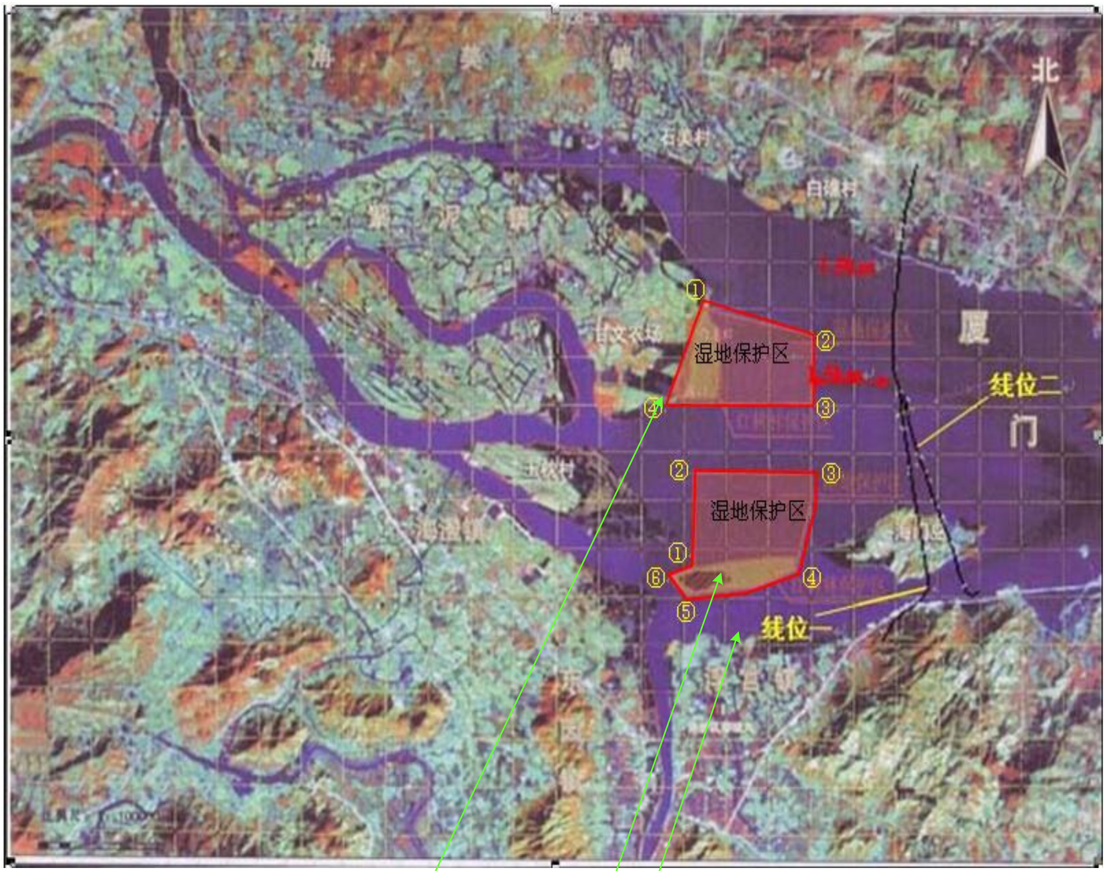
表 1.8-1 本项目周边环境敏感点

Table 1.8-1 Environmentally Sensitive Points in Surrounding Environment of the Project

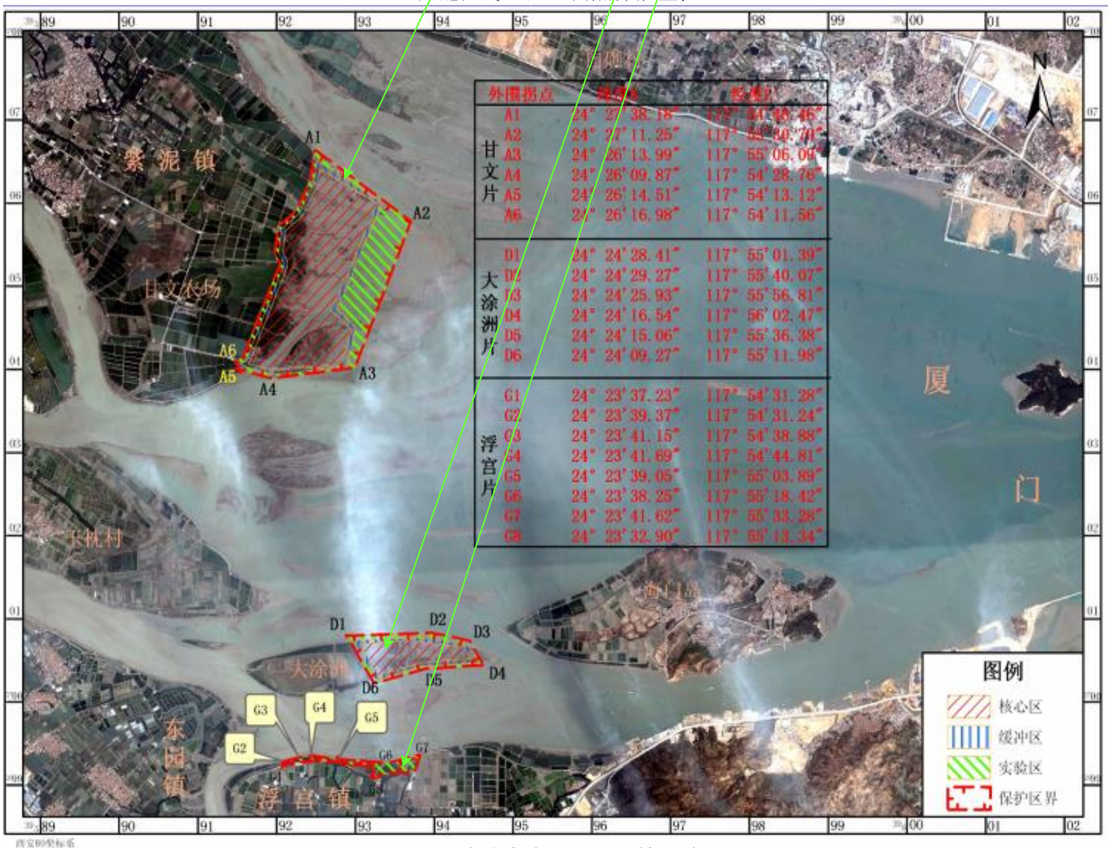
环境要素 Environmental elements	保护对象 Protection objects	与厂界位置 Location relative to battery limit		主要环境特征 Major environmental characteristics	环境质量目标 Environmental quality standard
		方位 Orientation	距离 Distance		
环境风险 Environmental risk （R=3.0km） (R=3.0km)	沙坂村 Shaban Village	东侧 East	0.035km	2189人，农业、养殖 2,189 persons, agriculture and cultivation	GB3095-2012 二级标准 Grade II standard
	丁厝村 Dingcuo Village	西侧 West	0.06km	800人，农业、养殖 800 persons, agriculture and cultivation	
	蔡店村 Caidian Village	南侧 South	0.06km	1221人，农业、养殖 1,221 persons, agriculture and cultivation	
	埔尾村 Puwei Village	南侧 South	0.06km	2581人，农业、养殖 2,581 persons, agriculture and cultivation	
	杨厝村 Yangcuo Village	西南侧 Southwest	0.65km	3007人，农业、养殖 3,007 persons, agriculture and cultivation	

	上房村 Shangfang Village	东北侧 Northeast	1.8km	1618人，农业种植 1618 persons, agriculture and cultivation	
	吴宅村 Wuzhai Village	西北侧 Northwest	2.4km	4544人，农业种植 4544 persons, agriculture and cultivation	
	流传村 Liuchuan Village	西南侧 Southwest	1.95km	3776人，农业、养殖 3776 persons, agriculture and cultivation	
	南门村 Nanmen Village	东南侧 Southeast	1.95km	3640人，农业、养殖 3640 persons, agriculture and cultivation	
	埭头村 Ditou Village	东南侧 Southeast	2.7km	1810人，农业、养殖 1,810 persons, agriculture and cultivation	
	石美村 Shimei Village	东侧 East	1.7km	5464人，农业种植 5,464 persons, agriculture and cultivation	
	东山村 Dongshan Village	东北侧 Northeast	2.4km	4983人，农业种植 4,983 persons, agriculture and cultivation	
海域环境 Sea area environment	九龙江 Jiulong River 北港 North Port	南侧 South	2.5km	平均高潮位2.411m，平均低潮位-1.579m，平均潮差3.99m Mean hight water: 2.411m, mean low water: -1.579m, mean range: 3.99m	GB3097-1997 第二类 Class II
	九龙江口湿地、红树林保护区 Wet land and mangroves reserve	东南侧 Southeast	6.5km	面积0.5km^2 Area: 0.5km^2	GB3097-1997 第一类 Class I

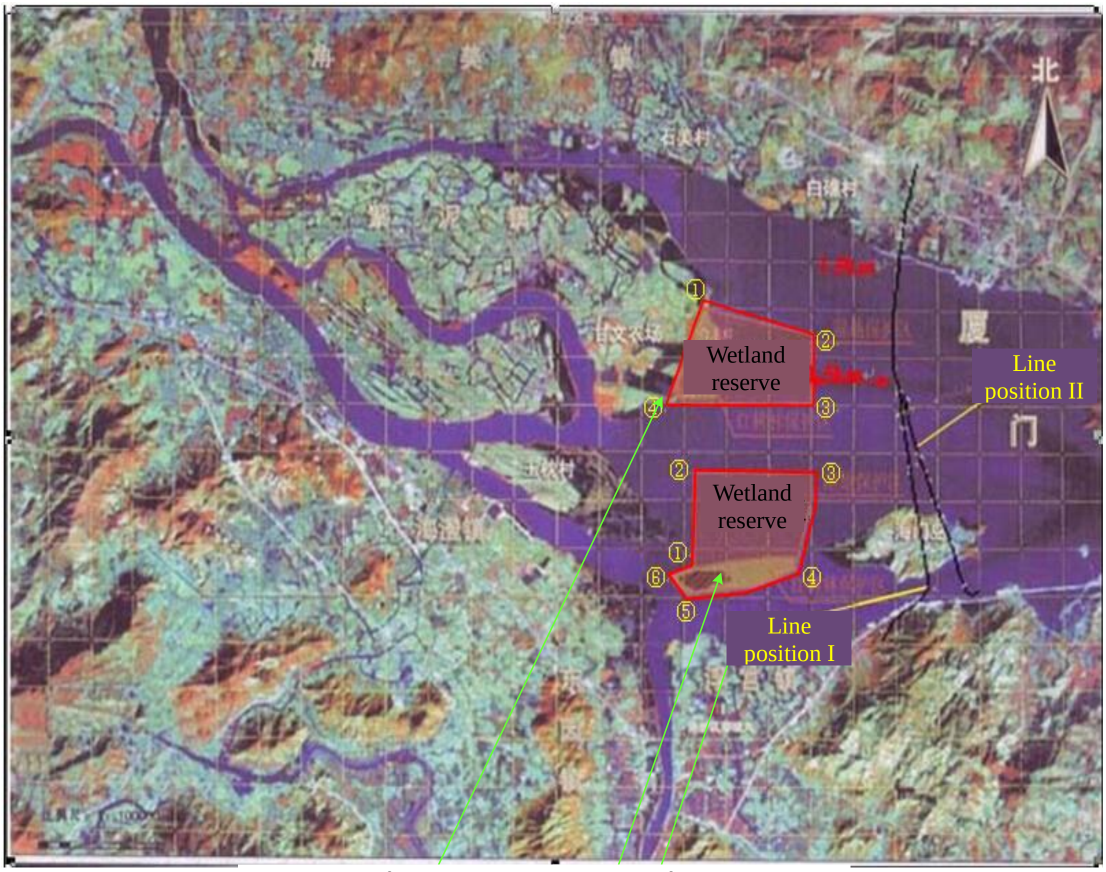
	at estuary of Jiulong River				
声环境 Acoustic environment （R=200m） (R=200m)	沙坂村 Shaban Village	东侧 East	0.035km	2189人，农业、养殖 2,189 persons, agriculture and cultivation	GB3096-2008 2类标准 Grade II standard
	蔡店村 Caidian Village	南侧 South	0.06km	1221人，农业、养殖 1,221 persons, agriculture and cultivation	
	埔尾村 Puwei Village	南侧 South	0.06km	2581人，农业、养殖 2,581 persons, agriculture and cultivation	
	丁厝自然村 Dingcuo Natural Village	西侧 West	0.06km	800人，农业、养殖 800 persons, agriculture and cultivation	



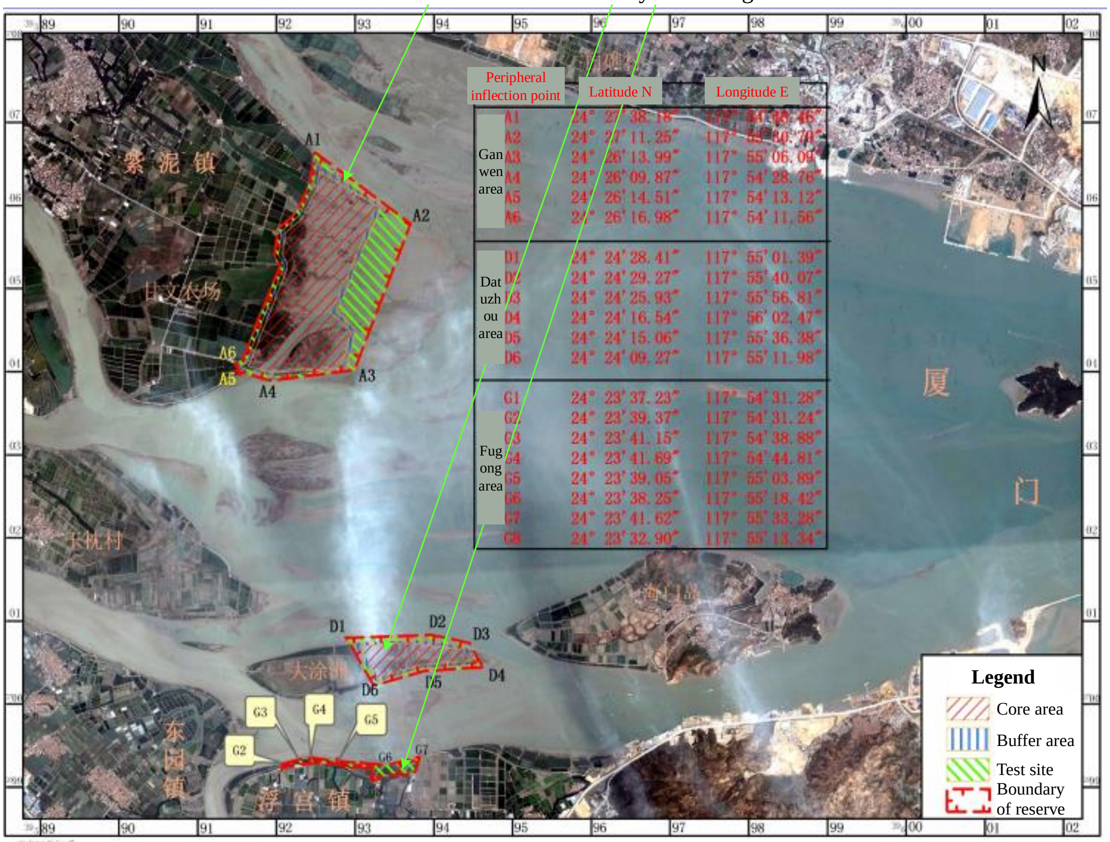
九龙江河口湿地自然保护区位置



龙海九龙江口红树林保护区位置



Location of wetland reserve at estuary of Jiulong River



	Peripheral inflection point	Latitude N	Longitude E
Ganwen area	A1	24° 27' 38.18"	117° 54' 48.46"
	A2	24° 27' 11.25"	117° 54' 50.70"
	A3	24° 26' 13.99"	117° 55' 06.09"
	A4	24° 26' 09.87"	117° 54' 28.76"
	A5	24° 26' 14.51"	117° 54' 13.12"
	A6	24° 26' 16.98"	117° 54' 11.56"
Datuzhou area	D1	24° 24' 28.41"	117° 55' 01.39"
	D2	24° 24' 29.27"	117° 55' 40.07"
	D3	24° 24' 25.93"	117° 55' 56.81"
	D4	24° 24' 16.54"	117° 56' 02.47"
	D5	24° 24' 15.06"	117° 55' 36.38"
	D6	24° 24' 09.27"	117° 55' 11.98"
Fugong area	G1	24° 23' 37.23"	117° 54' 31.28"
	G2	24° 23' 39.37"	117° 54' 31.24"
	G3	24° 23' 41.15"	117° 54' 38.88"
	G4	24° 23' 41.69"	117° 54' 44.81"
	G5	24° 23' 39.05"	117° 55' 03.89"
	G6	24° 23' 38.25"	117° 55' 18.42"
	G7	24° 23' 41.62"	117° 55' 33.28"
	G8	24° 23' 32.90"	117° 55' 13.34"

Location of mangroves reserve at estuary of Jiulong River,

图 1.8-1　海域环境敏感保护目

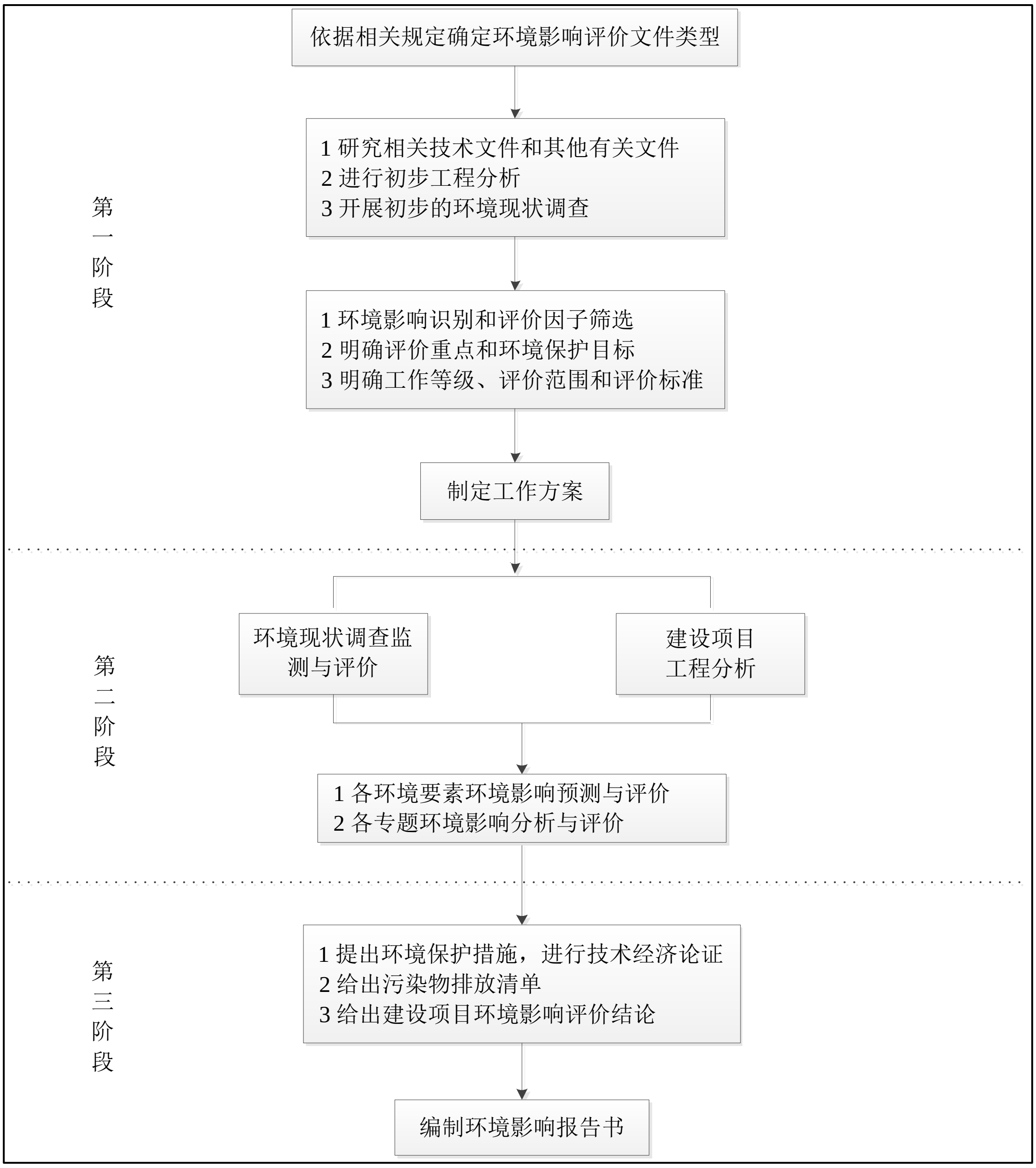
Figure 1.8-1 Environmentally Sensitive Protection Objects in Sea Area

1.9 评价工作程序

1.9 Assessment Work Procedures

本项目环评工作程序见图 1.9-1。

EIA work procedures of this project are as shown in Figure 1.9-1.



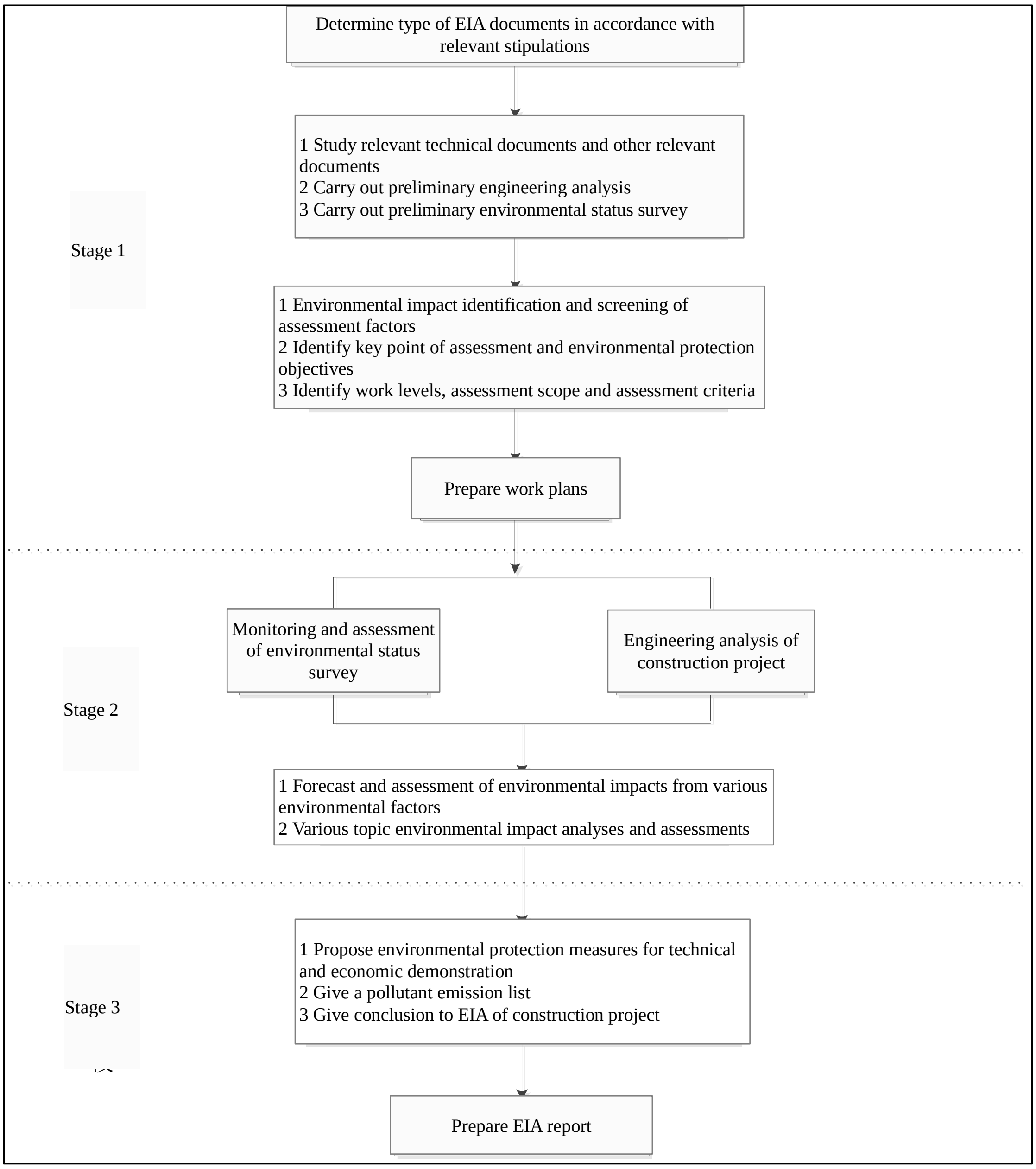


图 1.9-1　环境影响评价工作流程图

Figure 1.9-1 EIA Work Flow Chart

2 现有工程概况及工程分析

2 General Description and Engineering Analysis of Existing Project

2.1 项目概况

2.1 Project Overview

2.1.1 基本情况

2.1.1 General Description

联盛纸业（龙海）有限责任公司是一家近年发展迅速的包装纸私营工业企业，项目位于漳州台商投资区凤山工业园，占地面积 1246 亩，总投资 751304 万元，其中环保投资 18210 万元。现有职工 1500 人，厂区由角江路划分为南北两个地块。项目东侧隔角泰路为森茂塑胶、沙坂村，南面隔规划道路为埔尾村、蔡店村，西侧隔经二路为丁厝村。现有工程的地理位置见图 2.1-1，周边关系见图 2.1-2。

Liansheng Paper Industry (Longhai) Co., Ltd is a private enterprise of packing paper which has seen a rapid growth in recent years. The project is located in Fengshan Industrial Park of Zhangzhou Taiwanese Investment Zone with a total planned area of 1,246 mu and a total investment of RMB 7513.04 million, including the environmental protection investment of RMB 182.1 million. Now the project is staffed with 1,500 employees and the plant area is divided into south and north land blocks by the Jiaojiang Road. Senmao Plastic and Shaying Village lie to the west of the project and are separated therefrom by Jiaotai Road. Puwei Village and Caidian Village lie to the south of the project and are separated therefrom by planned road. Dingcuo Village lies to the west thereof and separated therefrom by Jinger Road. Geographic location of existing project is as shown in Figure 2.1-1 and relationship with surrounding environment is as shown in Figure 2.1-2.

2.1.2 项目建设过程

2.1.2 Project Construction Process

2010 年 4 月，公司在龙海市角美镇投资建设联盛纸业（龙海）有限公司，建设 200 万吨高档包装板纸工程，同年委托福建省环境保护设计院完成《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程环境影响报告书》，漳州市环境保护局以漳环审[2010]25 号对该项目报告书予以批复，环评报告书及批复内容要求：工程分为三期进行，一期建设年产 45 万吨牛皮箱板纸生产线和年产 35 万吨高强瓦楞原纸生产线，二期建设年产 45 万吨牛皮箱板纸生产线和年产 35 万吨高强瓦楞原纸生产线，三期建设年产 40 万吨灰底涂布白板纸生产线。项目建设自备动力车间以满足全厂用汽用电需求，一期选用额定蒸发量为 350t/h 的循环流化床多燃料锅炉 1 台，配置额定功率为 60MW 的抽凝式供热机组 1 台，二期选用额定蒸发量为 350t/h 的循环流化床多燃料锅炉 2 台，配置额定功率为 70MW 的背压式供热机组 1 台。

In April 2010, the company established Liansheng Paper Industry (Longhai) Co., Ltd. in Jiaomei Town of Longhai City, building a high-grade cardboard paper project with annual production of 2 mtpa. In the same year, the company commissioned Environmental Protection Design Institute of Fujian Province to complete *EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa* and the Environmental Protection Bureau of Zhangzhou City approved that EIA report with document ZHS [2010] No. 25. Contents and requirements of the EIA report and the approval are as follows: the project will be constructed in three phases. Phase I of the project consists of a 450,000 t/a kraft linerboard production line and a 350,000 t/a high-strength corrugating medium production line. Phase II consists of a 450,000 t/a kraft linerboard production line and a 350,000 t/a gray board production line). Phase III consists of a 400,000 t/a gray-coated whiteboard paper production line. The project will be constructed with a captive powerhouse to meet the steam and power demand of the whole plant. In Phase I, a CFB multi-fuel boiler with a BECR of 350t/h will be selected and be equipped with a back pressure type cogeneration unit with a rated power of 60MW. In the second phase, two CFB with a BECR of 350t/h will be selected and be equipped with a back pressure cogeneration unit with a rated power of 70MW.

建设单位在项目设计建设过程中，结合工程实际情况，对自备动力车间循环流化床锅炉的规模进行适当调整，并根据市场需求，对二三期部分产品方案进行了优化调整，导致实际建设情况与原环评报告及其环保批复内容存在一定差异，其变动的主要内容如下：

In the process of project design and construction, the construction company adjusted the scale of the circulating fluidized bed boiler in the captive power plant in accordance with the actual situation of the project, and optimized and adjusted some of the product plans of the second and third phases according to market demand, resulting in actual construction. The situation is different from the original EIA report and its environmental approval content. The main contents of the change are as follows:

（1）对自备动力车间循环流化床锅炉的型号进行适当调整，即将 3 台 350t/h 的循环流化多燃料锅炉变更为 3 台 410t/h 循环流化多燃料锅炉。

(1) Appropriate adjustment is made to type of the CFB boilers in captive powerhouse, that is, three 350t/h CFB multi-fuel boilers are changed into three 410t/h CFB multi-fuel boilers.

（2）二期建设年产 35 万吨高强瓦楞原纸生产线（PM8 线）调整为年产 35 万吨灰板纸生产线（PM7 线），2014 年 4 月建成投入试生产；二期年产 45 万吨牛皮箱板纸生产线（PM7 线）变更生产线编号，调整为 PM9 线，2017 年 12 月建成投入生产。三期年产 40 万吨灰底涂布白板纸生产线（PM9 线）调整为年产 40 万吨灰底涂布白板纸生产线（PM8 线），2014 年 4 月建成投入试生产。

(2) The 350,000 t/a high-strength corrugating medium production line (PM8 line) to be built in Phase II is changed into 350,000 t/a gray board production line (PM7 line), which is completed and put into service in April of 2014. Numbering of the 450,000 t/a kraft linerboard production line (PM7 line) in Phase II is changed into PM9 which is completed and put into service in December of 2017. The 400,000 t/a

gray-coated whiteboard paper production line (PM9 line) in Phase III is changed into 400,000 t/a gray-coated whiteboard paper production line (PM8 line), which is completed and put into trial production in April of 2014.

由于项目在实际建设过程中发生了变化，按照漳州市环境保护局的要求，深圳市宗兴环保科技有限公司编制完成《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程环境影响后评价报告》，并已经完成了在漳州市环境保护局的备案。

With such changes in actual construction process of the project, upon request of Environmental Protection Bureau of Zhangzhou City, Shenzhen Zongxing Environmental Protection Technology Co., Ltd prepared and completed *Post-project EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa*, which has been filed in the bureau.

2015 年 3 月 11 日漳州市环境保护局以漳环验[2015]7 号对二期 35 万 t/a 灰板纸（PM7 线）及三期 40 万 t/a 灰底涂布白板纸（PM8 线）完成竣工环境保护阶段性验收。2018 年 4 月 1 日联盛纸业组织召开了了竣工环境保护阶段性验收环保会议，并 2018 年 5 月 10 日漳州市环境保护局以漳环验[2018]1 号对二期 45 万吨牛皮箱板纸生产线（PM9 线）完成竣工环境保护阶段性验收。

On March 11, 2015, the Environmental Protection Bureau of Zhangzhou City completed the phased environmental protection acceptance on completion of the 350,000 t/a gray board (PM7 line) in Phase II and the 400,000 t/a gray-coated whiteboard paper (PM8 line) in Phase III in accordance with document ZHY [2015] No. 7. On April 01, 2018, Liansheng Paper convened environmental protection meeting for phased environmental protection acceptance on completion. On May 10, 2018, the Environmental Protection Bureau of Zhangzhou City completed the phased environmental protection acceptance on completion of the 450,000 t/a kraft linerboard (PM9 line) in Phase II in accordance with document ZHY [2018] No. 1.

2016 年，公司为解决制浆工序筛选出来的铁丝、塑料等造纸废渣，委托编制了《联盛纸业（龙海）有限公司年处理 55 万吨造纸废渣回收项目环境影响报

告表》，并于 2016 年 9 月 2 日取得了漳州台商投资区环安局的审批，项目于 2018 年 09 月竣工，并进入调试阶段；2018 年 3 月 16 日完成了项目污染防治设施竣工环保验收，且取得了漳州台商投资区环安局的验收意见函（漳台环验[2018]01 号）。

In 2016, the company commissioned the preparation of *EIA Report for the Papermaking Waste Recycling Project of Liansheng Paper (Longhai) Co., Ltd with Annual Processing Capacity of 550,000 Tons* in order to dispose of papermaking waste residues such as iron wire and plastics screened by the pulping process. On September 2, 2016, the company obtained the approval of the Environmental Protection Bureau of Zhangzhou Taiwanese Investment Zone. The project was completed in September of 2018 and progressed to commissioning stage. On March 16, 2018, the environmental protection acceptance on completion of the project pollution prevention facilities was completed and acceptance comments letter from the Environmental Protection Bureau of Zhangzhou Taiwanese Investment Zone (ZTHY [2018] No.01) was obtained.

2017 年 06 月 23 日，联盛纸业（龙海）有限公司取得漳州台商投资区环安局颁发的排污许可证，许可证编号为 913506815575947589001P。

On June 23, 2017, Liansheng Paper (Longhai) Co., Ltd. obtained the sewage discharge license no. 913506815575947589001P issued by the Environmental Protection Bureau of Zhangzhou Taiwanese Investment Zone.

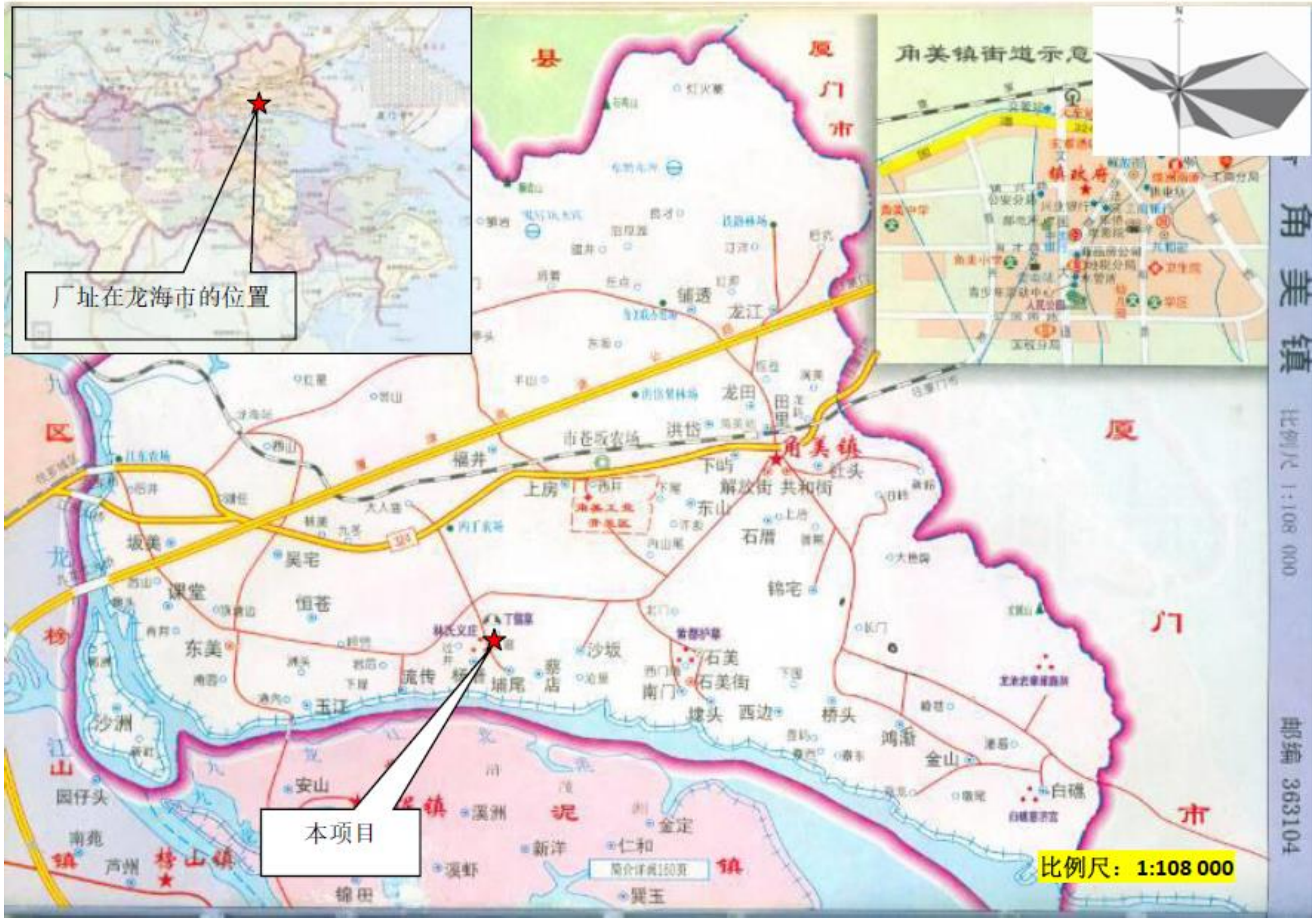
2018 年，根据《国家危险废物名录》（2016）废纸回收利用处理过程中产生的脱墨渣属于危险废物（HW12 染料、涂料废物 221-001-12），公司委托编制了《联盛纸业（龙海）有限公司脱墨污泥自行利用资源化处理项目环境影响报告书》，并于 2018 年 3 月 9 日公司取得了漳州台商投资区环安局的批复（漳台环审[2018]02 号）；项目于 2018 年 03 月 26 日竣工，并进入调试阶段，2018 年 6 月 11 日完成了项目污染防治设施竣工环保验收，且取得了漳州台商投资区环安局的验收意见函（漳台环验[2018]24 号）。

In accordance with National Catalog of Hazardous Wastes, the deinking residue generated during the recycling process of waste paper falls under hazardous waste

(HW12 dye, paint waste 221-2001-12). In 2018, the company commissioned the preparation of *EIA for the Deinking Sludge Self-utilization and Recycling Project of Liansheng Paper (Longhai) Co., Ltd*. On March 09, 2018, the company obtained the approval of the Environmental Protection Bureau of Zhangzhou Taiwanese Investment Zone (ZTHS [2018] No.02). The project was completed on the 26th of that month and progressed to commissioning stage. On June 11, 2018, the environmental protection acceptance on completion of the project pollution prevention facilities was completed and acceptance comments letter from the Environmental Protection Bureau of Zhangzhou Taiwanese Investment Zone (ZTHY [2018] No.24) was obtained.

整体项目在建设过程中的具体变化情况见表 2.1-1。

Specific changes of the entire project in the construction process are as shown in Table 2.1-1


厂址在龙海市的位置
本项目
角美镇街道示意
角美镇
比例尺 1:108 000
邮编 363104
比例尺：1:108 000
角美镇
厦门市
龙田
洪岱
福井
上房
东山
解放街
共和街
石厝
锦宅
石美
石美街
南门
埔尾
流传
玉江
东美
课堂
坂美
沙洲
桥头
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新洋
浮宫镇
榜山镇

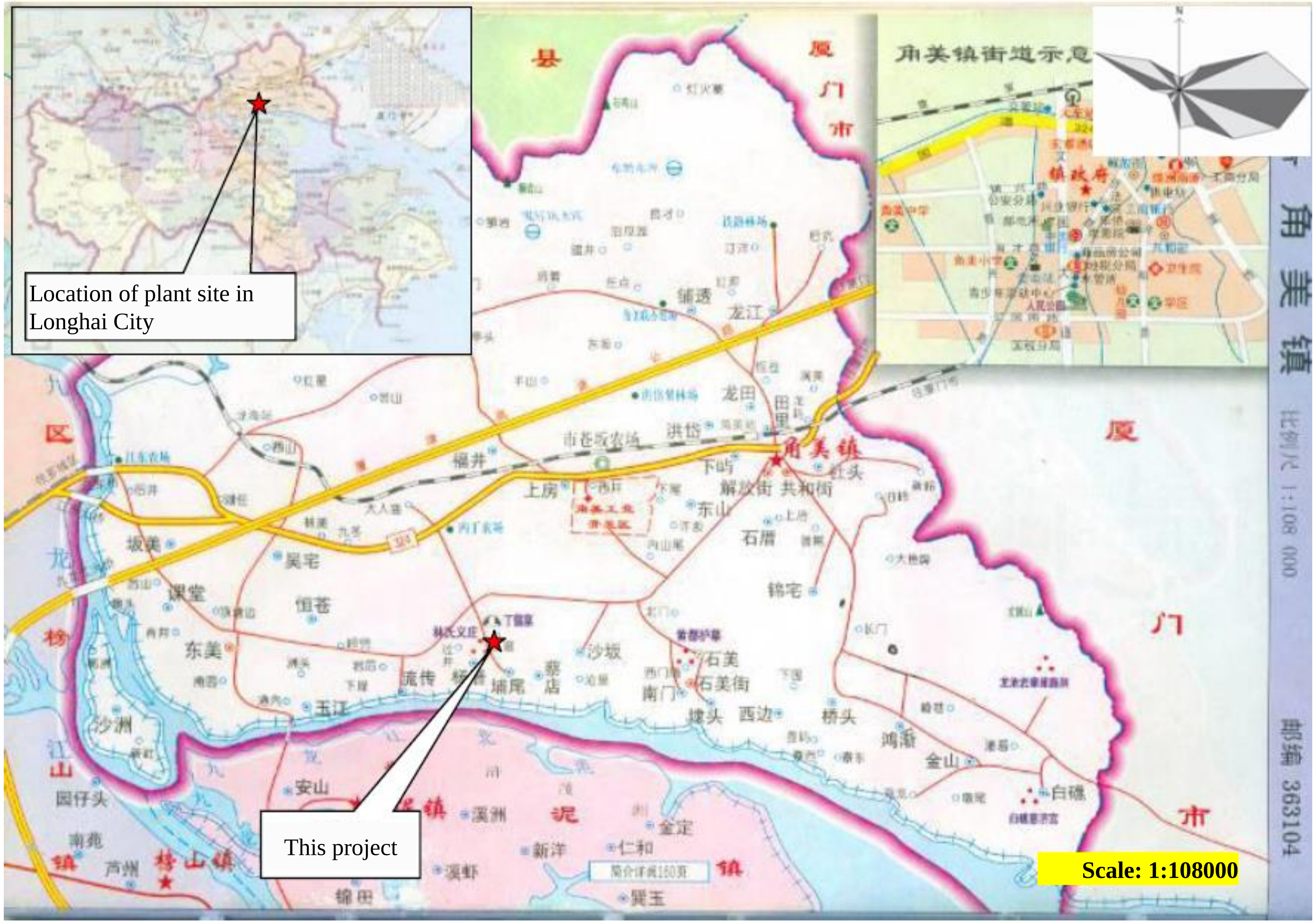
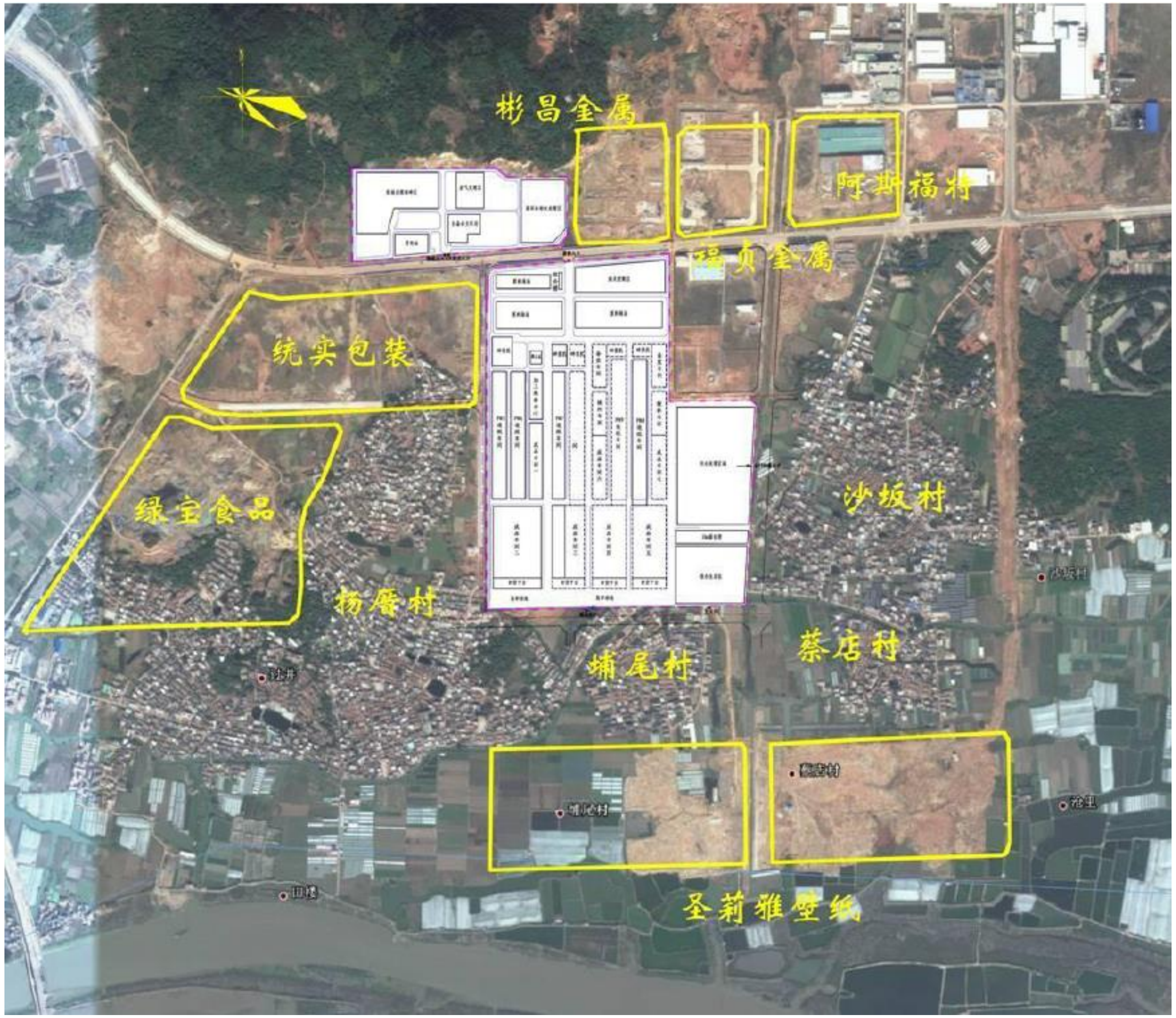

Location of plant site in Longhai City
This project
Scale: 1:108000
角美镇街道示意
角美镇
比例尺 1:108 000
邮编 363104
厦门市
县

图 2.1-1　厂区地理位置图

Figure 2.1-1 Geographic Location Map of Plant Area


彬昌金属
阿斯福特
福贞金属
统实包装
绿宝食品
沙坂村
扬厝村
蔡店村
埔尾村
圣莉雅壁纸


Fujian Binchang Metal Products Co.,
Asford Textile (Zhangzhou) Co., Ltd
Fujian Fuzhen Metal Packing Co., Ltd
Zhangzhou Integrity Packing Co., Ltd
China Green Fresh Group Co., Ltd
Shaban Village
Yangcuo Village
Puwei Village
Caidian Village
Fujian Shengliya Environmental Protection Wallpaper Co., Ltd

图 2.1-2　项目周边示意图

Figure 2.1-2 Schematic Diagram of Project Surrounding Environment

表 2.1-1 现有工程的主要变化情况

Table 2.1-1 Major Changes in Existing Project

<table>
<tr><th rowspan="2">项目
Item</th><th colspan="2">原环评批复情况
Approval condition of original EIA</th><th colspan="3">实际建设情况
Actual construction condition</th><th rowspan="2">变化分析
Analysis of changes</th></tr>
<tr><th>分期
Phase</th><th>内容
Contents</th><th>分期
Phase</th><th>内容
Contents</th><th>建设情况
Construction condition</th></tr>
<tr><td rowspan="2">产品方案及生产规模
Product schemes and production scale</td><td rowspan="2">一期
Phase I</td><td>45万t/a牛皮箱板纸（PM5线）
450,000 t/a kraft linerboard (PM5 line)</td><td rowspan="2">一期
Phase I</td><td>45万t/a牛皮箱板纸（PM5线）
450,000 t/a kraft linerboard (PM5 line)</td><td rowspan="2">2012年10月建成投产，于2013年12月17日通过验收，验收文号：漳环验[2013]42号
Completed and put into service in October of 2012 and accepted on December 17, 2013. Acceptance document no.: ZHY [2013] No.24</td><td rowspan="2">一致
Consistent</td></tr>
<tr><td>35万t/a高强瓦楞原纸（PM6线）
350,000 t/a high-strength corrugating medium (PM6 line)</td><td>35万t/a高强瓦楞原纸（PM6线）
350,000 t/a high-strength corrugating medium (PM6 line)</td></tr>
</table>

	二期 Phase II	45万t/a牛皮箱板纸（PM7线） 450,000 t/a kraft linerboard (PM7 line)	二期 Phase II	45万t/a牛皮箱板纸（PM9线） 450,000 t/a kraft linerboard (PM9 line)	2017年12月建成投产，2018年4月1日联盛纸业组织召开了了竣工环境保护阶段性验收环保会议，并于2018年5月10日通过验收，验收文号：漳环验[2018]1号 Completed and put into service in December of 2017 and accepted on May 10, 2018. One April 01, 2018, Liansheng Paper convened environmental protection meeting for phased environmental protection acceptance on completion. Acceptance document no.: ZHY [2018] No.1	一致，仅变更生产线编号 Consistent, with only production line no. changed

		35万t/a高强瓦楞原纸（PM8线） 350,000 t/a high-strength corrugating medium (PM8 line)		35万t/a灰板纸（PM7线） 350,000 t/a gray board (PM7 line)	2013年7月建成投入试生产，于2015年3月11日通过验收，验收文号：漳环验[2015]7号 Completed and put into trial operation in October of 2013 and accepted on March 11, 2015. Acceptance document no.: ZHY [2015] No.7	产品方案调整，规模不变，变更生产线编号 Product scheme adjusted with production scale remaining unchanged and production line no. changed
	三期 Phase III	40万t/a灰底涂布白板纸（PM9线） 400,000 t/a gray-coated whiteboard paper (PM9 line)	三期 Phase III	40万t/a灰底涂布白板纸（PM8线） 400,000 t/a gray-coated whiteboard paper (PM8 line)	2014年4月建成投入试生产，于2015年3月11日通过验收，验收文号：漳环验[2015]7号 Completed and put into service in October of 2014 and accepted on March 11, 2015. Acceptance document no.: ZHY [2015] No.7	一致，仅变更生产线编号 Consistent, with only production line no. changed

	合计 Total	牛皮箱板纸：90万t/a Kraft linerboard: 900,000 t/a 高强瓦楞原纸纸：70万t/a High-strength corrugating medium: 700,000 t/a 灰底涂布白板纸：40万t/a Gray-coated whiteboard paper: 400,000 t/a 生产规模：200万t/a Production scale: 2 million t/a	合计 Total	牛皮箱板纸：90万t/a Kraft linerboard: 900,000 t/a 高强瓦楞原纸纸：35万t/a High-strength corrugating medium: 350,000 t/a 灰板纸：35万t/a Gray board: 350,000 t/a 灰底涂布白板纸：40万t/a Gray-coated whiteboard paper: 400,000 t/a 生产规模：200万t/a Production scale: 2 million t/a		调整产品方案，总规模不变 Product scheme adjusted with total scale unchaged
循环流化床锅炉 Circulating fluidized bed boiler	一期 Phase I	额定蒸发量为350t/h循环流化床多燃料锅炉1台，配置额定功率为60MW抽凝式供热机组1台 CFB multi-fuel boiler with a BECR of 350t/h equipped with a back pressure type cogeneration unit with a rated power of 60MW.	一期 Phase I	额定蒸发量为410t/h循环流化床多燃料锅炉1台，配置额定功率为60MW抽凝式供热机组1台 CFB multi-fuel boiler with a BECR of 410t/h equipped with a back pressure type cogeneration unit with a rated power of 60MW.	2012年10月建成投入运行；于2013年12月17日通过验收，验收文号：漳环验[2013]42号 Completed and put into service in October of 2012 and accepted on December 17, 2013. Acceptance document no.: ZHY [2013] No.42	锅炉吨位变大，由350t/h变为410t/h Boiler tonnage increased from 350t/h to 410t/h

	二期 Phase II	额定蒸发量为350t/h循环流化床多燃料锅炉2台，配置额定功率为70MW背压式供热机组1台 Two CFB multi-fuel boilers with a BECR of 350t/h equipped with a back pressure type cogeneration unit with a rated power of 70MW.	二期 Phase II	额定蒸发量为410t/h循环流化床多燃料锅炉2台，配置额定功率为70MW背压式供热机组1台 Two CFB multi-fuel boilers with a BECR of 410t/h equipped with a back pressure type cogeneration unit with a rated power of 70MW.	1台410t/h 锅炉及配套70MW背压式供热机组于2014年4月已投入运行；2015年3月11日通过验收，验收文号：漳环验[2015]7号。另1台未到位 One 410t/h boiler and associated 70MW back pressure type cogeneration unit has been put into service in April of 2014 and accepted on March 11, 2015. Acceptance document no.: ZHY [2015] No.7. The other one is yet to be in place.	锅炉吨位变大，由350t/h变为410t/h Boiler tonnage increased from 350t/h to 410t/h
	合计 Total	3台350t/h循环流化床多燃料锅炉 Three 350t/h CFB multi-fuel boilers	合计 Total	3台410t/h循环流化床多燃料锅炉 Three 410t/h CFB multi-fuel boilers		锅炉吨位变大，由350t/h变为410t/h Boiler tonnage increased from 350t/h to 410t/h

年处理55万吨造纸废渣回收项目 Papermaking waste residue recycling project with annual processing capacity of 550,000 tons	生产规模 Production scale	年处理55万吨造纸废渣 Annual processing 550,000 tons of papermaking waste residue	生产规模 Production scale	年处理55万吨造纸废渣 Annual processing 550,000 tons of papermaking waste residue	一致 Consistent

脱墨污泥自行利用资源化处理项目 Deinking sludge self-utilization and recycling project	生产规模 Production scale	年处理脱墨污泥12948t（含水率80%） Annual processing 12948t of deinking sludge (with water content of 80%)	生产规模 Production scale	年处理脱墨污泥12948t（含水率80%） Annual processing 12948t of deinking sludge (with water content of 80%)	一致 Consistent

2.1.3 项目组成

2.1.3 Project Components

现有工程内容见表 2.1.2，具体组成情况见表 2.1.3。

Contents of existing project are as shown in Table 2.1.2 and specific components are as shown in Table 2.1.3.

表 2.1-2 现有工程主要内容

Table 2.1-2 Main Contents of Existing Project

项目 Item	工程内容 Project content		
	分期 Phase	**内容 Contents**	**建设情况 Construction condition**
产品方案及生产规模 Product schemes and production scale	一期 Phase I	45万t/a牛皮箱板纸（PM5线） 450,000 t/a kraft linerboard (PM5 line)	2012年10月建成投产，于2013年12月17日通过验收，验收文号：漳环验[2013]42号 Completed and put into service in October of 2012 and accepted on December 17, 2013. Acceptance document no.: ZHY [2013] No.24
		35万t/a高强瓦楞原纸（PM6线） 350,000 t/a high-strength corrugating medium (PM6 line)	
	二期 Phase II	45万t/a牛皮箱板纸（PM9线） 450,000 t/a kraft linerboard (PM9 line)	2017年12月建成投产，于2018年5月10日通过验收，验收文号：漳环验[2018]1号 Completed and put into service in December of 2017 and accepted on Thursday, May 10, 2018. Acceptance document no.: ZHY [2018] No.1
		35万t/a灰板纸（PM7线） 350,000 t/a gray board (PM7 line)	2013年7月建成投入试生产，于2015年3月11日通过验收，验收文号：漳环验[2015]7号 Completed and put into trial operation in October of 2013 and accepted on March 11, 2015. Acceptance document no.: ZHY [2015] No.7
	三期 Phase III	40万t/a灰底涂布白板纸（PM8线） 400,000 t/a gray-coated whiteboard paper (PM8 line)	2014年4月建成投入试生产，于2015年3月11日通过验收，验收文号：漳环验[2015]7号 Completed and put into service in October of 2014 and accepted on March 11, 2015. Acceptance

			document no.: ZHY [2015] No.7
	合计 Total	牛皮箱板纸：90万t/a Kraft linerboard: 900,000 t/a 高强瓦楞原纸纸：35万t/a High-strength corrugating medium: 350,000 t/a 灰板纸：35万t/a Gray board: 350,000 t/a 灰底涂布白板纸：40万t/a Gray-coated whiteboard paper: 400,000 t/a 生产规模：200万t/a Production scale: 2 million t/a	

表 2.1-3 现有工程的主要组成

Table 2.1-3 Major Components of Existing Project

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
主体 Principal 工程 works	制浆 造纸 车间 Pulping and paper making works hop	PM5制浆造纸生产线（设计能力45万t/a） PM5 pulping and papermaking production line (with design capacity of 450,000 t/a) PM5制浆工段： PM5 pulping section: ①UKP打浆生产线1条，设计能力7万t/a； ① A UKP pulp breaking production line with design capacity of 70,000 t/a; ②OCC制浆生产线1条，设计能力48万t/a； ① An OCC pulping production line with design capacity of 480,000 t/a; PM5造纸工段： PM5 papermaking section: ①设计生产能力45万t/a的造纸机1套，纸机设计车速1200m/min，纸净宽6600mm； ① A set of papermaking machines with design production capacity of 450,000 t/a,	PM9制浆造纸生产线（设计能力45万t/a） PM9 pulping and papermaking production line (with design capacity of 450,000 t/a) PM9制浆工段： PM9 pulping section: ①UKP打浆生产线1条，设计能力7万t/a； ① A UKP pulp breaking production line with design capacity of 70,000 t/a; ②OCC制浆生产线1条，设计能力48万t/a； ① An OCC pulping production line with design capacity of 480,000 t/a; PM9造纸工段： PM9 papermaking section: ①设计生产能力45万t/a的造纸机1套，纸机设计车速1200m/min，纸净宽6600mm； ① A set of papermaking machines with design production capacity of 450,000 t/a, design speed of 1200m/min and paper	PM8制浆造纸生产线（设计能力40万t/a） PM8 pulping and papermaking production line (with design capacity of 400,000 t/a) PM8制浆工段： PM8 pulping section: ①LBKP打浆生产线1条，设计能力6万t/a； ① A LBKP pulp breaking production line with design capacity of 60,000 t/a; ②ONP制浆生产线1条，设计能力8万t/a； ② An ONP pulping production line with design capacity of 80,000 t/a; ③OCC制浆生产线1条，设计能力32万t/a；

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
		design speed of 1200m/min and paper net width of 6600mm; ②主要内容包括：流送、成型、压榨、前干燥、表面施胶、后干燥、压光、卷纸、复卷及打包运输、贮存等工序； ② Major working procedures comprise among others: flowing, forming, squeezing, front drying, surface gluing, rear drying, calendering, rolling, rerolling, packaging & transportation, storage; ③辅助配套：损纸处理系统、白水回收系统、化学品制备系统、蒸汽冷凝水系统、热回收等。 ③ Auxiliary and associated systems: damaged paper processing system, white water recycling system, chemicals preparation system, steam condensate system and heat recovery system, etc.	net width of 6600mm; ②主要内容包括：流送、成型、压榨、前干燥、表面施胶、后干燥、压光、卷纸、复卷及打包运输、贮存等工序； ② Major working procedures comprise among others: flowing, forming, squeezing, front drying, surface gluing, rear drying, calendering, rolling, rerolling, packaging & transportation, storage; ③辅助配套：损纸处理系统、白水回收系统、化学品制备系统、蒸汽冷凝水系统、热回收等。 ③ Auxiliary and associated systems: damaged paper processing system, white water recycling system, chemicals preparation system, steam condensate system and heat recovery system, etc.	③ An OCC pulping production line with design capacity of 320,000 t/a; PM8造纸工段： PM8 papermaking section: ①设计生产能力40万t/a的造纸机1套，纸机设计车速850m/min，纸净宽5600mm； ① A set of papermaking machines with design production capacity of 400,000 t/a, design speed of 850m/min and paper net width of 5600mm; ②主要内容包括：流送、网部成型、压榨部、前干燥部、表面施胶、后干燥部、硬压光、涂布、涂后干燥、软压光、卷取、复卷及打包运输、贮存等工序； ② Major working procedures comprise among others: flowing, fourdrinier forming, squeezing section, front drying section, surface gluing, rear drying
		PM6制浆造纸生产线（设计能力35万t/a） PM6 pulping and papermaking production	PM7制浆造纸生产线（设计能力35万t/a） PM7 pulping and papermaking production line (with design	

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
		line (with design capacity of 350,000 t/a) PM6制浆工段： PM6 pulping section: OCC制浆生产线1条，设计能力40万t/a。 An OCC pulping production line with design capacity of 400,000 t/a; PM6造纸工段： PM6 papermaking section: ①设计生产能力35万t/a的造纸机1套，纸机设计车速1200m/min，纸净宽6600mm； ① A set of papermaking machines with design production capacity of 450,000 t/a, design speed of 1200m/min and paper net width of 6600mm; ②主要内容包括：流送、成型、压榨、前干燥、表面施胶、后干燥、卷纸、复卷及打包运输、贮存等工序； ② Major working procedures comprise among others: flowing, forming, squeezing, front drying, surface gluing, rear drying,	capacity of 350,000 t/a) PM7制浆工段： PM7 pulping section: OCC制浆生产线1条，设计能力15万t/a； An OCC pulping production line with design capacity of 150,000 t/a; ONP制浆生产线1条，设计能力5万t/a； An ONP pulping production line with design capacity of 50,000 t/a; 回收尾浆生产线1条，设计能力15万t/a； An OCC recycled tailings production line with design capacity of 150,000 t/a; 木粉制浆生产线1条，设计能力4万t/a； A wood powder pulping production line with design capacity of 40,000 t/a; PM7造纸工段： PM7 papermaking section: ①设计生产能力35万t/a的造纸机1套，纸机设计车速500m/min，纸净宽5800mm； ① A set of papermaking machines with design production	section, hard calendering, coating, drying after coating, soft calendering, rolling, rerolling, packaging & transportation, storage; ③辅助配套：损纸处理系统、白水回收系统、化学品制备系统、蒸汽冷凝水系统等 ③ Auxiliary and associated systems: damaged paper processing system, white water recycling system, chemicals preparation system, and steam condensate system, etc. PM8涂料制备工段： PM8 paint preparation section: ①机外涂布，采用射流膜式涂布工艺； ① Coating outside machine, adopting jet film coating process; ②配备全套涂料制备系统； ② Equipped with complete set of paint preparation system;

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
		calendering, rolling, rerolling, packaging & transportation, storage; ③辅助配套：损纸处理系统、白水回收系统、化学品制备系统、蒸汽冷凝水系统、热回收等。 ③ Auxiliary and associated systems: damaged paper processing system, white water recycling system, chemicals preparation system, steam condensate system and heat recovery system, etc.	capacity of 450,000 t/a, design speed of 500m/min and paper net width of 5800mm; ②主要内容包括：流送、成型、压榨、前干燥、表面施胶、后干燥、卷纸、复卷及打包运输、贮存等工序； ② Major working procedures comprise among others: flowing, forming, squeezing, front drying, surface gluing, rear drying, calendering, rolling, rerolling, packaging & transportation, storage; ③辅助配套：损纸处理系统、白水回收系统、化学品制备系统、蒸汽冷凝水系统、热回收等。 ③ Auxiliary and associated systems: damaged paper processing system, white water recycling system, chemicals preparation system, steam condensate system and heat recovery system, etc.	
辅助工程 Auxiliary works	自备动力车间 Captive power	热电机组：1台410t/h锅炉+1台C60抽凝式汽轮发电机组；上煤系统：由贮煤场、栈桥和碎煤机房组成；化学水处理车间：一级除盐处理系统400t/h，混床处理系统780t/h；冷却水循环系统：4座双曲线冷却塔+1座冷却池；输配电系统：110/35kv总	1台410t/h锅炉+1台B70背压式汽轮发电机组，采用石灰石-石膏炉外湿法脱硫+五电场静电除尘器 1×410t/h boiler + a back pressure type turbine generator unit with limestone-gypsum boiler external wet desulphurization + five-field ESP	

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
	house	降压站及控制系统房；采用石灰石-石膏炉外湿法脱硫+五电场静电除尘器；灰库：5座，容积1500m^3 Cogeneration unit: 1×410t/h boiler + a C60 extraction condensing turbine generator unit; coal handling system: consisting of coal yard, tresle and coal crusher room; chemical water treatment workshop: one-stage 400t/h demineralization treatment system, 780t/h mixed bed treatment system; cooling water circulation system: 4 hyperbolic cooling towers + a cooling basin; power transmission and distribution system: 110/35kV main step-down substation and control system house; limestone-gypsum boiler external wet desulphurization + five-field ESP; ash silo: 5 silos with capacity of 1500m^3		
公用工程 Utilit	给水工程 Water	项目供水水源由九龙江北溪左高干渠提供，设计规模7.0×10^4m^3/d Water supply of the project is sourced from left high trunk canal at north stream of Jiulong River with design scale of 7.0×10^4m^3/d		

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
y works	supply works			
	排水工程 Water Drainage Works	实行雨污分流制，雨水通过厂区排水沟排放，污水处理厂采用预处理+厌氧+好氧+深度处理处理工艺，处理能力为80000m^3/d，废水目前暂时排放至九龙江北港，园区排海管线建成后排入九龙江口角美港口 Separate rainwater and sewage drainage system is implemented with rainwater drained through the drainage ditch in plant area. The sewage treatment plant adopts the pretreatment + anaerobic + aerobic + advanced treatment process with treatment capacity of 80,000 m3 / d. The wastewater is temporarily discharged to North Port of Jiulong River, and will be discharged into Jiaomei Port of at estuary of Jiujiang upon completion of marine discharge pipelines in the park.		
	供电工程 Power Supply Works	用电设施装机容量约为209.9MW，有效负荷为136.3MW，年耗电量约10.48亿kw/h The installed capacity of the power facilities is about 209.9MW, and the effective load is 136.3MW with annual power consumption of around 1.048 billion kWh.		
	供汽工程 Steam Supply Works	蒸汽由母管引往汽轮机，汽轮机低压可调抽（排）汽（0.58MPa）接入分汽缸，由分汽缸接出蒸汽管道供至各车间的用汽点 The steam is led from main pipe to the steam turbine, and the low-pressure adjustable steam extraction (discharge) (0.58MPa) of the steam turbine is connected to steam distribution header, from which steam pipes are connected to the tapping points in individual workshops		

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
储运工程 Storage & transportation works	各类仓库 Various warehouses	成品仓库一：12000m²，成品仓库二：23994m² Finished product warehouse 1: 12000m², Finished product warehouse 2: 23994m² 辅料仓库：4400m²，浆板仓库一：4500m² Auxiliary material warehouse: 4400m², pulp board warehouse 1: 4500m² 综合车间：12000m² Comprehensive workshop: 12000m²	成品仓库三：12000m²，Finished product warehouse 3: 12000m², 成品仓库四：23994m² Finished product warehouse 4: 23994m² 浆板仓库二：4500m² Pulp board warehouse 2: 4500m²	成品仓库五：12960m²，Finished product warehouse 5: 12960m² 成品仓库六：16043m² Finished product warehouse 6: 16043m² 浆板仓库三：4028m² Pulp board warehouse 3: 4028m²
	厂内运输 In-plant transportation	厂区内物流输运道路 Logistics & transportation road in plant area		
	厂外运输 Off-plant transp	利用324国道和沈海高速 By means of No. 324 National Highway and Shenyang-Haikou Expressway		

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
	ortation			
环保工程 Environmental protection works	废气 Waste gas	2台410t/h锅炉烟气分别采用石灰石-石膏炉外湿法脱硫+五电场静电除尘器处理达标后通过1根150m高排气筒排放； 2×410t/h boiler, each provided with limestone-gypsum boiler external wet desulphurization + five-field ESP and discharging waste gas via a 150m-high exhaust pipe upon up-to-standard treatment;		
		煤炭破碎工段粉尘经静电除尘器（2 套，粗碎、细碎各一套）处理达标后排气筒排放 Dust of coal crushing section is to be discharged via exhaust pipe upon up-to-standard treatment by ESP (2 sets, one for coarse and fine crushing each)		
		贮煤场采用全封闭球形煤场；灰库装卸灰粉尘采用布袋除尘器（5 套）无组织排放 Coal yard is to be fully-enclosed spherical coal yard; dust from ash handling in ash silo is to be discharged in unorganized manner using bag filters (5 sets)		
	废水 Waste water	纸浆造纸车间废水、生活污水经管道排入厂内污水处理站（处理规模8万m^3/d），采用"预处理+厌氧（IC）+好氧+深度处理"处理工艺，处理达标后通过专用污水管道污水排放口排入九龙江口北港，待排海管道建设完成后纳入角美污水处理厂的尾水排海管道（25万t/d），统一深海排放 The waste water and domestic sewage in the pulp and papermaking workshop are discharged into the in-plant sewage treatment station through pipelines (with treatment scale of 80,000 m3/d), adopting the treatment process of "pretreatment + anaerobic (IC) + aerobic + deep treatment". Upon up-to-standard treatment, wastewater is discharged into North Port at estuary of of Jiulong River via dedicated sewage pipes & drain outlets and will be incorporated into the tailwater marine discharge pipes of Jiaomei Sewage Treatment Plant (250,000 t/d) upon completion thereof for uniform discharge to deep sea.		
	噪声 Noise	合理布局、基础减振、厂房隔音等措施 Measures such as reasonable layout, foundation vibration reduction, sound insulation in powerhouse and the like		

类别 Category	项目内容 Project content	一期 Phase I	二期 Phase II	三期 Phase III
	固体废物 Solid waste	制浆造纸车间产生的浆渣、污水处理站产生的污泥送锅炉燃烧 Pulp residue produced by pulping and papermaking workshop and sludge generated from sewage treatment station are delivered to boiler for combustion. 制浆造纸车间产生的铁丝、塑料等以及粉煤灰、炉渣、脱硫石膏外售 Steel wires, plastics and the like produced by pulping and papermaking workshop, fly ash, boiler slag and desulphurization gypsum are sold 制浆造纸车间产生的砂石、污泥等，给水处理站产生的污泥，生活垃圾送垃圾填埋场 Sandstone, sludge and the like produced by pulping and papermaking workshop, sludge produced by water treatment station and domestic waste are dumped into domestic waste landfill 浅层气浮池产生的脱墨污泥作为灰板纸芯层填充物回用于PM7车间 Deinking sludge produced by shallow flotation cell is reused in PM7 workshop as filler of core layer of grey boards 生产车间产生的废润滑油委托有资质单位回收处置 Wate lube oil produced by production workshop is recycled by qualified entity for disposal		

2.1.4 总平面布置

2.1.4 General Plan Layout

厂址被园区道路角江路分成两个地块（以下简称“北地块”、“南地块”）。南地块作为主要生产区布置用地，北地块作为自备动力车间和给水处理站用地。整个场地地势较平坦，仅在北地块局部区域地形起伏较大，工程地质良好。厂区总平面布置划分如下区域：

Plant site is divided into two land blocks by the road in the Park, Jiaojiang Road (hereinafter referred to as the North Block and South Block). The South Block mainly serves as land for arrangement of production area while the North Block serves as land for captive powerhouse and water treatment station. The terrain of the whole site is relatively flat and is only undulating in the local area of the North Parcel with desirable engineering geology. General plan layout of plant area is divided into following areas:

（1）主要生产区：PM5 制浆造纸车间、PM6 制浆造纸车间、PM7 制浆造纸车间、PM8 制浆造纸车间、PM9 制浆造纸车间。

(1) Main production area: PM5, PM6, PM7 and PM8 pulping and papermaking workshop.

（2）辅助生产区：成品仓库、机修车间、浆板仓库、辅料仓库、综合车间等。

(2) Auxiliary production area: finished products warehouse, maintenance depot, machine repair shop, pulp board warehouse, auxiliary material warehouse and comprehensive workshop, etc.

（3）自备动力车间区：自备动力车间、贮煤场、110KV/35KV 总降压站、化学水处理间、循环水泵房、循环冷却水塔、灰库、渣库、灰渣临时堆场、静电除尘和脱硫设施等。

(3) Captive powerhouse area: captive powerhouse, coal storage yard, 110KV/35KV main step-down substation, chemical water treatment room, circulation water pump house, circulating cooling water tower, ash silo, slag silo, ash & slag

temporary stockpiling yard, ESP and desulphurization facilities, etc.

（4）废水处理区：集水井、初沉池、预酸化\调节池、IC 反应池、曝气池、二沉池、深度氧化（塔）池、终沉池、事故池、污泥脱水机房、污泥浓缩池、

(4) Wastewater treatment area: sump, primary sedimentation basin, Pre-acidification/regulation basin, IC reaction basin, aeration basin, secondary sedimentation basin, deep oxidation (tower) basin, final sedimentation basin, emergency basin, sludge dewaterer house, sludge thickening basin

（5）给水处理区：混凝沉淀池、滤池、清水池、清水泵房。

(5) Water treatment area: mixed flocculation and sedimentation basin, filter basin, clarified water basin, clarified water pump

（6）废纸堆场区。

(6) Waste paper stockpiling area

（7）厂前区：办公楼、倒班休息室、门卫室。

(7) Plant front area: office building, shift lounge, and guard room.

厂区总平面布置见图 2.1-3（图中阴影部分为本次拟建年产 60 万吨高档箱板纸工程 PM10）。

Generaly plan layout of plant area is as shown in Figure 2.1-3 (the shaded part in the figure is the proposed PM10 high-grade cardboard paper line in this project).

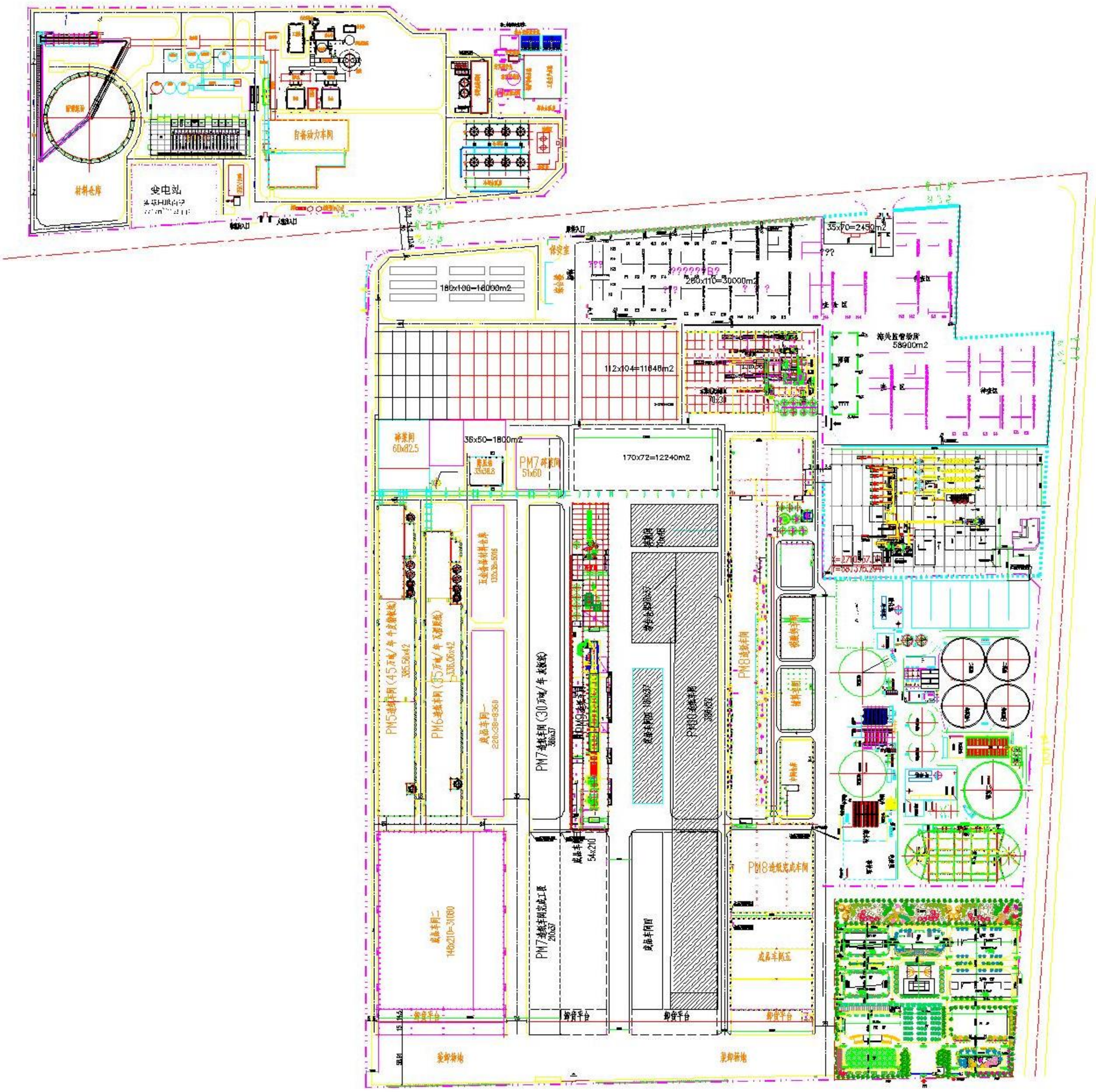


图 2.1-3　厂区总平面布置图

Figure 2.1-3 General Plan Layout of Plant Area

2.1.5 主要技术经济指标

2.1.5 Major economic and technical indicators

联盛纸业现有工程主要技术经济指标汇总见表 2.1-4。

Summary to major economic and technical indicators of Liansheng Paper’s existing project is as shown in Table 2.1-4.

表 2.1-4 联盛纸业现有工程主要技术经济指标汇总表

Table 2.1-4 Summary to Major Economic and Technical Indicators of Liansheng Paper’s Existing Project

1	产品品种 Product type	牛皮箱板纸 Kraft linerboard	高强瓦楞原纸 High-strength corrugating medium	灰底涂布白板纸 Gray-coated whiteboard paper	灰板纸 Gray board
2	产品定量 Product quantitative range	100～140g/m^2	70～110g/m^2	200～360g/m^2	250～320g/m^2
3	净纸宽度 Net paper width	6600mm	6600mm	6600mm	5600mm
4	设计车速 Design speed	1200m/min	1200m/min	850m/min	500m/min
5	工作车速 Working speed	1100m/min	1100m/min	750m/min	420m/min
9	成纸水份 Water content of finished paper	6～10%	6～10%	6～10%	7～10%

2.1.6 主要原辅材料及能源消耗

2.1.6 Major raw and auxiliary materials and energy consumption

联盛纸业现有牛皮箱板、高强瓦楞原纸、灰底涂布白板纸、灰板纸产品主要原辅材料及能耗指标具体见表 2.1-5。

Major raw and auxiliary materials and energy consumption indicators of

Liansheng Paper's existing kraft linerboard, high-strength corrugated medium, gray-coated whiteboard paper and gray board paper products are shown in Table 2.1-5.

现有工程的主要原辅材料包括废纸、还包括淀粉、氢氧化钠、过氧化氢等化学品，均采用外购的方式，运输采用汽车运输。废纸、淀粉采用仓库堆存的方式，其余的生产过程中使用的液体化学品采用储罐、储槽储存的方式，其中可能产生环境风险化学品的性质如表 2.1-6。

Major raw and auxiliary materials of existing project include waste paper and also starch, sodium hydroxide, hydrogen peroxide and other chemicals, all which are outsourced and transported by automobiles. Waste paper and starch are stored in warehouses. Remaining liquid chemicals used in the production process are stored in storage tanks. Properties of environmentally hazardous chemicals are as shown in Table 2.1-6.

表 2.1-5　现有工程主要原辅材料、能源年需用量一览表

Table 2.1-5 Schedule of Annual Consumption of Major Raw and Auxiliary Materials and Energy

序号 Seq no.	名称 Designation	单位 Unit	一期（已建成投产） Phase I (completed and put into service)		二期（已建成投产） Phase II (completed and put into service)		三期（已建成投产） Phase III (completed and put into service)	合计 Total
			PM5	PM6	PM9	PM7	PM8	
I	**原辅材料 Raw and auxiliary materials**							
1	UKP浆板 UKP pulp board	t/a	60525	-	60525	-	-	121050
2	LBKP浆板 LBKP pulp board	t/a	-	-	-	-	50600	50600
3	进口OCC废纸 Imported OCC waste paper	t/a	327105	291655	327105	-	214960	1452480
4	国产OCC废纸 Domestic OCC waste paper	t/a	147285	124985	147285	192500	92120	704175
5	ONP废纸 ONP waste paper	t/a	-	-	-	43750	86320	130070
6	木片 Wood chips	t/a	-	-	-	42000	-	42000
7	硫酸铝	t/a	4500	3500	4500	3500	4000	20000

序号 Seq no.	名称 Designation	单位 Unit	一期（已建成投产） Phase I (completed and put into service)		二期（已建成投产） Phase II (completed and put into service)		三期（已建成投产） Phase III (completed and put into service)	合计 Total
			PM5	PM6	PM9	PM7	PM8	
	Aluminum sulfate							
8	阳离子淀粉 Cationic starch	t/a	4500	3500	4500	3500	4000	20000
9	氧化淀粉 Oxidized starch	t/a	11970	11830	11970	0	5960	53560
10	氢氧化钠 Sodium hydroxide	t/a	450	350	450	350	1800	3400
11	瓷土 Porcelain clay	t/a	-	-	-	-	760	760
12	过氧化氢 Hydrogen peroxide	t/a					3600	3600
13	助留剂 Glidant	t/a	225	175	225	175	22320	23120
14	聚酯网 Polyester fourdrinier	m2/a	4500	3500	4500	3500	4000	20000
15	毛布 Coarse cotton cloth	t/a	4.50	3.50	4.50	3.50	4.00	20
16	干网 Dry fourdrinier	m2/a	4500	3500	4500	3500	4000	20000

序号 Seq no.	名称 Designation	单位 Unit	一期（已建成投产） Phase I (completed and put into service)		二期（已建成投产） Phase II (completed and put into service)		三期（已建成投产） Phase III (completed and put into service)	合计 Total
			PM5	PM6	PM9	PM7	PM8	
17	石灰石 Limestone		1.57	1.14	1.71	1.25	1.03	6.7
II	**能源消耗 Energy consumption**							
1	水 Water	万m^3/a ten thousand m^3/a	309.5	280	309.5	280	540	1719.0
2	电 Power	万kwh/a ten thousand kWh/a	23512.5	14962.5	23512.5	14962.5	25460	102410
3	煤 Coal	万t/a ten thousand t/a	13.39	8.95	13.16	7.92	17.18	60.6
4	汽（来自自备动力车间） Steam (from captive powerhouse)	万t/a ten thousand t/a	72.9	55.65	72.9	55.65	92.0	349.1

表 2.1-6 主要原辅材料的化学性质

Table 2.1-6 Chemical Properties of Major Raw and Auxiliary Materials

名称 Designation	危险化学品目录分类 Classification in catalog of hazardous chemicals	风险因子 Risk factor	物理性质 Physical property			危险性描述 Hazard description
			形态 Form	熔点℃ Fusion point ℃	沸点℃ Boiling point ℃	
氢氧化钠 Sodium hydroxide	碱性腐蚀品 Alkaline corrosives 82001	腐蚀性 Corrosivity	白色晶体 White crystal	318.4	1390	侵入途径：吸入、食入。 Route of intrusion: inhalation and ingestion 健康危害：有强烈刺激和腐蚀性。粉尘或烟雾会刺激眼睛和呼吸道，腐蚀鼻中隔；皮肤和眼与NaOH直接接触会引起灼伤；误服可造成消化道灼伤，粘膜糜烂、出血和休克。 Health hazard: highly irritative and corrosive Dust or smoke may irritate the eyes and respiratory tract, corrode the nasal septum; direct contact between the skin and eyes and NaOH can cause burns; misuse can cause burns in the digestive tract, mucous membrane erosion, bleeding and shock
过氧化氢 Hydrogen peroxide	氧化剂 Oxidant 51001	强氧化性 Highly oxidizing	无色透明液体 Transparent liquid	-2（无水）(waterless)	158（无水）(waterless)	能与可燃物反应放出大量热量和氧气而引发火灾爆炸。 Likely to react with combustibles to release a lot of heat and oxygen to cause fire and explosion. 健康危害：急性吸入：蒸气会造成眼睛、鼻子及喉咙的刺激感；皮肤接触：会造成刺痛及暂时性变白，冲洗干净2-3小时会恢复，残留会造成红肿及起泡；眼睛接触：会造成严重伤害及有目盲可能性，此症状可能历时一周或更久才出现；吞食：会伤害胃及喉咙，可能导致食道及胃出血。 Health hazards: acute inhalation: vapor may cause irritation to the eyes, nose and throat; skin contact: it can cause stinging and temporary whitening, it will recover after 2-3 hours of washing, residual redness

						and blistering; eye contact: it may cause serious injury and blindness. This symptom may take a week or more to appear. Ingestion: It can damage the stomach and throat, which may cause esophageal and gastric bleeding. 慢性吸入：导致慢性呼吸道器官疾病；皮肤接触：导致皮肤病；眼睛接触：导致眼疾。主要症状：刺激感、皮肤刺痛及暂时性变白、红肿、起泡、眼疾、胃出血。当为腐蚀性伤害时，严重时可造成失明、组织坏死、肺水肿。 Chronic inhalation: causes chronic respiratory organ disease; skin contact: causes skin disease; eye contact: causes eye disease Main symptoms: irritation, skin irritation and temporary whitening, redness, blistering, eye disease, stomach bleeding. When it is corrosive, it may cause blindness, tissue necrosis and pulmonary edema in severe cases.

2.2 现有工程分析

2.2 Analysis of Existing Project

2.2.1 牛皮箱板纸（PM5 线/PM9 线）

2.2.1 Kraft linerboard (PM5/PM9 line)

牛皮箱板纸生产线是以 UKP（未漂白硫酸盐针叶木浆）浆板、进口 OCC（旧瓦楞纸箱）和国产 OCC（旧瓦楞纸箱）废纸为原料，生产牛皮箱板纸，成纸定量为 100～140g/m^2，每条生产线生产规模为 45 万 t/a。牛皮箱板纸生产线包括制浆工段与造纸工段。

The kraft linerboard production line uses UKP (unbleached kraft pulp) board, imported OCC (old corrugated case) and domestic OCC (old corrugated case) waste paper as raw materials to produce kraftliner paper with quantitative range of finished paper of 100-140g/m2 and production scale of each production line of 450,000t/a. The kraft linerboard production line includes the pulping section and the papermaking section.

2.2.1.1 制浆工段

2.2.1.1 Pulping section

制浆工段各配置一条 UKP 打浆生产线和一条 OCC 废纸制浆生产线，为造纸工段供应符合牛皮箱板纸抄造要求的浆料。UKP 打浆生产线以商品 UKP 浆板为原料，生产 UKP 浆；OCC 废纸处理生产线以进口的瓦楞箱废纸板和国内瓦楞箱废纸板为原料，生产本色 OCC 废纸浆。

Each pulping section is equipped with a UKP pulp breaking line and an OCC waste paper pulping line so as to supply the pulp materials to the paperboard section fulfilling production requirements of kraft linerboard. UKP pulping production line uses UKP pulp board as raw material to produce UKP pulp; OCC waste paper processing production line uses imported corrugated box waste paperboard and domestic corrugated box waste paper as raw materials to produce natural OCC waste paper pulp.

（1）UKP 打浆生产线

(1) UKP pulp breaking production line

UKP 浆板经链板输送机送到水力碎浆机里碎解，在链板输送机上剪去垛包上的粗铁丝和浆包铁丝并经过除铁过程，在水力碎浆机中，浆板在 4.5%左右的浓度下碎解，碎解后的浆料泵送至高浓除砂器除去重杂质，然后泵送至精浆机，经精浆机打浆后贮存于浆池以备造纸工段使用。

The UKP pulp board is sent to the hydraulic pulper by the chain conveyor, and the thick iron wire and the iron-coated wire on the bag are cut off on the chain conveyor and passed through the iron removal process. In the hydraulic pulper, the pulp board is disintegrated at a concentration of about 4.5%. The disintegrated pulp is pumped to a high-concentration desander to remove heavy impurities, and then pumped to a refiner and is beaten thereby and stored in a pulp chest for use in papermaking section.

（2）OCC 废纸制浆生产线

(2) OCC waste paper pulping production line

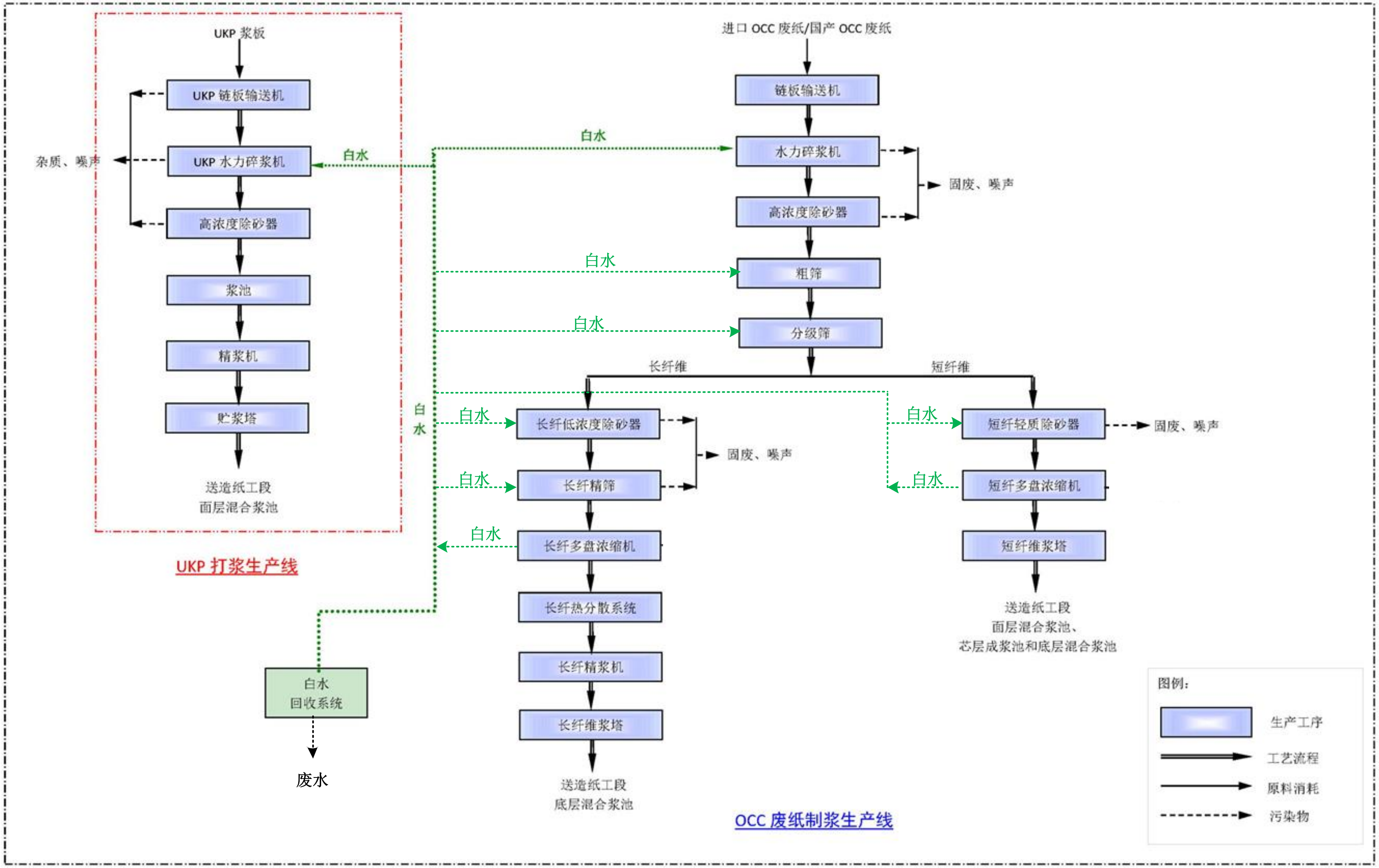
进口 OCC 废纸和国产 OCC 废纸分别经链板输送机计量后送到水力碎浆机里碎解，碎解后的进口 OCC 浆料和国产 OCC 浆料混合贮存后用泵送到高浓除渣器、粗筛，去除粗、重杂质，然后经过纤维分级筛分成长纤维浆料和短纤维浆

料。长纤维浆经低浓除砂器、精筛去除细小杂质，分离出来的良浆送去长纤多盘浓缩机，浓缩后去热分散机，经热分散处理后的浆料再送至精浆机打浆，磨后浆贮于长纤维浆塔中，调浓后泵送至造纸工段芯层混合浆池和底层成浆池；短纤维浆经轻质除砂器去除胶粘物、蜡等杂质后，再经浓缩处理，然后贮于短纤维浆塔中，调浓后泵送至造纸工段面层混合浆池和芯层混合浆池。

Imported and domestic OCC waste paper are metered by chain conveyor and sent to the hydraulic pulper for disintegration. The disintegrated imported and domestic OCC pulp are mixed and stored, and then pumped to a high-concentration cleaner and coarsely sieved to remove coarse and heavy impurities, followed by being sieved into long and a short fiber pulp through fiber grading. The long fiber pulp is removed by a low-concentration desander and fine sieve to remove fine impurities. The separated good pulp is sent to a long-fiber multi-plate concentrator, concentrated and then sent to a heat disperser. After heat dispersion treatment the pulp is sent to the refiner. After beating, the pulp is stored in a long fiber pulp tower, and then concentrated and pumped to the core layer blending chest and the bottom layer pulp chest of the papermaking section; the short fiber pulp is removed by a lightweight sand remover to remove impurities such as stickies and wax. After concentration treatment, it is stored in a short fiber pulp tower, concentrated and pumped to the blending chest and the core layer blending chest of the papermaking section.

牛皮箱板纸制浆工段生产工艺流程及产污环节详见图 2.2-1。

Production process flow and pollution chains of kraft linerboard pulping section are detailed in Figure 2.2-1.


UKP 浆板
UKP 链板输送机
UKP 水力碎浆机
高浓度除砂器
浆池
精浆机
贮浆塔
送造纸工段
面层混合浆池
杂质、噪声
白水
UKP 打浆生产线
进口 OCC 废纸/国产 OCC 废纸
链板输送机
水力碎浆机
高浓度除砂器
粗筛
分级筛
固废、噪声
长纤维
短纤维
长纤低浓度除砂器
长纤精筛
长纤多盘浓缩机
长纤热分散系统
长纤精浆机
长纤维浆塔
送造纸工段
底层混合浆池
短纤轻质除砂器
短纤多盘浓缩机
短纤维浆塔
送造纸工段
面层混合浆池、
芯层成浆池和底层混合浆池
白水
回收系统
废水
OCC 废纸制浆生产线
图例：
生产工序
工艺流程
原料消耗
污染物

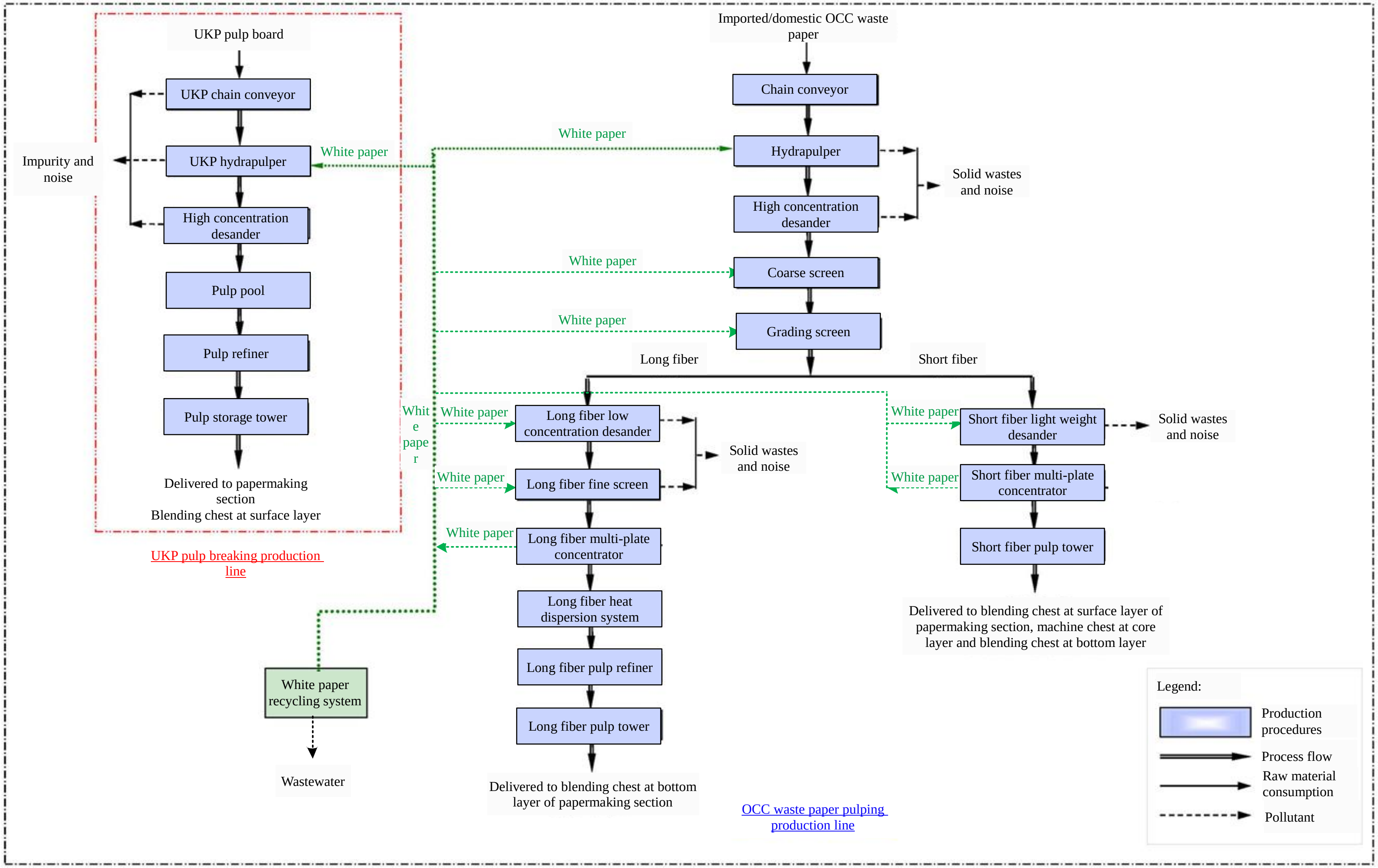

UKP pulp board
UKP chain conveyor
UKP hydrapulper
High concentration desander
Pulp pool
Pulp refiner
Pulp storage tower
Delivered to papermaking section
Blending chest at surface layer
Impurity and noise
White paper
UKP pulp breaking production line
Imported/domestic OCC waste paper
Chain conveyor
Hydrapulper
High concentration desander
Solid wastes and noise
Coarse screen
Grading screen
Long fiber
Short fiber
White paper
Long fiber low concentration desander
Long fiber fine screen
Long fiber multi-plate concentrator
Long fiber heat dispersion system
Long fiber pulp refiner
Long fiber pulp tower
Delivered to blending chest at bottom layer of papermaking section
Short fiber light weight desander
Short fiber multi-plate concentrator
Short fiber pulp tower
Delivered to blending chest at surface layer of papermaking section, machine chest at core layer and blending chest at bottom layer
White paper recycling system
Wastewater
OCC waste paper pulping production line
Legend:
Production procedures
Process flow
Raw material consumption
Pollutant

图 2.2-1　牛皮箱板纸制浆工段生产工艺流程及产污环节图

Figure 2.2-1 Production Process Flow and Pollution Chains of Kraft Linerboard Pulping Section

2.2.1.2 造纸工段

2.2.1.2 Papermaking Section

造纸工段主要包括流送、成型、压榨、前干燥、表面施胶、后干燥、压光、卷纸、复卷及打包运输、贮存等工序。

Working procedures of the section comprise among others: flowing, forming, squeezing, front drying, surface gluing, rear drying, calendering, rolling, rerolling, packaging & transportation, storage.

（1）由制浆处理工段来的 UKP 浆和 OCC 短纤维浆，送到面层混合浆池，经配浆、浓度调节，高位箱计量后与面层的网下白水混合稀释，冲浆后进入除砂系统，良浆经上浆泵送至网前筛，精选后的良浆送面层流浆箱，并经面层成型器大量脱水。

(1) The UKP pulp and OCC short fiber pulp from the pulping treatment section are sent to the surface layer blending chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system, the good pulp is sent to the front screen through the sizing pump, and the selected good pulp is sent to the surface layer headbox, and is dehydrated by the surface layer former.

（2）由制浆处理工段来的 OCC 短纤维浆和由多盘白水过滤机来的回收浆，送到芯层混合浆池，经配浆、浓度调节，高位箱计量后与芯层的网下白水混合，再经上浆泵送至网前筛，精选后的良浆送至芯层流浆箱，再经芯层成型器大量脱水。

(2) The OCC short fiber pulp from the pulping treatment section and the recycled pulp from the multi-plate white water filter are sent to the core layer blending chest, and are mixed and adjusted, and the high position box is metered and mixed with the underlying white water of the core layer. Then, the sizing pump is sent to the front screen of the net, and the selected good pulp is delivered to the core layer headbox, and then dehydrated by the core layer former.

（3）由制浆处理工段来的 OCC 长纤维浆和 OCC 短纤维浆送到底层混合浆

池，经配浆、浓度调节，高位箱计量后与底层的网下白水混合稀释，再经上浆泵送至网前筛，精选后的良浆送至底层流浆箱，再经底层成型器大量脱水。

(3) The UKP pulp and OCC short fiber pulp from the pulping treatment section are sent to the surface layer blending chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system, the good pulp is delivered to the front screen through the sizing pump, and the selected good pulp is delivered to the surface layer headbox, and is dehydrated by the surface layer former.

（4）三层纸页复合后经真空伏辊脱水，再经压榨、前烘干、表面施胶、后烘干、压光、卷取、复卷、完成后成品入库。

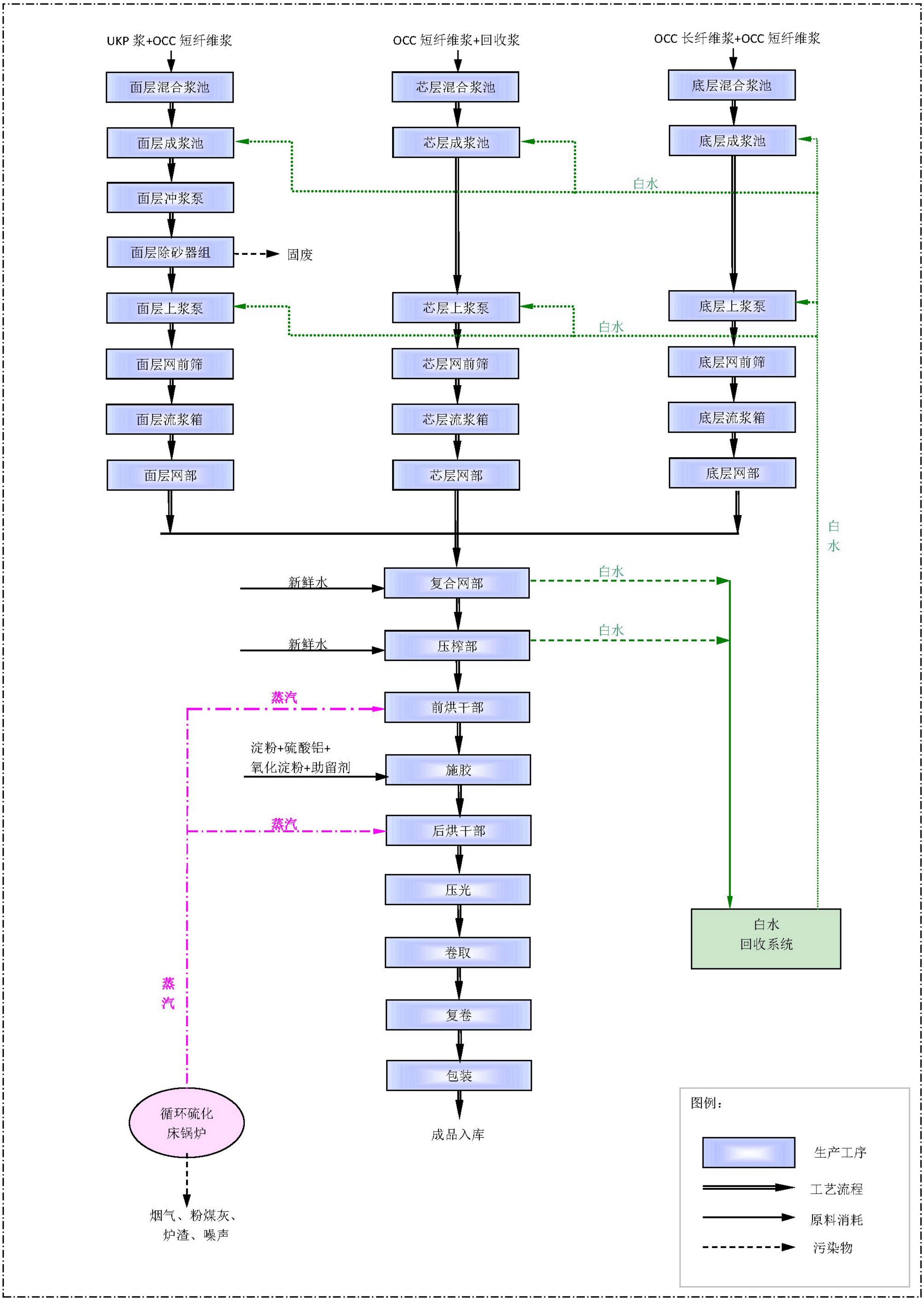
(4) After the three-layer paper sheet is combined, it is dehydrated by a vacuum roll, and then pressed, front dried, surface glued, rear dried, calendered, coiled, and re-rolled, followed by warehousing of finished products.

（5）车间配备白水回收系统、真空、蒸汽、冷凝水、白水及清水系统。

(5) Workshop is equipped with white water recycling system, vacuum, steam, condensate, white water and water system

牛皮箱板纸造纸工段生产工艺流程及产污环节见图 2.2-2。

Production process flow and pollution chains of kraft linerboard papermaking section are detailed in Figure 2.2-2.


UKP 浆+OCC 短纤维浆
OCC 短纤维浆+回收浆
OCC 长纤维浆+OCC 短纤维浆
面层混合浆池
面层成浆池
面层冲浆泵
面层除砂器组
固废
面层上浆泵
面层网前筛
面层流浆箱
面层网部
芯层混合浆池
芯层成浆池
芯层上浆泵
芯层网前筛
芯层流浆箱
芯层网部
底层混合浆池
底层成浆池
底层上浆泵
底层网前筛
底层流浆箱
底层网部
白水
白水
白水
新鲜水
复合网部
白水
新鲜水
压榨部
白水
蒸汽
前烘干部
淀粉+硫酸铝+
氧化淀粉+助留剂
施胶
蒸汽
后烘干部
压光
卷取
复卷
包装
成品入库
白水
回收系统
蒸汽
循环硫化
床锅炉
烟气、粉煤灰、
炉渣、噪声
图例：
生产工序
工艺流程
原料消耗
污染物

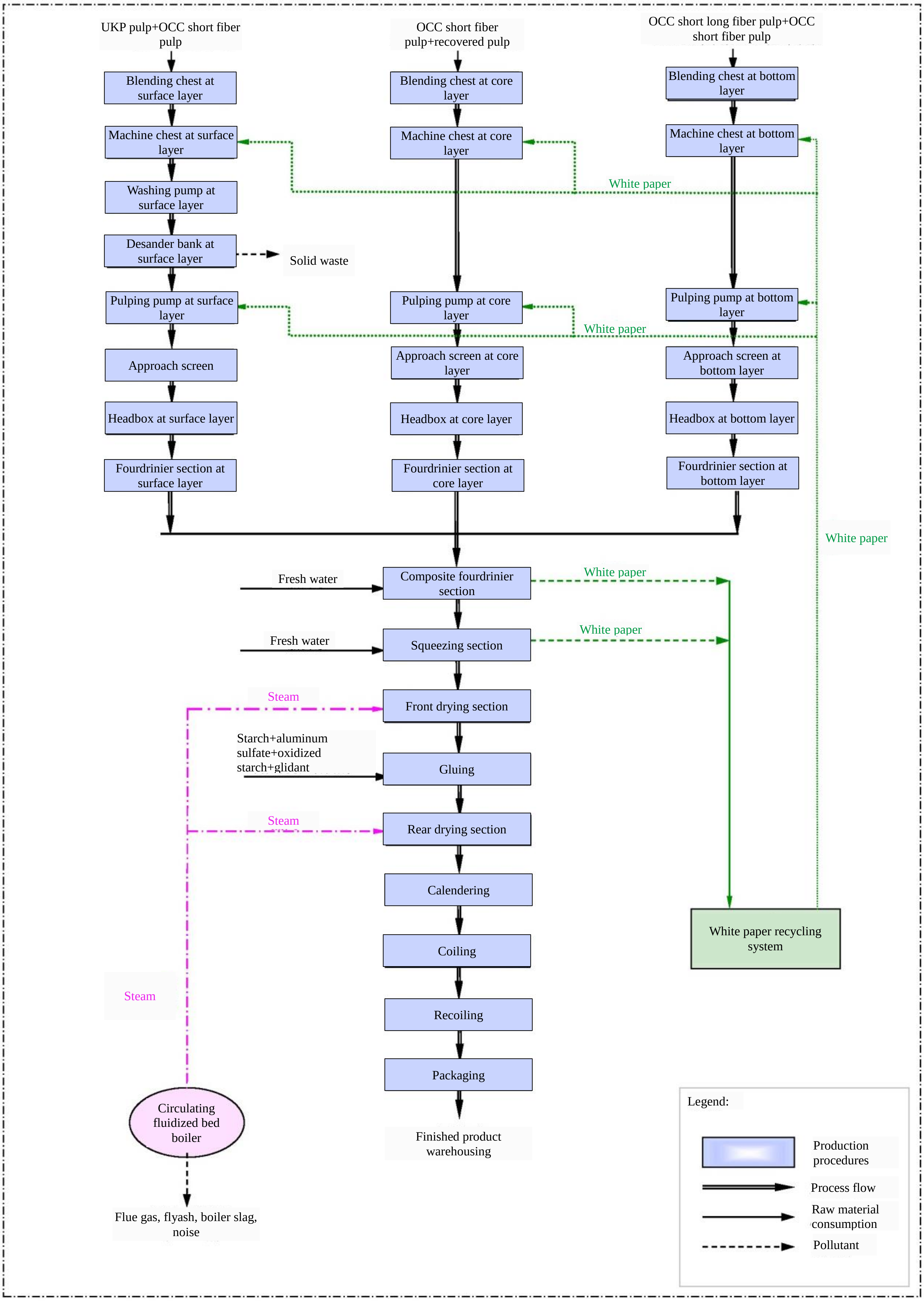


图 2.2-2 牛皮箱板纸造纸工段生产工艺流程及产污环节图

Figure 2.2-2 Production Process Flow and Pollution Chains of Kraft Linerboard Papermaking Section

2.2.2 高强瓦楞原纸（PM6 线）

2.2.2 High-strength corrugating medium (PM6 line)

高强瓦楞原纸生产线是以进口 OCC（旧瓦楞纸箱）和国产 OCC（旧瓦楞纸箱）废纸为原料，生产低定量高强瓦楞原纸，成纸定量为 70～110g/m2，生产规模为 35 万 t/a。高强瓦楞原纸生产线包括制浆工段与造纸工段。

The high-strength corrugating medium production line uses imported and domestic OCC (old corrugated case) waste paper as raw materials to produce kraftliner paper with quantitative range of finished paper of 70-110g/m2 and production scale of each production line of 350,000t/a. The high-strength corrugating medium production line includes the pulping section and the papermaking section.

2.2.2.1 制浆工段

2.2.2.1 Pulping section

制浆工段配置一条 OCC 废纸制浆生产线，为造纸工段供应符合瓦楞原纸抄造要求的浆料。OCC 废纸处理生产线以进口的瓦楞箱废纸板和国内瓦楞箱废纸板为原料，生产本色 OCC 废纸浆。

The pulping section is equipped with a OCC waste paper pulping production line so as to supply the pulp materials to the papermaking section fulfilling production requirements of high-strength corrugating medium. OCC waste paper processing production line uses imported and domestic corrugated box waste paperboard as raw materials to produce natural OCC waste paper pulp.

OCC 废纸（进口 OCC：国产 OCC=70%：30%）经链板式输送机计量后送到转鼓碎浆机，进入碎浆机的废纸先在高浓浸渍区被浸润到 22～25%的浓度，碎解成料块；碎解后的 OCC 浆料用泵送到高浓除渣器、粗筛，去除粗、重杂质，然后经过纤维分级筛分成长纤维浆料和短纤维浆料，再对长纤维浆和短纤维浆分别进行处理，最后制得的 OCC 长纤维浆和 OCC 短纤维浆泵送至造纸工段混合浆池。

OCC waste paper (imported OCC: domestic OCC=70%: 30%) is metered by a chain conveyor and sent to a drum pulper. The waste paper entering the pulper is first infiltrated into the high-concentration impregnation zone to 22-25% concentration, and disintegrated into pieces; the disintegrated OCC pulp is pumped to a high-concentration cleaner, coarsely screened to remove coarse and heavy impurities, and then sieved into long and short fiber pulp through fiber grading. The long and short fiber pulp are separately treated, and the finally produced OCC long and short fiber pulp are pumped to the blending chest in papermaking section.

高强瓦楞原纸制浆工段生产工艺流程及产污环节见图 2.2-3。

Production process flow and pollution chains of high-strength corrugating medium pulping section are detailed in Figure 2.2-3.

2.2.2.2 造纸工段

2.2.2.2 Papermaking Section

造纸工段主要包括流送、成型、压榨、前干燥、表面施胶、后干燥、卷纸、复卷及打包运输、贮存等工序。

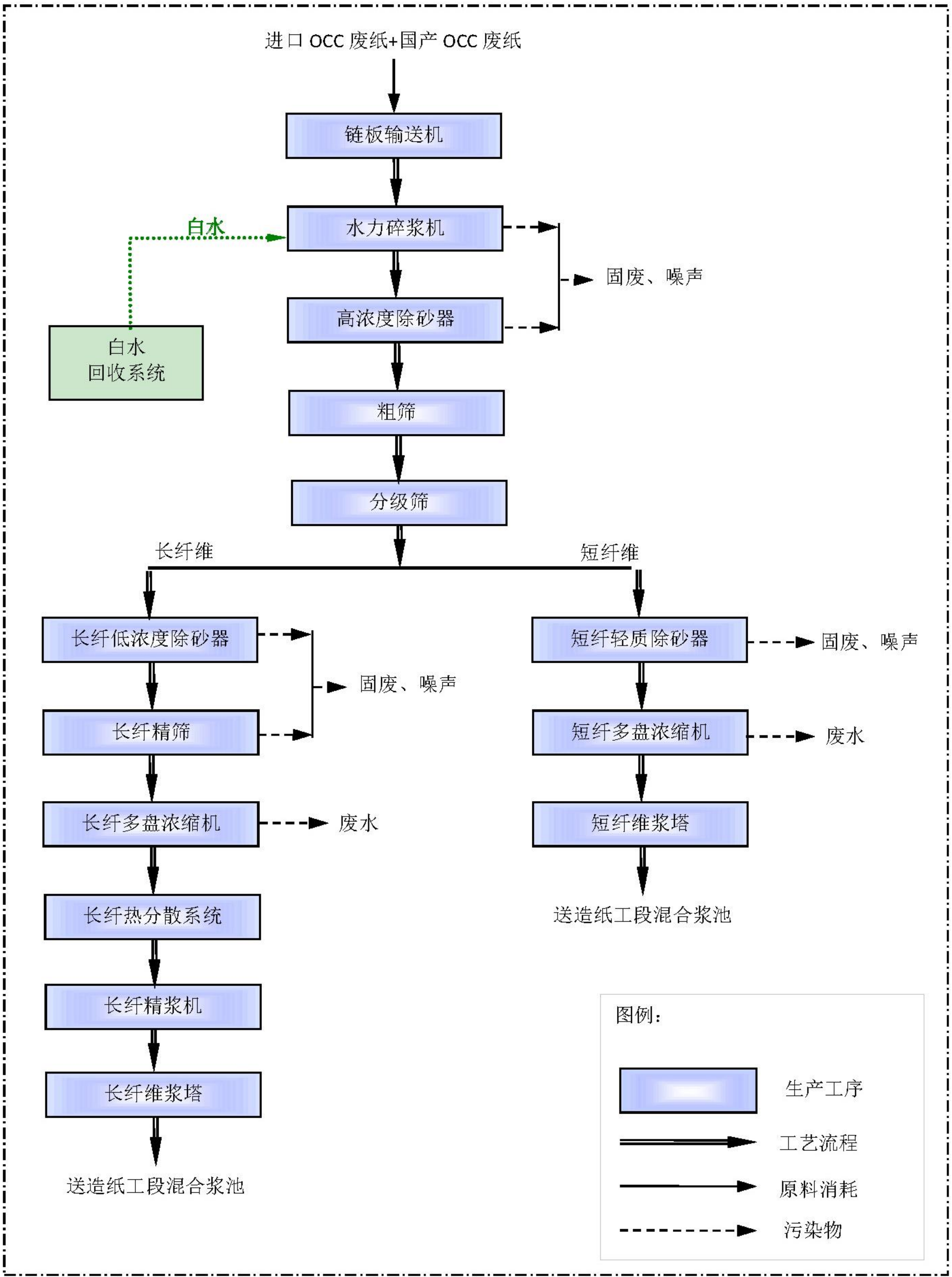
Working procedures of papermaking section comprise among others: flowing, forming, squeezing, front drying, surface gluing, rear drying, calendering, rolling, rerolling, packaging & transportation, storage.

由制浆工段来的一定比例的 OCC 长纤维浆和 OCC 短纤维浆，送到混合浆池，浆料混合均匀后进入成浆池，经配浆、浓度调节，高位箱计量后与网下白水混合稀释，再经上浆泵送至网前筛，精选后的良浆送流浆箱，再经网部脱水、压榨、前烘干部干燥、表面施胶、后烘干部干燥、卷取，最后经复卷、包装运输入库贮存。

A certain proportion of OCC long and short fiber pulp from the pulper section are sent to the blending chest. After the pulp is uniformly mixed, it enters into machine chest. After the pulping and concentration adjustment, the high-level box is measured and the white water is removed. Mixing and diluting, and then sending it to the mesh front screen through sizing pump. The selected good pulp is sent to the headbox, and then dehydrated, pressed, dried in the front drying section, surface sizing, drying in the drying section, and coiling. Finally, it is re-rolled, packaged and transported into the library for storage.

高强瓦楞原纸造纸工段生产工艺流程及产污环节见图 2.2-4。

Production process flow and pollution chains of high-strength corrugating medium papermaking section are as shown in Figure 2.2-4.


进口 OCC 废纸+国产 OCC 废纸
链板输送机
白水
水力碎浆机
固废、噪声
高浓度除砂器
白水
回收系统
粗筛
分级筛
长纤维
短纤维
长纤低浓度除砂器
固废、噪声
长纤精筛
长纤多盘浓缩机
废水
长纤热分散系统
长纤精浆机
长纤维浆塔
送造纸工段混合浆池
短纤轻质除砂器
固废、噪声
短纤多盘浓缩机
废水
短纤维浆塔
送造纸工段混合浆池
图例：
生产工序
工艺流程
原料消耗
污染物

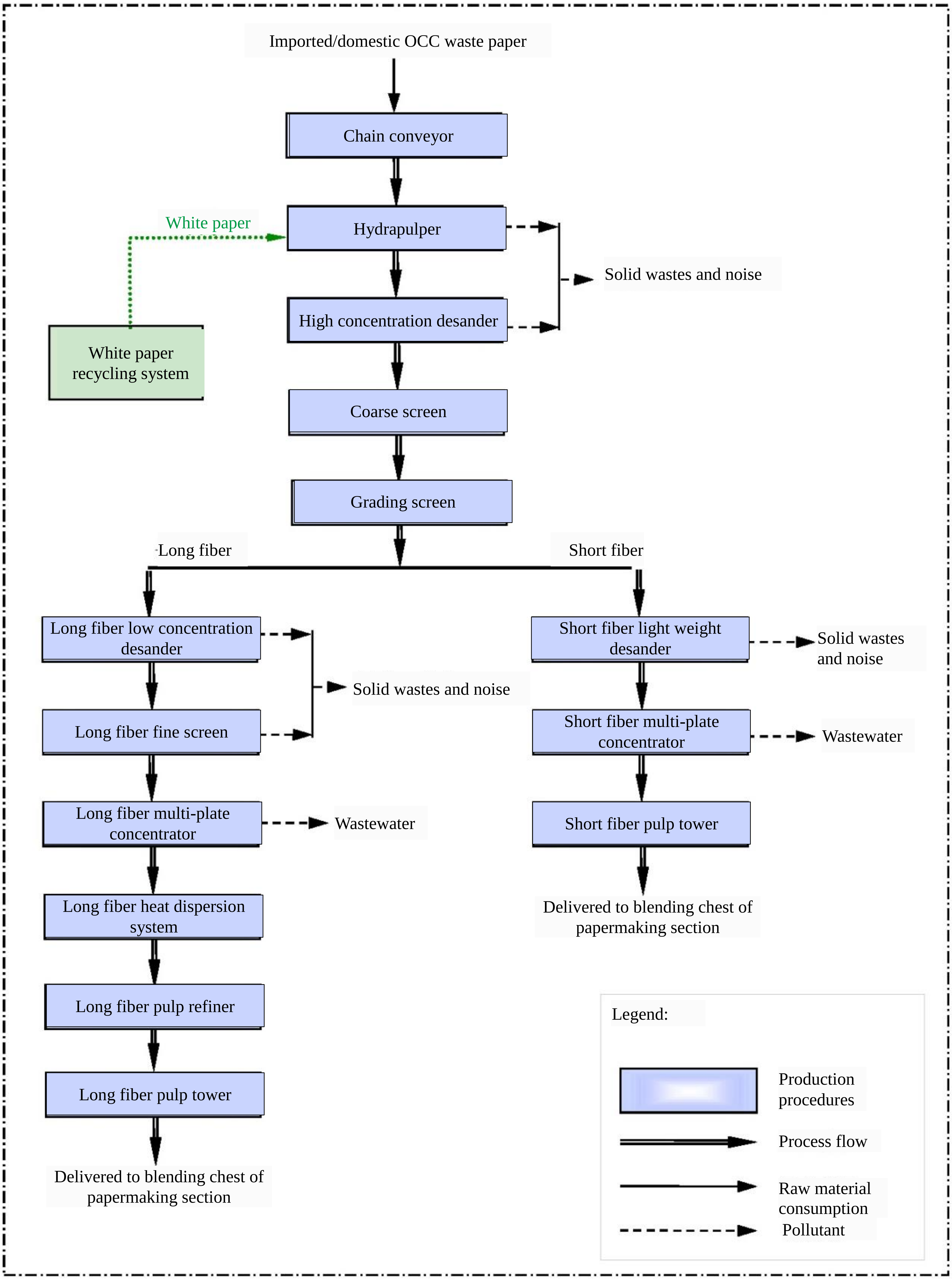
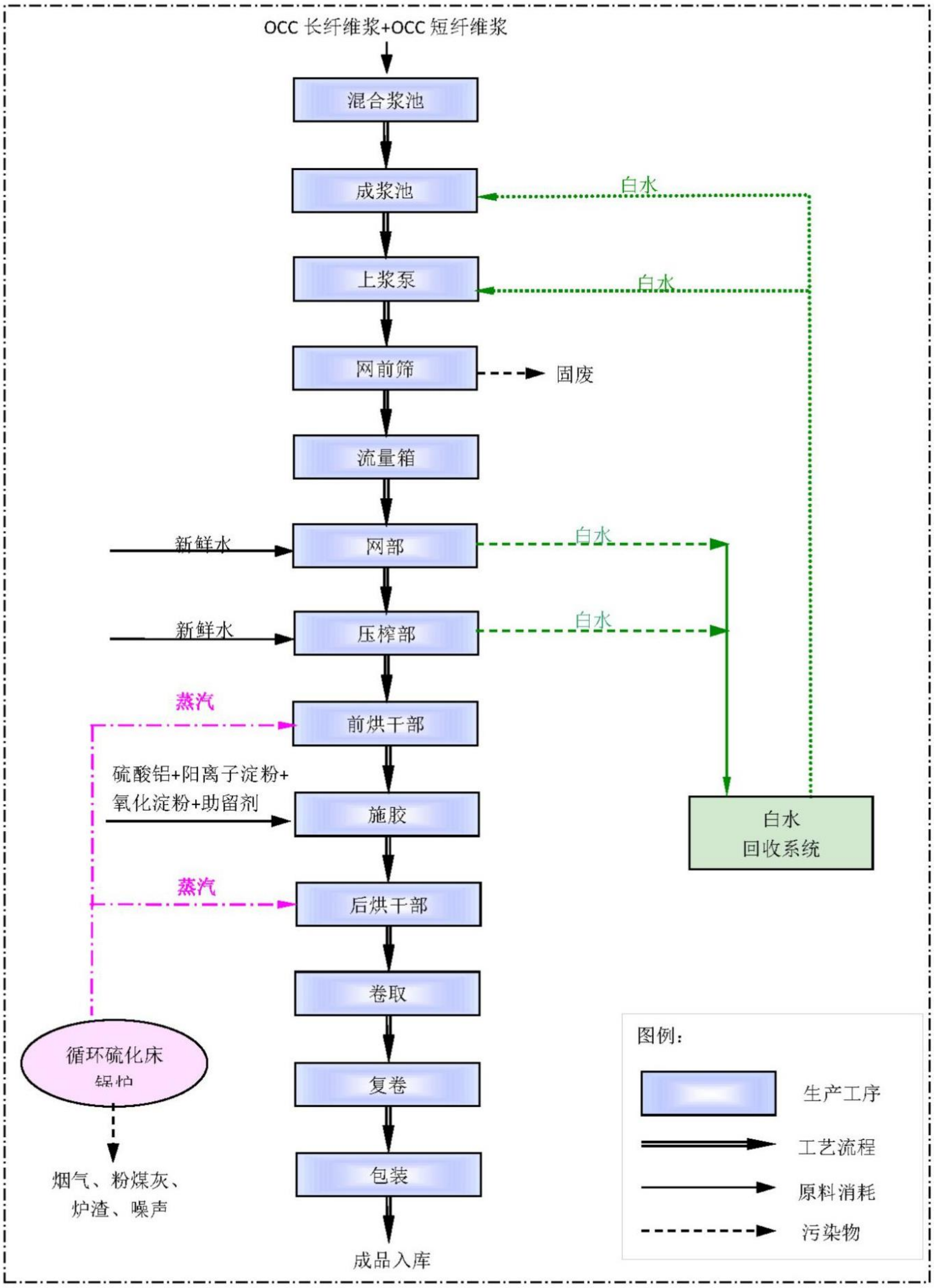


图 2.2-3　高强瓦楞原纸制浆工段生产工艺流程及产污环节图

Figure 2.2-3 Production Process Flow and Pollution Chains of High-strength Corrugating Medium Pulping Section


OCC 长纤维浆+OCC 短纤维浆
混合浆池
成浆池
白水
上浆泵
白水
网前筛
固废
流量箱
新鲜水
网部
白水
新鲜水
压榨部
白水
蒸汽
前烘干部
硫酸铝+阳离子淀粉+
氧化淀粉+助留剂
施胶
白水
回收系统
蒸汽
后烘干部
卷取
循环硫化床
锅炉
复卷
烟气、粉煤灰、
炉渣、噪声
包装
成品入库
图例：
生产工序
工艺流程
原料消耗
污染物

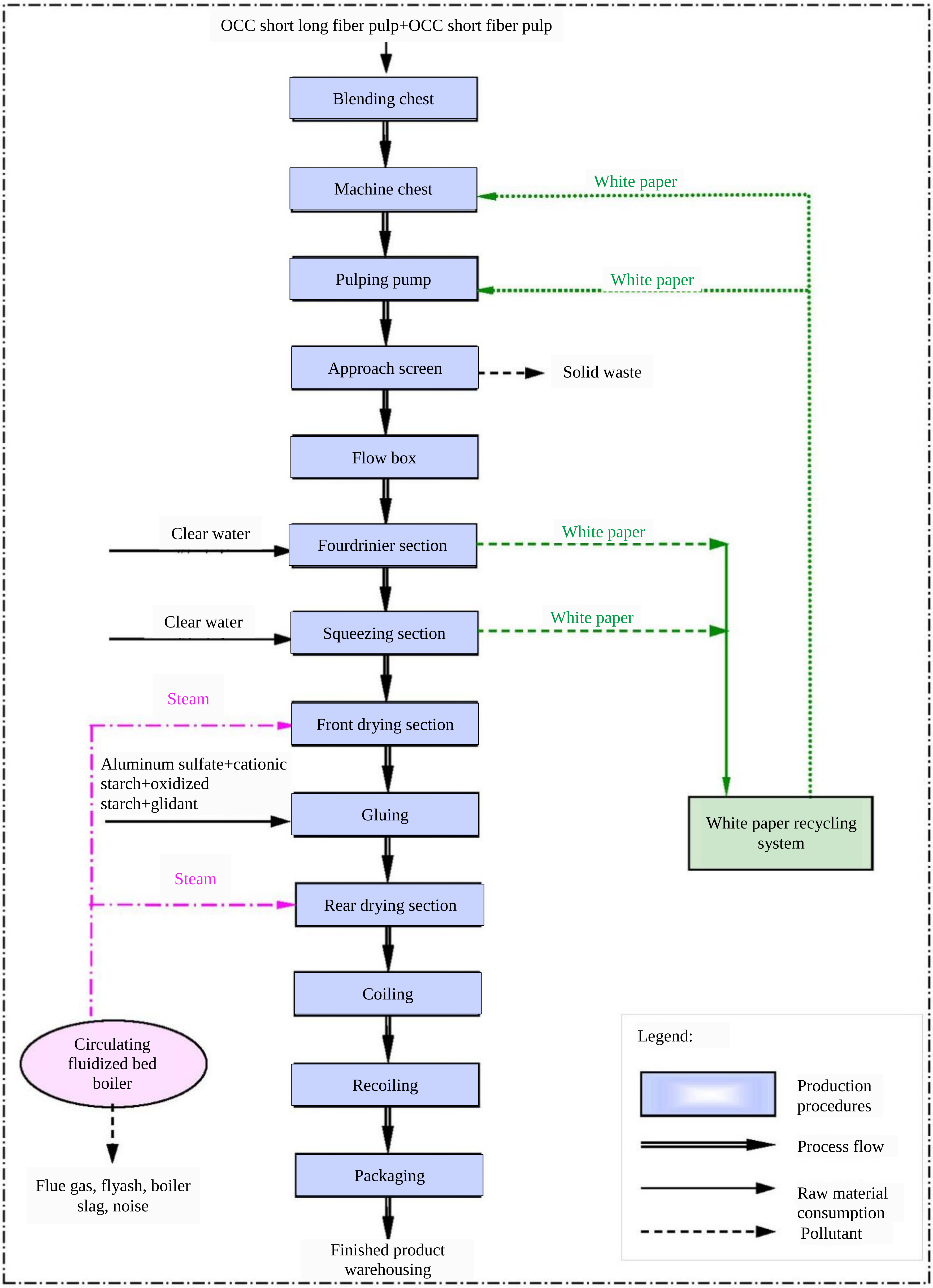


图 2.2-4　高强瓦楞原纸造纸工段生产工艺流程及产污环节图

Figure 2.2-4 Production Process Flow and Pollution Chains of High-strength Corrugating Medium Papermaking Section

2.2.3 灰板纸（PM7 线）

2.2.3 Gray board (PM7 line)

灰板纸生产线是以国产 OCC（旧瓦楞纸箱）废纸、ONP（陈旧报纸）、回收尾浆、木粉、和为原料，生产灰板纸，成纸定量为 250～320g/m^2。PM7 线生产规模为 35 万 t/a。灰板纸生产线包括制浆工段与造纸工段。

The gray board production line uses domestic OCC (old corrugated case) waste paper, ONP (old newspaper), recycled tailings, wood powder and raw materials to produce gray board paper with quantitative range of finished paper of 250-320g/m^2. Production scale of production line is 350,000t/a. The gray board production line includes the pulping and papermaking section.

2.2.3.1 制浆工段

2.2.3.1 Pulping section

制浆工段各配置一条 5 万 t/a ONP 废纸处理生产线、一条 15 万 t/a OCC 废纸处理生产线、一条 15 万 t/a 的回收尾浆处理生产线以及一条 4 万 t/a 的木粉处理生产线。

Pulping section is equipped with a 50,000 t/a ONP waste paper processing production line, a 150,000 t/a OCC waste paper processing production line, a 150,000 t/a recycled tailings treatment production line and a 40,000 t/a wood powder treatment and production line.

回收尾浆处理生产线、木粉处理生产线，为造纸工段供应符合纸机抄造要求的浆料。回收尾浆处理生产线以 PM5、PM6 生产线产生的尾浆为原料生产浆料，木粉处理生产线以木片为原料生产浆料；ONP 废纸处理生产线以 ONP 废纸为原料，生产 ONP 废纸浆；OCC 废纸处理生产线以为原料，生产本色 OCC 废纸浆。

Recycled tailings treatment production line and wood powder treatment and production line supply the papermaking section with the pulp fulfilling the production requirements of paper machine. The tailings processing line of the recovery tailpipe uses the tailings produced by the PM5 and PM6 production lines as raw materials to produce the pulp, and the wood powder processing production line uses the wood chips as raw materials to produce the pulp; the ONP waste paper processing production line uses ONP waste paper as the raw material to produce ONP waste paper pulp; OCC Waste paper processing line is used as raw material to produce natural OCC waste paper pulp.

（1）OCC 废纸生产线

(1) OCC waste paper production line

OCC 废纸（国产 OCC）经链板式输送机计量后送到水力碎浆机里碎解，碎解后的 OCC 浆料用泵送到高浓除渣器、粗筛，去除粗、重杂质，然后经过纤维分级筛分成长纤维浆料和短纤维浆料，再对长纤维浆和短纤维浆分别进行处理。制得的 OCC 长纤维浆和 OCC 短纤维浆分别贮于长纤维浆塔和短纤维浆塔中，调浓后分别泵送至造纸工段底层成浆池和芯层混合浆池。

OCC (domestic) waste paper are metered by chain conveyor and sent to the hydraulic pulper for disintegration. The disintegrated imported and domestic OCC pulp are mixed and stored, and then pumped to a high-concentration cleaner and coarsely sieved to remove coarse and heavy impurities, followed by being sieved into long and a short fiber pulp through fiber grading. The produced OCC long and short fiber pulp are respectively stored in the long and short fiber pulp tower and are respectively concentrated and then pumped to the machine chest at bottom layer and blending chest at core layer of papermaking section.

（2）ONP 废纸生产线

(2) ONP waste paper production line

ONP 废纸经链板式输送机计量后，送到转鼓碎浆机碎解，碎解后的浆料经高浓除渣器除渣，再经粗筛、低浓除砂器、浮选槽、精筛、多盘浓缩机、热分散系统处理后贮于浆塔，再由泵送往造纸工段面层成浆池。浮选槽内的脱墨废水经浅层气浮池预处理后排入污水处理站。

After the ONP waste paper is metered by the chain plate conveyor, it is sent to the drum pulper for disintegration. The disintegrated pulp is slag removed by the high concentration slag remover, and then treated by the coarse sieve, low concentration desander, flotation cell, fine sieve, multi-plate concentrator and heat dispersion system to be stored in the pulp tower. Afterwards it is pumped to the machine chest at surface layer of papermaking section. The deinking wastewater in the flotation cell is pretreated by the shallow flotation cell and discharged into the sewage treatment station.

（3）回收尾浆处理生产线

(3) Recycled tailing treatment and production line

以 PM5、PM6 生产线产生的尾浆用泵送到高浓除渣器、粗筛，去除粗、重杂质，再经低浓除砂器精筛、多盘浓缩机系统处理后贮于浆塔，再由泵送往造纸工段芯层成浆池。

The tailings produced by the PM5 and PM6 production lines are pumped to the high-concentration slag remover and coarse sieve to remove coarse and heavy impurities, and then stored in the pulp tower after being treated by a low-concentration desander, fine sieve and multi-plate concentrator system. Afterwards they are pumped to machine chest at core layer of papermaking section.

（4）木粉处理生产线

(4) Wood powder treatment and production line

木片经双螺旋输送机计量后输送到三层振动筛进行筛选，经气蒸仓加温加热后输送至热磨机进行疏解，再经磨浆机精整磨浆后泵送至造纸工段芯层浆池。

The wood chips are metered by double-auger conveyor and transported to a three-layer vibrating screen for screening. After being heated and heated by the steaming warehouse, they are sent to a hot mill for dissolving, and then refined by the refiner and pumped to the pulp chest at core layer of papermaking section.

灰板纸制浆工段生产工艺流程及产污环节见图 2.2-5。

Production process flow and pollution chains of gray board pulping section are as shown in Figure 2.2-5.

2.2.3.2　造纸工段

2.2.3.2　Papermaking Section

造纸工段主要包括流送、成型、压榨、前干燥、表面施胶、后干燥、卷纸、复卷及打包运输、贮存等工序。

Working procedures of papermaking section comprise among others: flowing, forming, squeezing, front drying, surface gluing, rear drying, calendering, rolling, rerolling, packaging & transportation, storage.

（1）由制浆工段来的木粉浆，送到面层成浆池，经配浆、浓度调节，高位箱计量后与面层的网下白水混合稀释，冲浆后进入除砂系统，良浆经上浆泵送至网前筛，精选后的良浆送面层流浆箱，并经面层成型器大量脱水。

(1) The wood powder pulp from the pulping section is delivered to the surface layer machine chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system, the good pulp is sent to the front screen through the sizing pump, and the selected good pulp is sent to the surface layer headbox, and is dehydrated by the surface layer former.

（2）由制浆工段来的 ONP 浆、回收尾浆、OCC 短纤维浆，送到衬层成浆池，经配浆、浓度调节，高位箱计量后与衬层的网下白水混合，再经上浆泵送至网前筛，精选后的良浆送至衬层流浆箱，再经衬层成型器大量脱水。

(2) The ONP pulp, recycled tailings and OCC short fiber pulp from the pulping section are sent to the lining layer machine chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system, the good pulp is sent to the front screen through the sizing pump, and the selected good pulp is sent to the lining layer headbox, and is dehydrated by the lining layer former.

（3）由制浆工段来的 OCC 长纤维浆送到底层成浆池，经配浆、浓度调节，高位箱计量后与底层的网下白水混合稀释，再经上浆泵送至网前筛，精选后的良浆送至底层流浆箱，再经底层成型器大量脱水。

(3) The OCC long fiber pulp from the pulping treatment section is delivered to the bottom layer machine chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system,

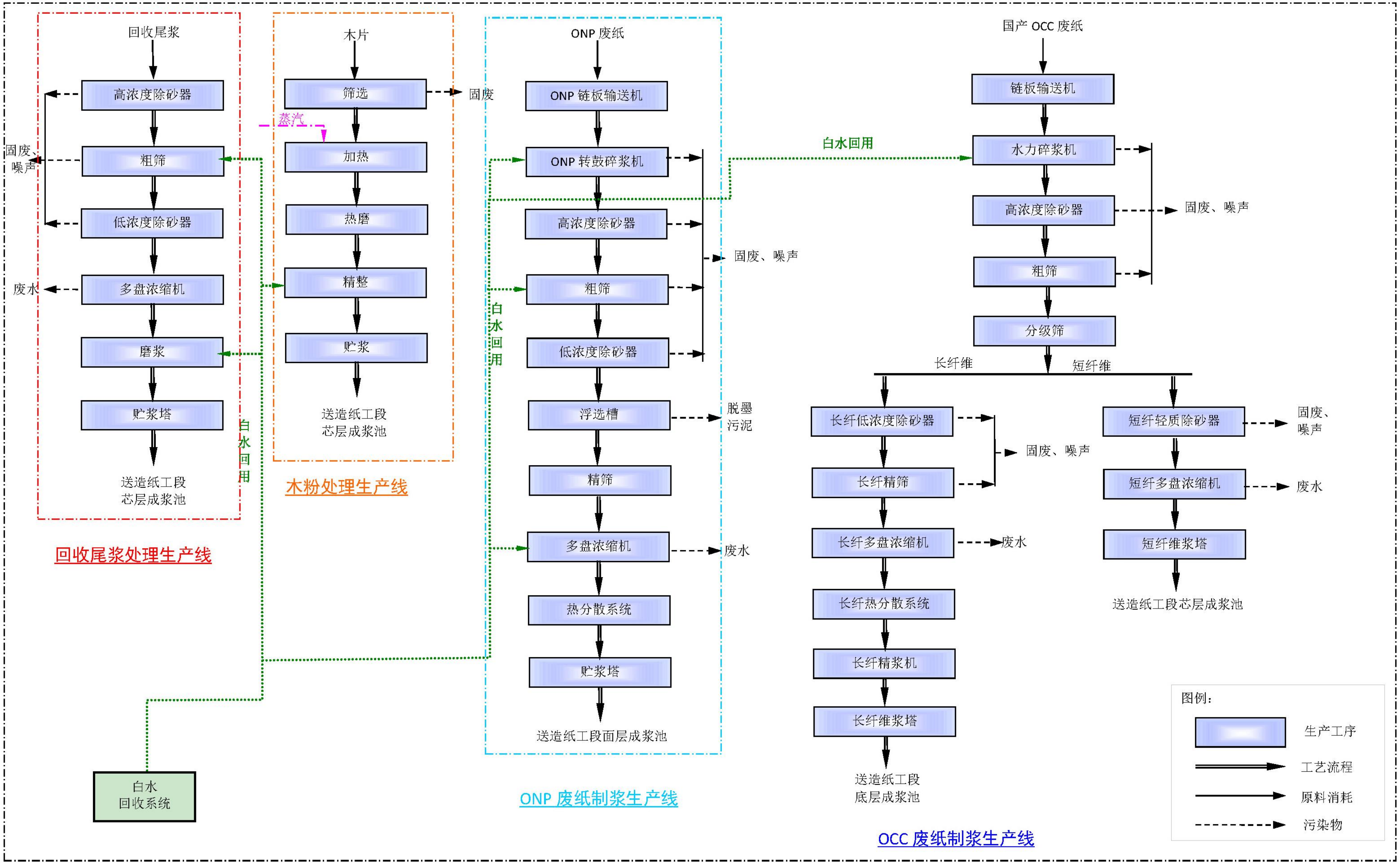
the good pulp is sent to the front screen through the sizing pump, and the selected good pulp is sent to the surface layer headbox, and is dehydrated by the surface layer former.

（4）三层纸页复合后经高真空脱水箱、真空伏辊脱水，由真空吸移辊转入压榨部，压榨脱水后再经吸移辊引入前烘干部，经前烘干部干燥到一定干度后，进行表面施胶、后烘干部干燥、卷取，最后经复卷、包装运输入库贮存。

(4) After the three-layer paper sheet is combined, it is dehydrated by a high-vacuum dewatering box and a vacuum roll, and is transferred from the vacuum suction roll to the press section, and then pressed and dehydrated, and then introduced into the front drying section by the suction roller, and dried by the pre-drying section. After a certain degree of dryness, the surface is sizing, the post-drying part is dried, coiled, and finally re-rolled, packaged and transported into warehouse for storage.

灰板纸造纸工段生产工艺流程及产污环节见图 2.2-6。

Production process flow and pollution chains of gray board papermaking section are as shown in Figure 2.2-6.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高浓度除砂器
粗筛
低浓度除砂器
多盘浓缩机
磨浆
贮浆塔
送造纸工段
芯层成浆池
固废、噪声
废水
白水回用
回收尾浆处理生产线
木片
筛选
固废
蒸汽
加热
热磨
精整
贮浆
送造纸工段
芯层成浆池
木粉处理生产线
ONP 废纸
ONP 链板输送机
ONP 转鼓碎浆机
高浓度除砂器
粗筛
低浓度除砂器
浮选槽
精筛
多盘浓缩机
热分散系统
贮浆塔
送造纸工段面层成浆池
固废、噪声
脱墨
污泥
废水
白水回用
ONP 废纸制浆生产线
国产 OCC 废纸
链板输送机
水力碎浆机
高浓度除砂器
粗筛
分级筛
固废、噪声
白水回用
长纤维
短纤维
长纤低浓度除砂器
长纤精筛
长纤多盘浓缩机
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长纤精浆机
长纤维浆塔
送造纸工段
底层成浆池
固废、噪声
废水
短纤轻质除砂器
短纤多盘浓缩机
短纤维浆塔
送造纸工段芯层成浆池
固废、
噪声
废水
白水
回收系统
OCC 废纸制浆生产线
图例：
生产工序
工艺流程
原料消耗
污染物

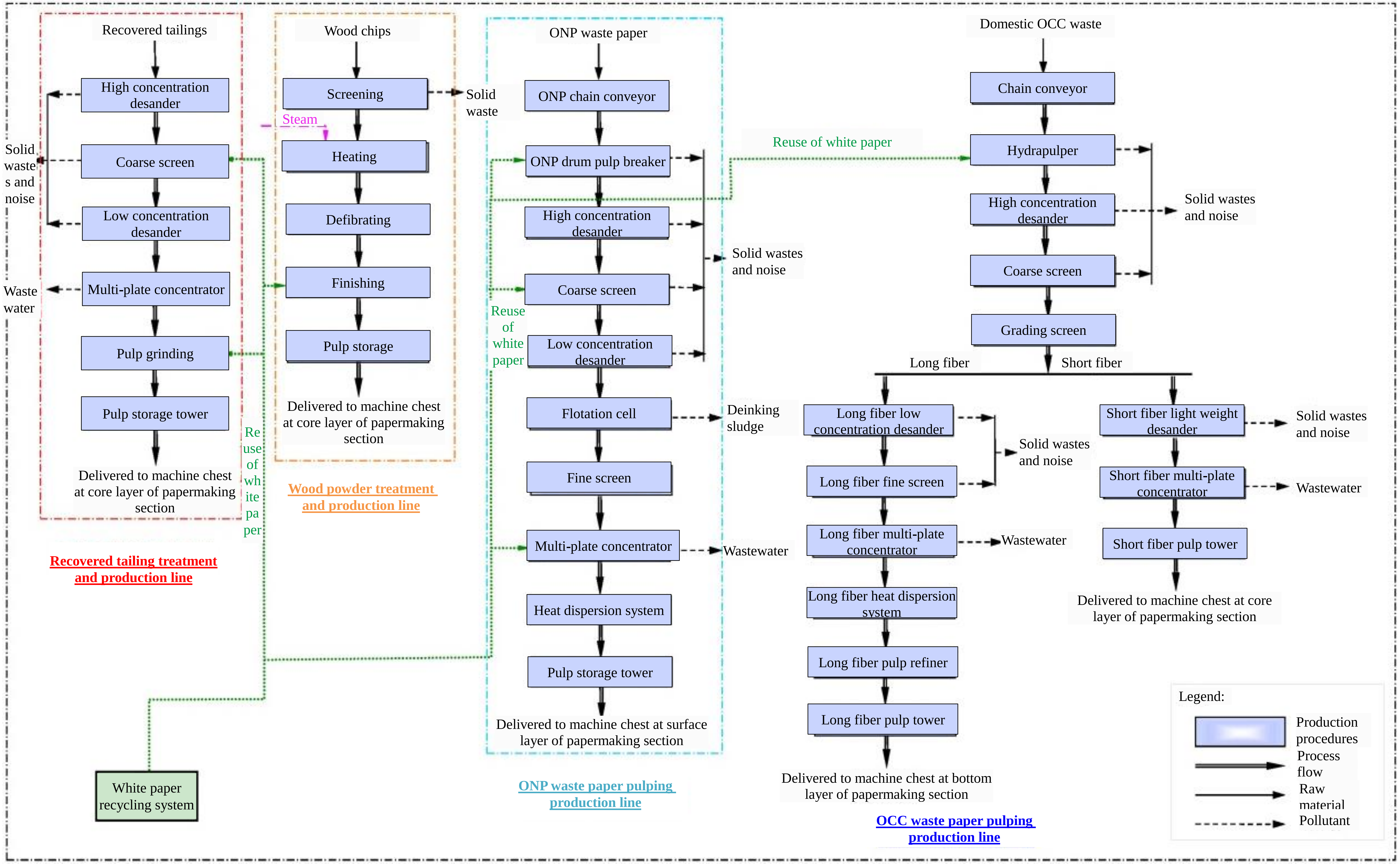
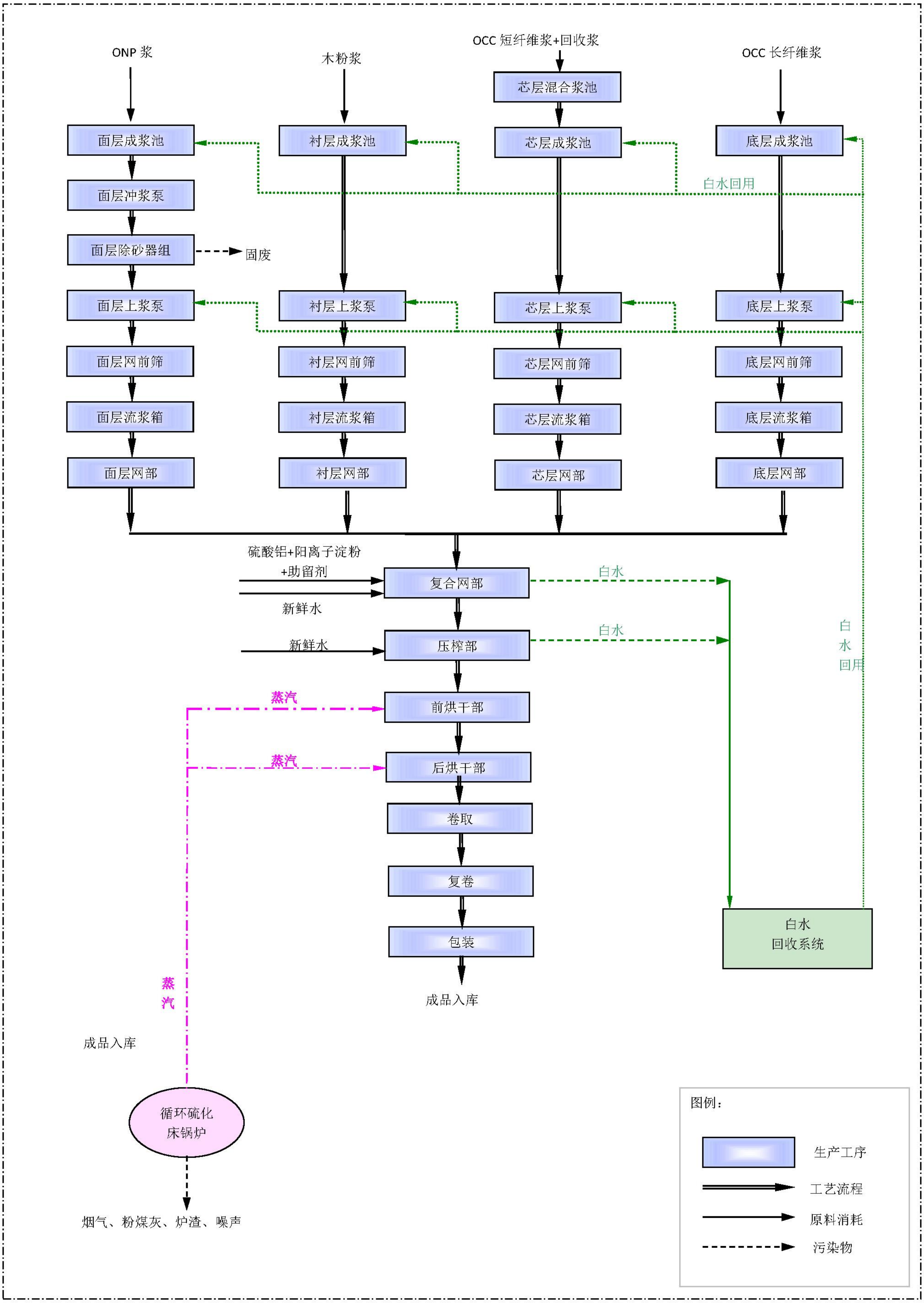

Recovered tailings
High concentration desander
Coarse screen
Low concentration desander
Multi-plate concentrator
Pulp grinding
Pulp storage tower
Delivered to machine chest at core layer of papermaking section
Solid wastes and noise
Waste water
Recovered tailing treatment and production line
Wood chips
Screening
Solid waste
Steam
Heating
Defibrating
Finishing
Pulp storage
Delivered to machine chest at core layer of papermaking section
Wood powder treatment and production line
Reuse of white paper
ONP waste paper
ONP chain conveyor
ONP drum pulp breaker
High concentration desander
Coarse screen
Low concentration desander
Flotation cell
Fine screen
Multi-plate concentrator
Heat dispersion system
Pulp storage tower
Delivered to machine chest at surface layer of papermaking section
Solid wastes and noise
Deinking sludge
Wastewater
ONP waste paper pulping production line
Reuse of white paper
Domestic OCC waste
Chain conveyor
Hydrapulper
High concentration desander
Coarse screen
Grading screen
Solid wastes and noise
Long fiber
Short fiber
Long fiber low concentration desander
Long fiber fine screen
Long fiber multi-plate concentrator
Long fiber heat dispersion system
Long fiber pulp refiner
Long fiber pulp tower
Delivered to machine chest at bottom layer of papermaking section
Solid wastes and noise
Wastewater
Short fiber light weight desander
Short fiber multi-plate concentrator
Short fiber pulp tower
Delivered to machine chest at core layer of papermaking section
Solid wastes and noise
Wastewater
OCC waste paper pulping production line
White paper recycling system
Legend:
Production procedures
Process flow
Raw material
Pollutant

图 2.2-5 灰板纸制浆工段生产工艺流程及产污节点图

Figure 2.2-5 Production Process Flow and Pollution Chains of Gray Board Pulping Section


ONP 浆
木粉浆
OCC 短纤维浆+回收浆
OCC 长纤维浆
芯层混合浆池
面层成浆池
衬层成浆池
芯层成浆池
底层成浆池
白水回用
面层冲浆泵
面层除砂器组
固废
面层上浆泵
衬层上浆泵
芯层上浆泵
底层上浆泵
面层网前筛
衬层网前筛
芯层网前筛
底层网前筛
面层流浆箱
衬层流浆箱
芯层流浆箱
底层流浆箱
面层网部
衬层网部
芯层网部
底层网部
硫酸铝+阳离子淀粉
+助留剂
新鲜水
复合网部
白水
新鲜水
压榨部
白水
白
水
回用
蒸汽
前烘干部
蒸汽
后烘干部
卷取
复卷
包装
成品入库
白水
回收系统
蒸
汽
成品入库
循环硫化
床锅炉
烟气、粉煤灰、炉渣、噪声
图例：
生产工序
工艺流程
原料消耗
污染物

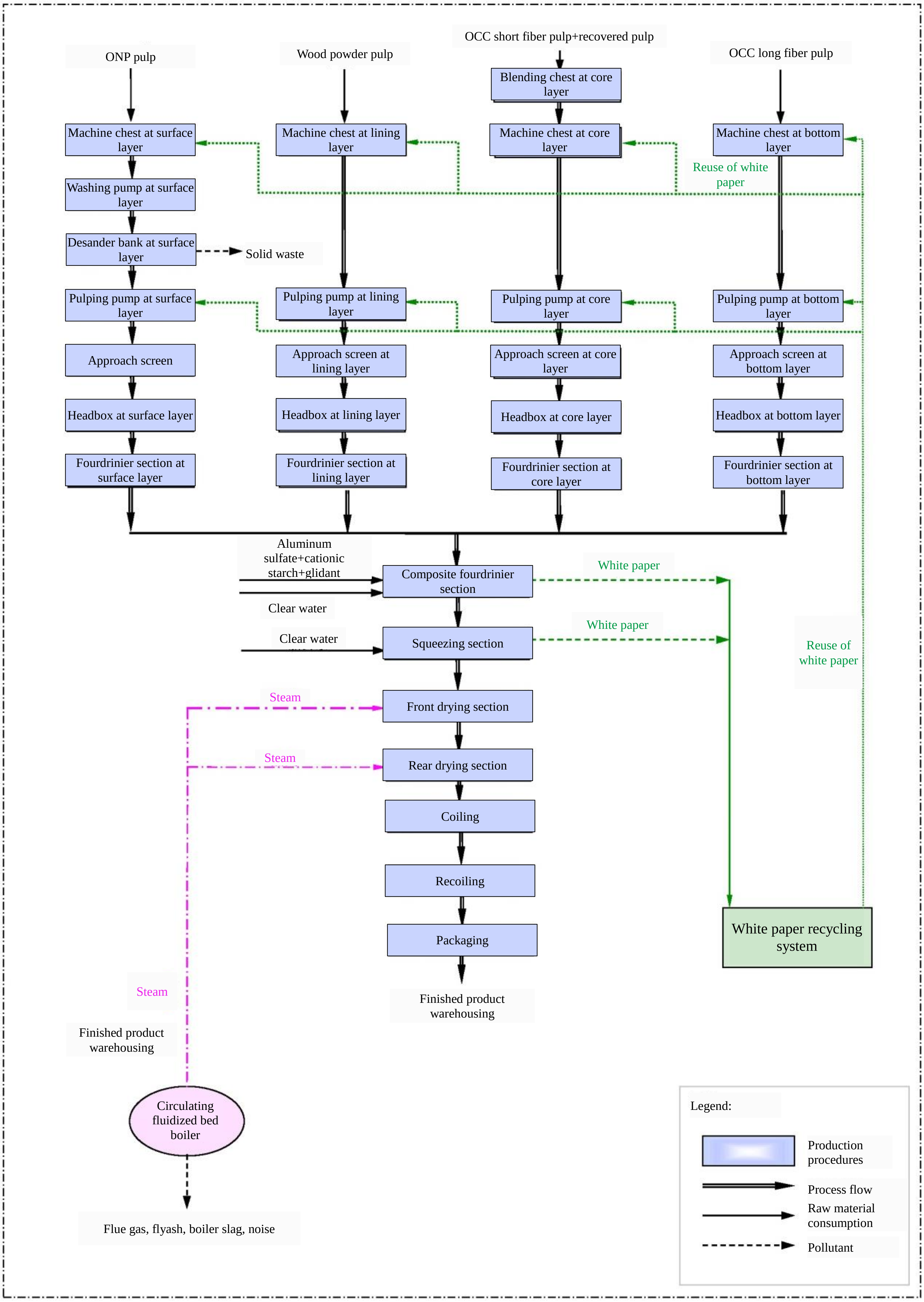


图 2.2-6　灰板纸造纸工段生产工艺流程及产污环节图

Figure 2.2-6 Production Process Flow and Pollution Chains of Gray Board Papermaking Section

2.2.4 灰底涂布白板纸（PM8 线）

2.2.4 Gray-coated whiteboard paper (PM8 line)

灰底涂布白板纸生产线是以 LBKP（阔叶木浆）浆板、ONP（陈旧报纸）、进口 OCC（旧瓦楞纸箱）和国产 OCC（旧瓦楞纸箱）废纸为原料，生产灰底涂布白板纸，成纸定量为 200～360g/m^2。PM8 线生产规模为 40 万 t/a。灰底涂布白板纸生产线包括制浆工段与造纸工段。

The gray-coated whiteboard paper production line uses LBKP (leaves bleached hardwood kraft pulp) board, ONP (old newspaper) and imported and domestic OCC (old corrugated case) waste paper as raw materials to produce gray-coated whiteboard paper with quantitative range of finished paper of 200-360g/m^2. Production scale of production line is 400,000t/a. The gray-coated whiteboard paper production line includes the pulping and papermaking section.

2.2.4.1 制浆工段

2.2.4.1 Pulping section

制浆工段各配置一条 LBKP 打浆生产线，一条 ONP 废纸处理生产线和一条 OCC 废纸处理生产线，为造纸工段供应符合纸机抄造要求的浆料。LBKP 打浆生产线以商品木 LBKP 浆板为原料，生产 LBKP 浆；ONP 废纸处理生产线以 ONP 废纸为原料，生产 ONP 废纸浆；OCC 废纸处理生产线以进口的瓦楞箱废纸板和国内瓦楞箱废纸板为原料，生产本色 OCC 废纸浆。

Each pulping section is equipped with a LBKP pulp breaking line, an ONP waste paper treatment & production line and an OCC waste paper treatment & production line so as to supply the pulp materials to the paperboard section fulfilling production requirements of paper machine. LBKP pulp breaking line uses commercial wooden LBKP pulp board as raw material to produce LBKP pulp; ONP waste paper production line uses ONP waste paper as raw material to produce ONP pulp; OCC waste paper treatment & production line uses imported corrugated box waste paperboard and domestic corrugated box waste paper as raw materials to produce natural OCC waste paper pulp.

（1）LBKP 打浆生产线

(1) LBKP pulp breaking line

LBKP 浆板经链板输送机送到水力碎浆机里碎解，在链板输送机上剪去垛包上的粗铁丝和浆包铁丝并经过除铁过程，在水力碎浆机中，浆板在 4.5%左右的浓度下碎解，碎解后的浆料泵送至高浓除砂器除去重杂质，然后泵送至精浆机，经精浆机打浆后贮存于浆池以备造纸工段使用。

The LBKP pulp board is sent to the hydraulic pulper by the chain conveyor, and the thick iron wire and the iron-coated wire on the bag are cut off on the chain conveyor and passed through the iron removal process. In the hydraulic pulper, the pulp board is disintegrated at a concentration of about 4.5%. The disintegrated pulp is pumped to a high-concentration desander to remove heavy impurities, and then pumped to a refiner and is beaten thereby and stored in a pulp chest for use in papermaking section.

（2）ONP 废纸生产线

(2) ONP waste paper production line

ONP 废纸经链板式输送机计量后，送到转鼓碎浆机碎解，碎解后的浆料经高浓除渣器除渣，再经粗筛、低浓除砂器、浮选槽、精筛、多盘浓缩机、热分散系统处理后贮于浆塔，再由泵送往造纸工段衬层成浆池。浮选槽内的脱墨废水经浅层气浮池预处理后排入污水处理站。

After the ONP waste paper is metered by the chain plate conveyor, it is sent to the drum pulper for disintegration. The disintegrated pulp is slag removed by the high concentration slag remover, and then treated by the coarse sieve, low concentration desander, flotation cell, fine sieve, multi-plate concentrator and heat dispersion system to be stored in the pulp tower. Afterwards it is pumped to the machine chest at lining layer of papermaking section. The deinking wastewater in the flotation cell is pretreated by the shallow flotation cell and discharged into the sewage treatment station.

（3）OCC 废纸生产线

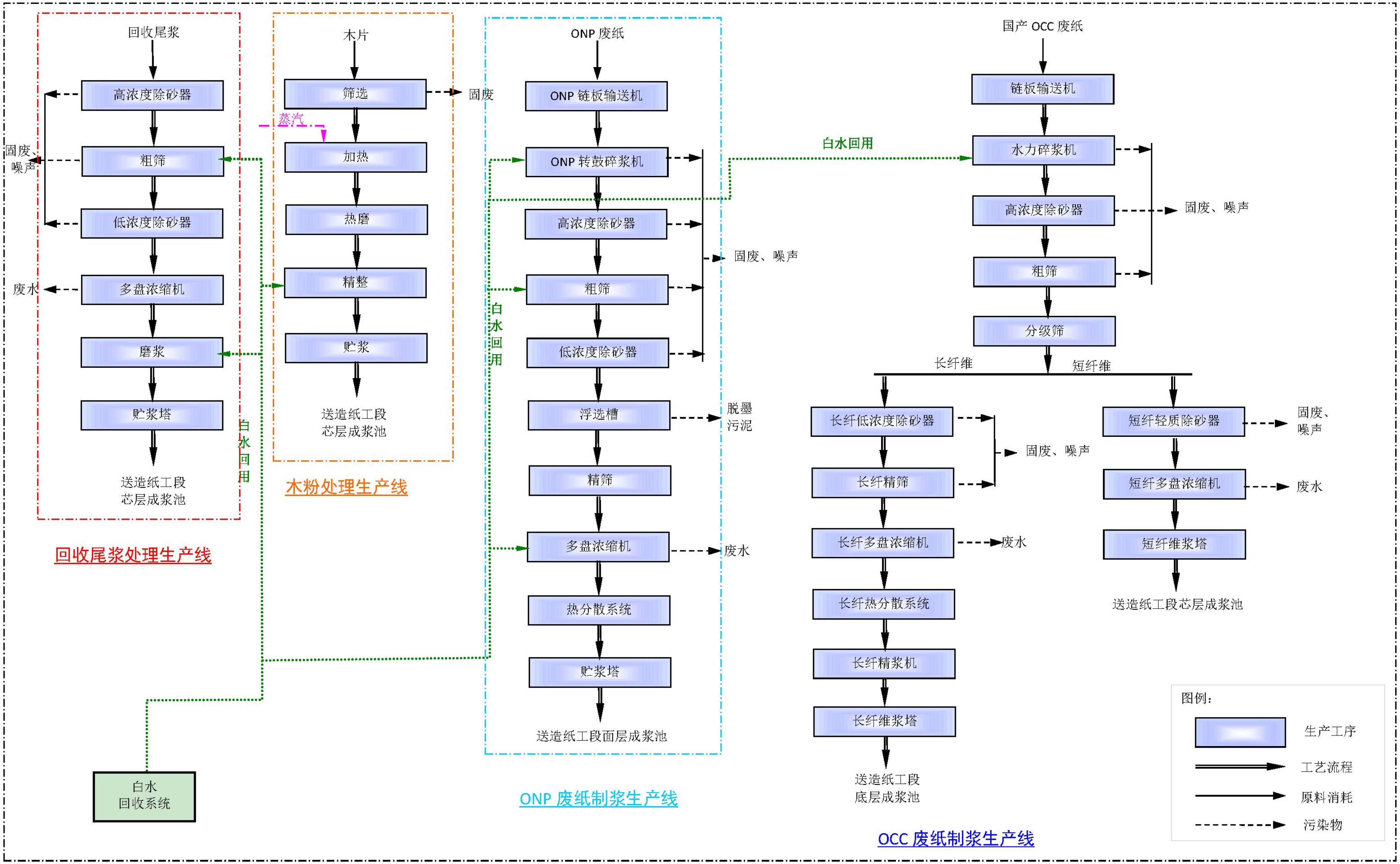
(3) OCC waste paper production line

OCC 废纸(包括进口 OCC 和国产 OCC)经链板式输送机计量后送到水力碎浆机里碎解，碎解后的 OCC 浆料用泵送到高浓除渣器、粗筛，去除粗、重杂质，然后经过纤维分级筛分成长纤维浆料和短纤维浆料，再对长纤维浆和短纤维浆分别进行处理。制得的 OCC 长纤维浆和 OCC 短纤维浆分别贮于长纤维浆塔和短纤维浆塔中，调浓后分别泵送至造纸工段底层成浆池和芯层混合浆池。

OCC (domestic and imported) waste paper are metered by chain conveyor and sent to the hydraulic pulper for disintegration. The disintegrated imported and domestic OCC pulp are mixed and stored, and then pumped to a high-concentration cleaner and coarsely sieved to remove coarse and heavy impurities, followed by being sieved into long and a short fiber pulp through fiber grading. The produced OCC long and short fiber pulp are respectively stored in the long and short fiber pulp tower and are respectively concentrated and then pumped to the machine chest at bottom layer and blending chest at core layer of papermaking section.

灰底涂布白板纸制浆工段生产工艺流程及产污环节见图 2.2-7。

Production process flow and pollution chains of gray-coated whiteboard paper pulping section are as shown in Figure 2.2-7.


回收尾浆
高浓度除砂器
粗筛
低浓度除砂器
多盘浓缩机
磨浆
贮浆塔
送造纸工段
芯层成浆池
固废、
噪声
废水
白
水
回
用
回收尾浆处理生产线
木片
筛选
固废
蒸汽
加热
热磨
精整
贮浆
送造纸工段
芯层成浆池
木粉处理生产线
ONP 废纸
ONP 链板输送机
ONP 转鼓碎浆机
高浓度除砂器
粗筛
低浓度除砂器
浮选槽
精筛
多盘浓缩机
热分散系统
贮浆塔
送造纸工段面层成浆池
固废、噪声
脱墨
污泥
废水
白
水
回
用
ONP 废纸制浆生产线
白水回用
白水
回收系统
国产 OCC 废纸
链板输送机
水力碎浆机
高浓度除砂器
粗筛
分级筛
固废、噪声
长纤维
短纤维
长纤低浓度除砂器
长纤精筛
长纤多盘浓缩机
长纤热分散系统
长纤精浆机
长纤维浆塔
送造纸工段
底层成浆池
固废、噪声
废水
短纤轻质除砂器
短纤多盘浓缩机
短纤维浆塔
送造纸工段芯层成浆池
固废、
噪声
废水
OCC 废纸制浆生产线
图例：
生产工序
工艺流程
原料消耗
污染物

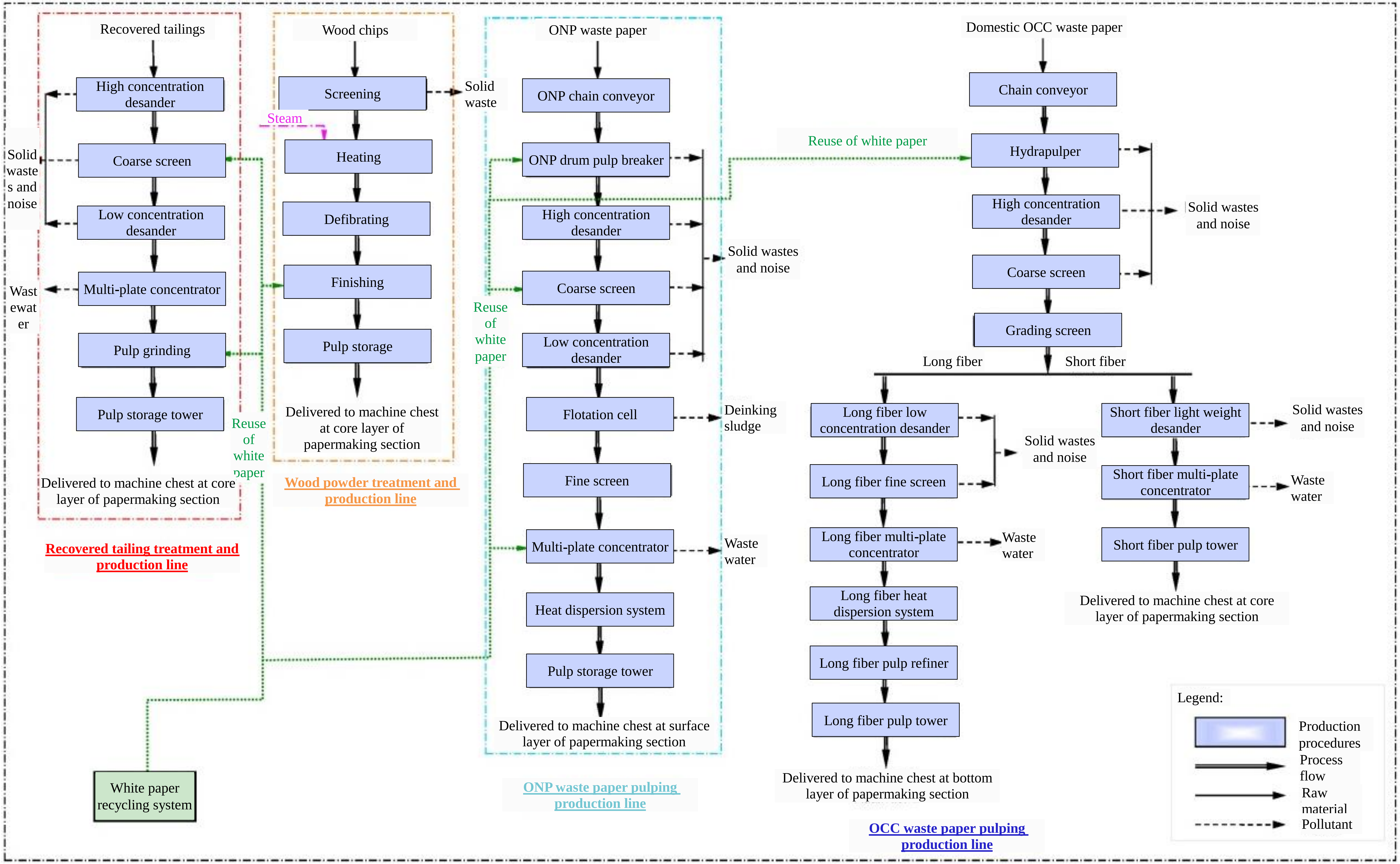

Recovered tailings
High concentration desander
Coarse screen
Low concentration desander
Multi-plate concentrator
Pulp grinding
Pulp storage tower
Delivered to machine chest at core layer of papermaking section
Solid wastes and noise
Wastewater
Reuse of white paper
Recovered tailing treatment and production line
Wood chips
Screening
Solid waste
Steam
Heating
Defibrating
Finishing
Pulp storage
Delivered to machine chest at core layer of papermaking section
Wood powder treatment and production line
ONP waste paper
ONP chain conveyor
ONP drum pulp breaker
High concentration desander
Coarse screen
Low concentration desander
Flotation cell
Fine screen
Multi-plate concentrator
Heat dispersion system
Pulp storage tower
Delivered to machine chest at surface layer of papermaking section
Solid wastes and noise
Deinking sludge
Waste water
Reuse of white paper
ONP waste paper pulping production line
Reuse of white paper
Domestic OCC waste paper
Chain conveyor
Hydrapulper
High concentration desander
Coarse screen
Grading screen
Solid wastes and noise
Long fiber
Short fiber
Long fiber low concentration desander
Long fiber fine screen
Long fiber multi-plate concentrator
Long fiber heat dispersion system
Long fiber pulp refiner
Long fiber pulp tower
Delivered to machine chest at bottom layer of papermaking section
Solid wastes and noise
Waste water
Short fiber light weight desander
Short fiber multi-plate concentrator
Short fiber pulp tower
Delivered to machine chest at core layer of papermaking section
Solid wastes and noise
Waste water
OCC waste paper pulping production line
White paper recycling system
Legend:
Production procedures
Process flow
Raw material
Pollutant

图 2.2-7　灰底涂布白板纸制浆工段生产工艺流程及产污环节图

Figure 2.2-7 Production Process Flow and Pollution Chains of Gray-coated Whiteboard Paper Pulping Section

2.2.4.2 造纸工段

2.2.4.2 Papermaking Section

造纸工段主要包括流送、网部成型、压榨部、前干燥部、表面施胶、后干燥部、硬压光、涂布、涂后干燥、软压光、卷取、复卷及打包运输、贮存等工序。

Working procedures of the section comprise among others: flowing, fourdrinier forming, squeezing section, front drying section, surface gluing, rear drying section, hard calendering, coating, drying after coating, soft calendering, rolling, rerolling, packaging & transportation, storage;

（1）由制浆工段来的 LBKP 浆，送到面层成浆池，经配浆、浓度调节，高位箱计量后与面层的网下白水混合稀释，冲浆后进入除砂系统，良浆经上浆泵送至网前筛，精选后的良浆送面层流浆箱，并经面层成型器大量脱水。

(1) The LBKP pulp from the pulping section is delivered to the surface layer machine chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system, the good pulp is sent to the front screen through the sizing pump, and the selected good pulp is sent to the surface layer headbox, and is dehydrated by the surface layer former.

（2）由制浆工段来的 ONP 浆，送到衬层成浆池，经配浆、浓度调节，高位箱计量后与衬层的网下白水混合，再经上浆泵送至网前筛，精选后的良浆送至衬层流浆箱，再经衬层成型器大量脱水。

(2) The ONP pulp from the pulping section is delivered to the lining layer machine chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system, the good pulp is sent to the front screen through the sizing pump, and the selected good pulp is sent to the lining layer headbox, and is dehydrated by the lining layer former.

（3）由制浆工段来的 OCC 短纤维浆和由多盘白水过滤机来的回收浆，送到芯层混合浆池，经配浆、浓度调节，高位箱计量后与芯层的网下白水混合，再经上浆泵送至网前筛，精选后的良浆送至芯层流浆箱，再经芯层成型器大量脱水。

(3) The OCC short fiber pulp from the pulping section and the recycled pulp from the multi-plate white water filter are sent to the core layer blending chest, and are mixed and adjusted, and the high position box is metered and mixed with the underlying white water of the core layer. Then, the sizing pump is sent to the front screen of the net, and the selected good pulp is sent to the core layer headbox, and then dehydrated by the core layer former.

（4）由制浆工段来的 OCC 长纤维浆送到底层成浆池，经配浆、浓度调节，高位箱计量后与底层的网下白水混合稀释，再经上浆泵送至网前筛，精选后的良浆送至底层流浆箱，再经底层成型器大量脱水。

(4) The OCC long fiber pulp from the pulping treatment section is sent to the bottom layer machine chest, and the pulp is adjusted and the concentration is adjusted. After the high-level box is metered, it is mixed with the white water of the surface layer and diluted, after the pulping. After entering the sand removal system, the good pulp is sent to the front screen through the sizing pump, and the selected good pulp is sent to the surface layer headbox, and is dehydrated by the surface layer former.

（5）四层纸页复合后经高真空脱水箱、真空伏辊脱水，由真空吸移辊转入压榨部，压榨脱水后再经吸移辊引入前烘干部，经前烘干部干燥到一定干度后，进行表面施胶，再经后烘干、硬压光、涂布、涂后干燥、软压光、卷取、复卷、完成后成品入库。

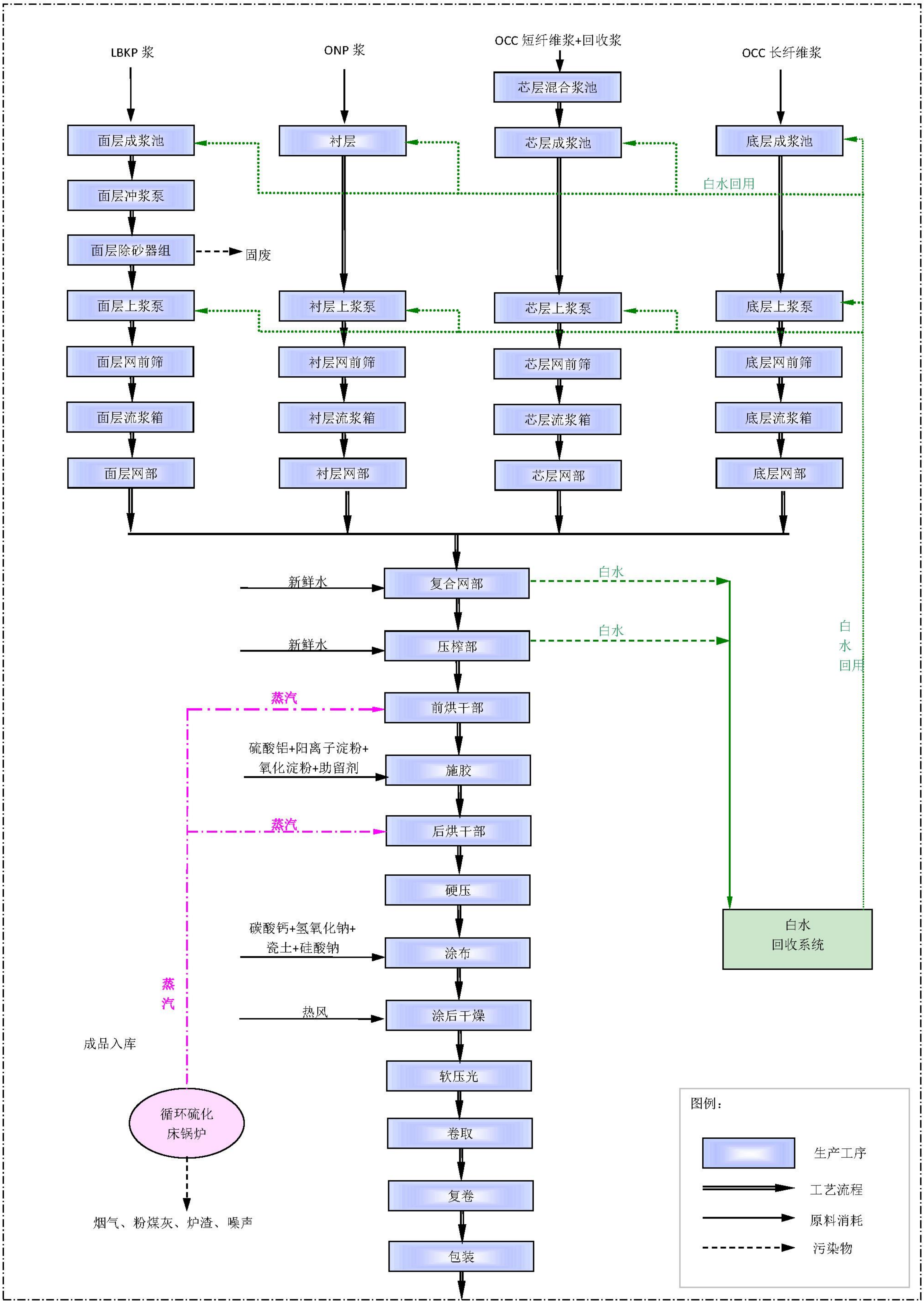
(5) After the four-layer paper sheet is combined, it is dehydrated by a high-vacuum dewatering box and a vacuum roll, and is transferred from the vacuum suction roll to the press section to be pressed and dehydrated, and then is introduced into the front drying section by the suction roller, and dried to a certain degree of dryness thereby. Afterwards, the four-layer paper sheet is surface glued and then rear dried, hard calendered, coated, dried upon coating, soft calendered, coiled, recoiled and finished, followed by warehousing of finished product.

（6）车间配备白水回收系统、真空、蒸汽、冷凝水、白水及清水系统。

(6) Workshop is equipped with white water recycling system, vacuum, steam, condensate, white water and water system

灰底涂布白板纸造纸工段生产工艺流程见图 2.2-8。

Production process flow of gray-coated whiteboard paper pulping section is as shown in Figure 2.2-8.


LBKP 浆
ONP 浆
OCC 短纤维浆+回收浆
OCC 长纤维浆
芯层混合浆池
面层成浆池
衬层
芯层成浆池
底层成浆池
白水回用
面层冲浆泵
面层除砂器组
固废
面层上浆泵
衬层上浆泵
芯层上浆泵
底层上浆泵
面层网前筛
衬层网前筛
芯层网前筛
底层网前筛
面层流浆箱
衬层流浆箱
芯层流浆箱
底层流浆箱
面层网部
衬层网部
芯层网部
底层网部
新鲜水
复合网部
白水
新鲜水
压榨部
白水
白
水
回用
蒸汽
前烘干部
硫酸铝+阳离子淀粉+
氧化淀粉+助留剂
施胶
蒸汽
后烘干部
硬压
白水
回收系统
碳酸钙+氢氧化钠+
瓷土+硅酸钠
涂布
蒸
汽
热风
涂后干燥
成品入库
软压光
循环硫化
床锅炉
卷取
图例：
生产工序
工艺流程
原料消耗
污染物
复卷
烟气、粉煤灰、炉渣、噪声
包装

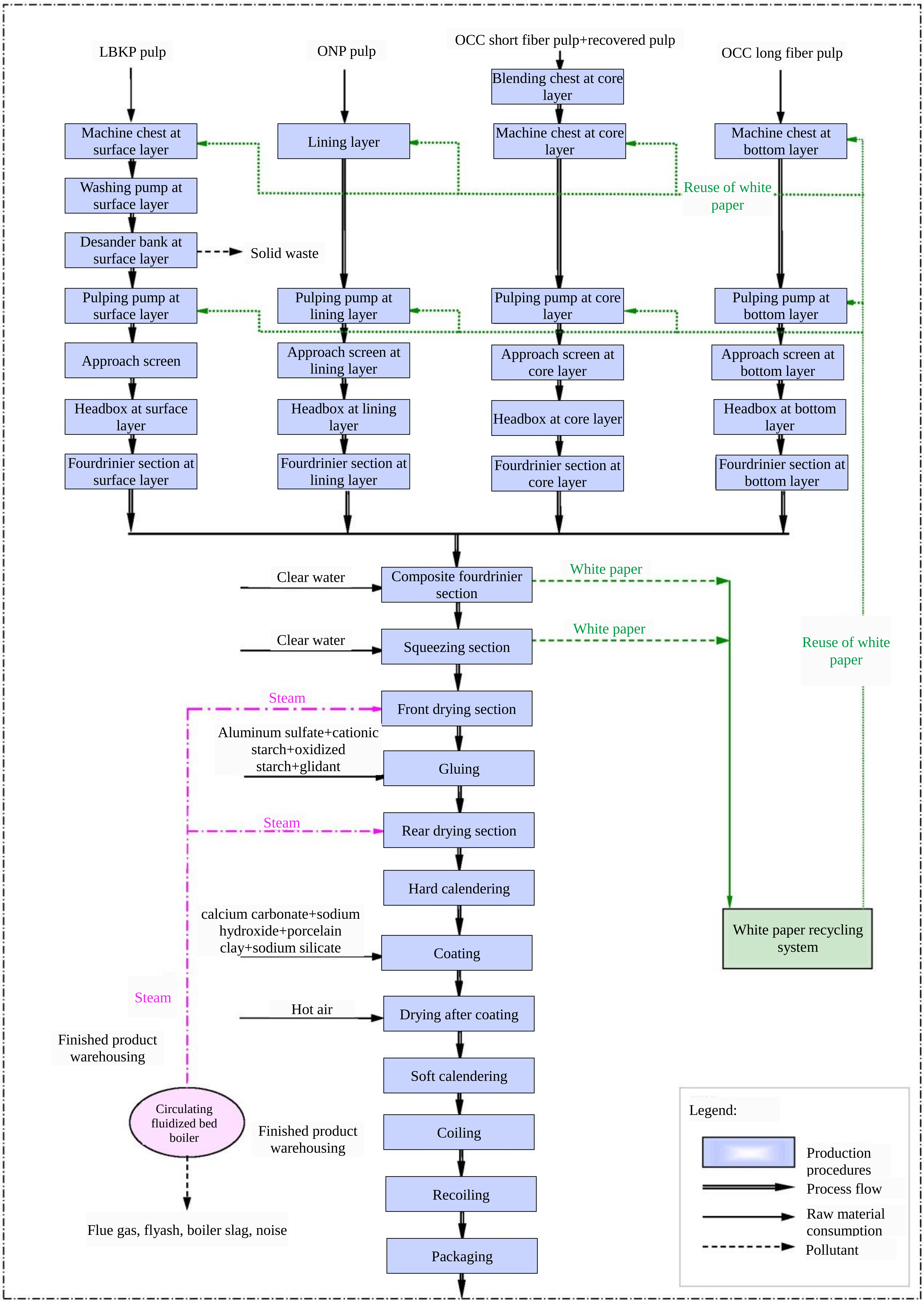


图 2.2-8 灰底涂布白板纸造纸工段生产工艺流程及产污环节图

Figure 2.2-8 Production Process Flow and Pollution Chains of Gray-coated Whiteboard Paper Pulping Section

2.2.5 公用辅助工程

2.2.5 Utility and Auxiliary Works

2.2.5.1 自备动力系统

2.2.5.1 Captive power system

自备动力系统主要由输煤系统和贮煤场、软水处理系统、循环流化床锅炉、发电机组、冷却水系统、灰/渣处理系统组成，具体工艺流程及产污环节见图 2.2-9。

Captive power system consists of, among others, coal handling system & coal yard, softwater treatment system, CBF boiler, power generating units, cooling water system and ash/slag handling system. Specific process flow and pollution chains are a shown in Figure 2.2-9.

工艺流程说明：

Description on Process Flow:

（1）输煤系统和贮煤场

(1) Coal handling system and coal yard

贮煤场为封闭结构，运煤栈道全部封闭，转运站设喷水压尘设施。贮煤场设有若干卸料斗，通过推土机将燃煤卸入料斗，由给料器送入输煤胶带机，经转运后运往碎煤机房，碎煤后合格的燃煤由输送机运往自备动力车间储煤仓。

Coal yard is of enclosed structure while coal handling tresle is fully enclosed with transfer station provided with water spray dust suppression facilities. Coal yard is provided with several discharge hoppers. Fuel coal is discharged into the hopper by bulldozer and delivered into belt conveyor by coal feeder to be transferred to coal crusher room. Upon crushing, qualified fuel coal is conveyed to coal bunker of captive powerhouse by coal conveyor.

两台锅炉满负荷运行时全年需要消耗标煤 65.41 万 t/a，现有工程用煤量为 60.6 万 t/a。

When operating at full load, both boilers need to consume 654,100 tons of standard coal for the whole year and coal consumption of existing project is 606,000 t/a.

（2）化学水处理系统

(2) Chemical water treatment system

化学水处理车间来水采用一级除盐加混床处理系统，工艺生产返回的凝结水经回收热量冷却后直接经过混床系统处理，处理后的除盐水作为锅炉的补充水。

Influent from chemical water treatment workshop is treated by using one-stage demineralization + mixed bed treatment system. The condensate returned from process production is directly treated by the mixed bed upon heat recovery and cooling and treated demineralized water serves as make-up water for boiler.

（3）循环流化床锅炉

(3) CFB boiler

现有工程实际已建成配套 2×410t/h 循环流化床锅炉，锅炉烟气采用静电除尘器处理；采用石灰石-石膏炉外湿法脱硫设施进行脱硫，脱硫用石灰石采购成品石灰石粉，并储存于负压密闭料仓；采用低温燃烧技术(850-900℃)控制 NO_X 的发生量。烟气最后通过高度 150m、Φ4.8m 的烟囱排放。

Exisiting project in fact has been constructed with 2×410t/h CFB boilers as a complete set. Flue gas from boilersis treated using ESP and desulphurized using limestone-gypsum boiler external wet desulphurization facilities. Limestone for desulphurization is purchased finished products of limestone powder and stored in negative-pressure enclosed hopper. Generations of NO_X are controlled using low-temperature combustion technology (850-900℃). Finally flue gas is discharged via stack with height of 150m and diameter of Φ4.8m.

目前现有动力车间的 2 台循环硫化床锅炉供汽能力为 432t/h，还可供汽量 388t/h。

Both CBF boilers in the existing powerhouse have a steam supply capacity of 432t/h with an extra steam supply capacity of 388t/h.

（4）发电机组

(4) Generating unit

配置 1 台 C60-8.83/0.58 型抽凝式汽轮发电机组和 1 台 B70-8.83/0.58 背压式汽轮发电机组，锅炉高压蒸汽经过汽轮机组抽凝减压后产生的低压蒸汽供给生

产。

It is equipped with a C60 extraction condensing turbine generator unit and a B70-8.83/0.58 back pressure type turbine generator unit. HP steam of boiler is extracted, condensed and depressurized by the turbine unit to produce LP steam so as to be supplied to production.

（5）冷却水系统

(5) Cooling water system

采用循环冷却水系统，建设冷却塔 1 座。

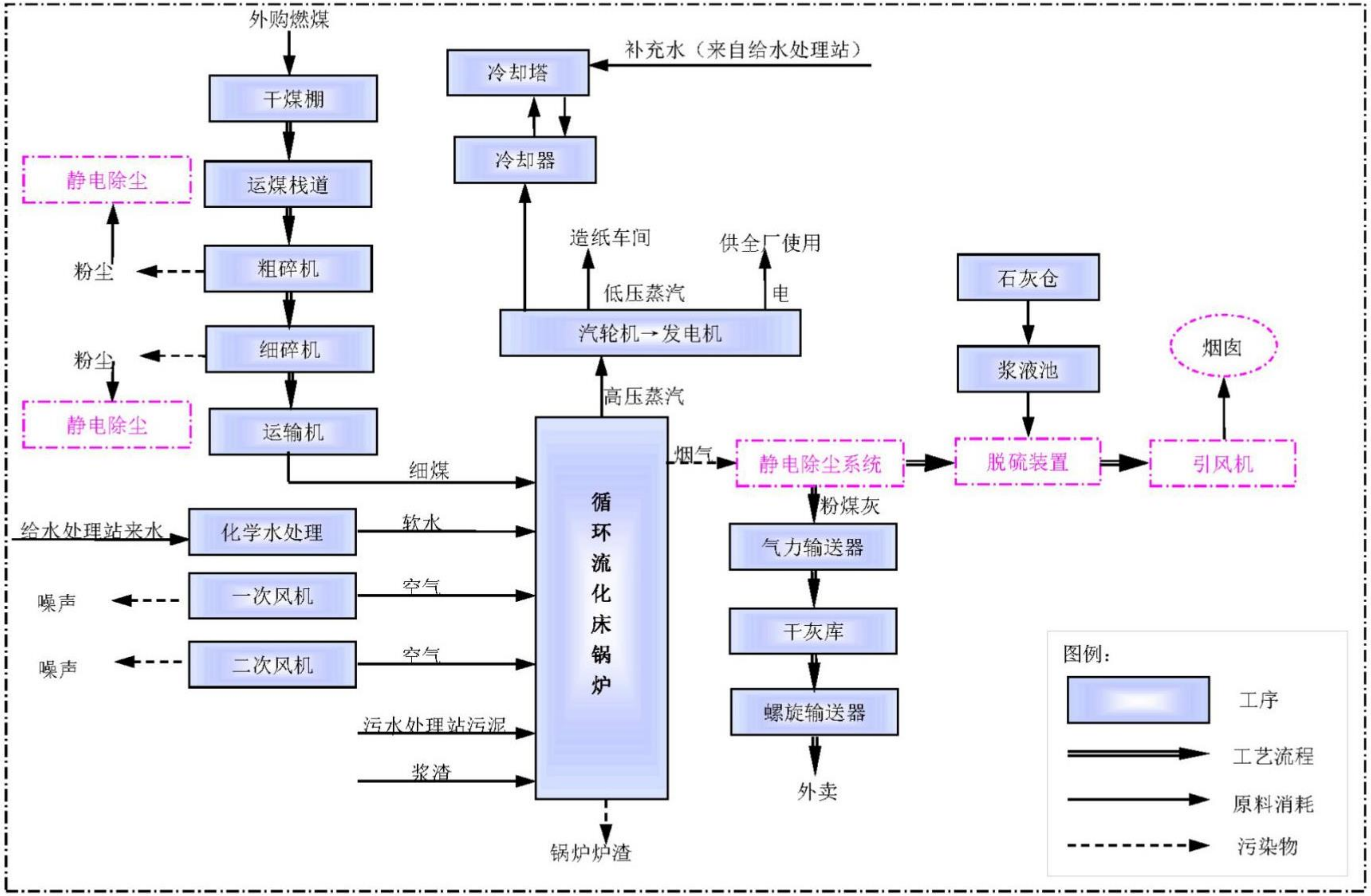
Circulating cooling water system is used and constructed with a cooling tower.

（6）灰/渣处理系统

(6) Ash/slag treatment system

采用灰渣分除，气力出灰，干排渣。设 5 座灰库，每个灰库容积约 1500m^3，可储存 3 天的干灰。静电除尘器收集的粉煤灰经正压气力输送系统送至干灰库后由螺旋喂料器排入运输车辆。为了防止卸灰粉尘，在螺旋喂料器加水增湿。底渣采用螺旋冷却器回收热量冷却后，经研磨后暂存灰库中，由汽车运走综合利用。

Ash and slag are separately handled with pneumatic ash removal and dry slag discharge. Five ash silos are provided, each with a capacity of 1500m^3 and capable of storing dry ash for 3 days' operation. The fly ash collected by the ESP is delivered to the dry ash silo by the positive pressure pneumatic conveying system and discharged into the transport vehicle by the screw feeder. Screw feeder is watered and humidified in order to prevent dust from generating due to ash discharge. The bottom slag is cooled by a spiral cooler to recover heat and is temporarily stored in the ash silo after grinding so as to be transported by trucks for comprehensive utilization.


外购燃煤
干煤棚
运煤栈道
静电除尘
粉尘
粗碎机
细碎机
粉尘
静电除尘
运输机
细煤
给水处理站来水
化学水处理
软水
噪声
一次风机
空气
噪声
二次风机
空气
污水处理站污泥
浆渣
循环流化床锅炉
锅炉炉渣
冷却塔
补充水（来自给水处理站）
冷却器
造纸车间
供全厂使用
低压蒸汽
电
汽轮机→发电机
高压蒸汽
烟气
静电除尘系统
粉煤灰
气力输送器
干灰库
螺旋输送器
外卖
石灰仓
浆液池
脱硫装置
烟囱
引风机
图例：
工序
工艺流程
原料消耗
污染物

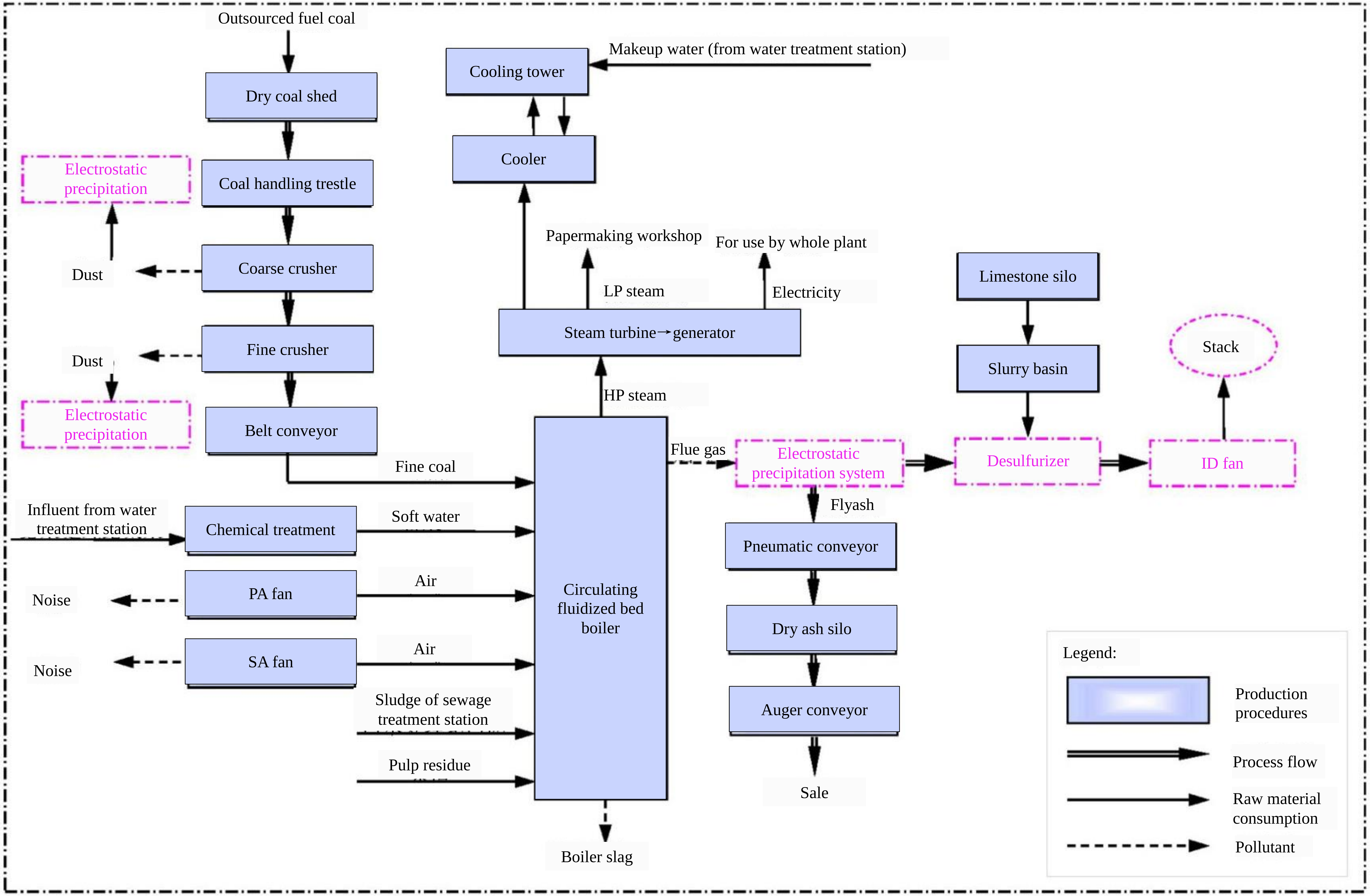

Outsourced fuel coal
Dry coal shed
Coal handling trestle
Electrostatic precipitation
Dust
Coarse crusher
Dust
Fine crusher
Electrostatic precipitation
Belt conveyor
Fine coal
Cooling tower
Makeup water (from water treatment station)
Cooler
Papermaking workshop
For use by whole plant
LP steam
Electricity
Steam turbine→generator
HP steam
Limestone silo
Slurry basin
Stack
Flue gas
Electrostatic precipitation system
Desulfurizer
ID fan
Flyash
Influent from water treatment station
Chemical treatment
Soft water
Noise
PA fan
Air
Noise
SA fan
Air
Sludge of sewage treatment station
Pulp residue
Circulating fluidized bed boiler
Pneumatic conveyor
Dry ash silo
Auger conveyor
Sale
Boiler slag
Legend:
Production procedures
Process flow
Raw material consumption
Pollutant

图 2.2-9　自备动力系统工艺流程及排污节点图

Figure 2.2-9 Process Flow and Blowdown Node Diagram of Captive Power System

2.2.5.2 给水工程

2.2.5.2 Water supply works

（1）用水量

(1) Water consumption

全厂平均用水量约 68347m^3/d，需原水 70000m^3/d。

Average water consumption of whole plant is around 68347m^3/d, requiring 70000m^3/d of raw water.

（2）供水水源

(2) Water supply source

项目供水水源由九龙江北溪左高干渠提供，该水源水量丰富，水质较好，可满足厂内现有工程的用水量需求。

Water supply of project is to be sourced from left high trunk canal at North Creek of Jiulong River, which is capable of satisfying water demand of existing project with abundant water quantity and desirable water quality.

（3）厂区给水

(3) Water supply in plant area

项目设置一个给水处理站，厂区给水管采用四个系统，即生产用水给水管理系统、消火栓消防水管理系统、生活用水管道系统以及自动喷水消防给水管道系统。工程净化处理工艺采用混合、絮凝、沉淀、过滤、加药及污泥处理等措施，给水处理站处理能力为 79200t/d。其制水处理工艺流程详见图 2.2-10。

The project is provided with a water treatment station and water supply pipes in plant area are used by such four systems as production water supply management, fire hydrant fire water management, domestic water pipe and fire sprinkler water supply pipe system. Mixing, flocculation, sedimentation, filtration, chemical dosing and sludge treatment measures and other measures are used for purification and treatment process of the project. Treatment capacity of water treatment station is 79200t/d. Process flow of water purification and treatment process are detailed in Figure 2.2-10.

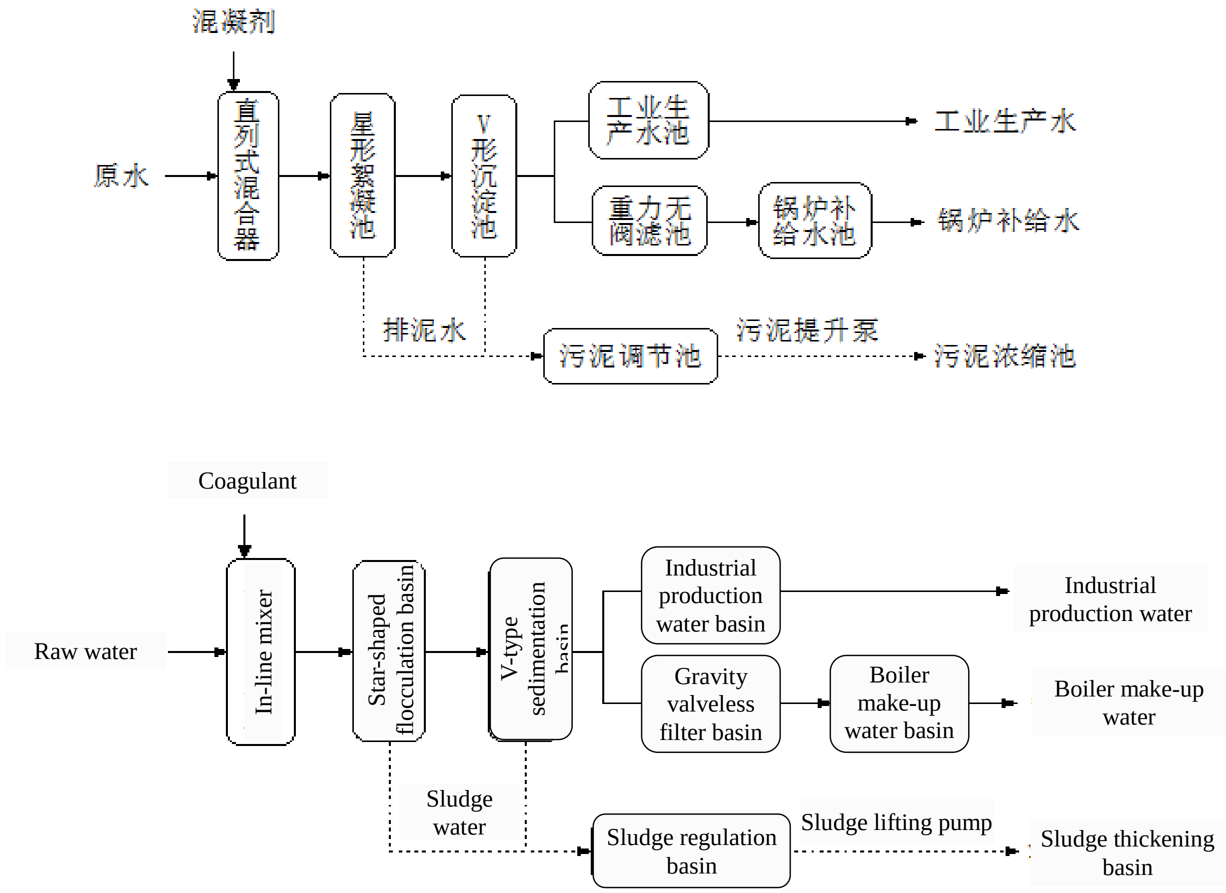


图 2.2-10　项目给水处理站净水处理工艺流程图

Figure 2.2-10 Flow Chart of Water Purification and Treatment Process of Water Treatment Station in the Project

（4）循环冷却水工程

(4) Circulating cooling water system

自备动力车间总的平均冷却水量为 9500m^3/h，最大冷却水量为 12500m^3/h，已大大超过企业的其余的生产用水量，因此，自备动力车间的冷却用水采用循环冷却方式，该循环冷却水工程设置在自备动力车间附近，并靠近冷却用水设备的地方。循环冷却水工程的设计规模为 13000m^3/h。

Tota average cooling water consumption and maximum cooling water consumption of captive powerhouse is 9500m^3/h and 12500m^3/h, which are considerably more than remainder of production water consumption of the enterprise. As such, cooling water of captive powerhouse shall be in circulating cooling mode and such circulating cooling water works will be provided in the vicinity thereof and adjacent to cooling water consumers. The circulating cooling water works have a design scale of 13000m^3/h.

（5）化学水处理系统

(5) Chemical water treatment system

化学水处理车间来水采用一级除盐加混床处理系统，工艺生产返回的凝结水经回收热量冷却后直接经过混床系统处理，处理后的除盐水作为锅炉的补充水。

Influent from chemical water treatment workshop is treated by using one-stage demineralization + mixed bed treatment system. The condensate returned from process production is directly treated by the mixed bed upon heat recovery and cooling and treated demineralized water serves as make-up water for boiler.

2.2.5.3 排水工程

2.2.5.3 Water Drainage Works

项目排水分自备动力车间工业排水、其它排水和造纸车间的生产废水三大部分。浆纸生产车间废水主要是造纸车间、污水处理站及生活污水；自备动力车间排水主要是用于给水化学处理的排水和循环冷却水排水，这两股废水收集后用于煤场和锅炉冲灰水；其它用水主要是给水处理的排水、地面冲洗水、绿化、消防用水排水等。

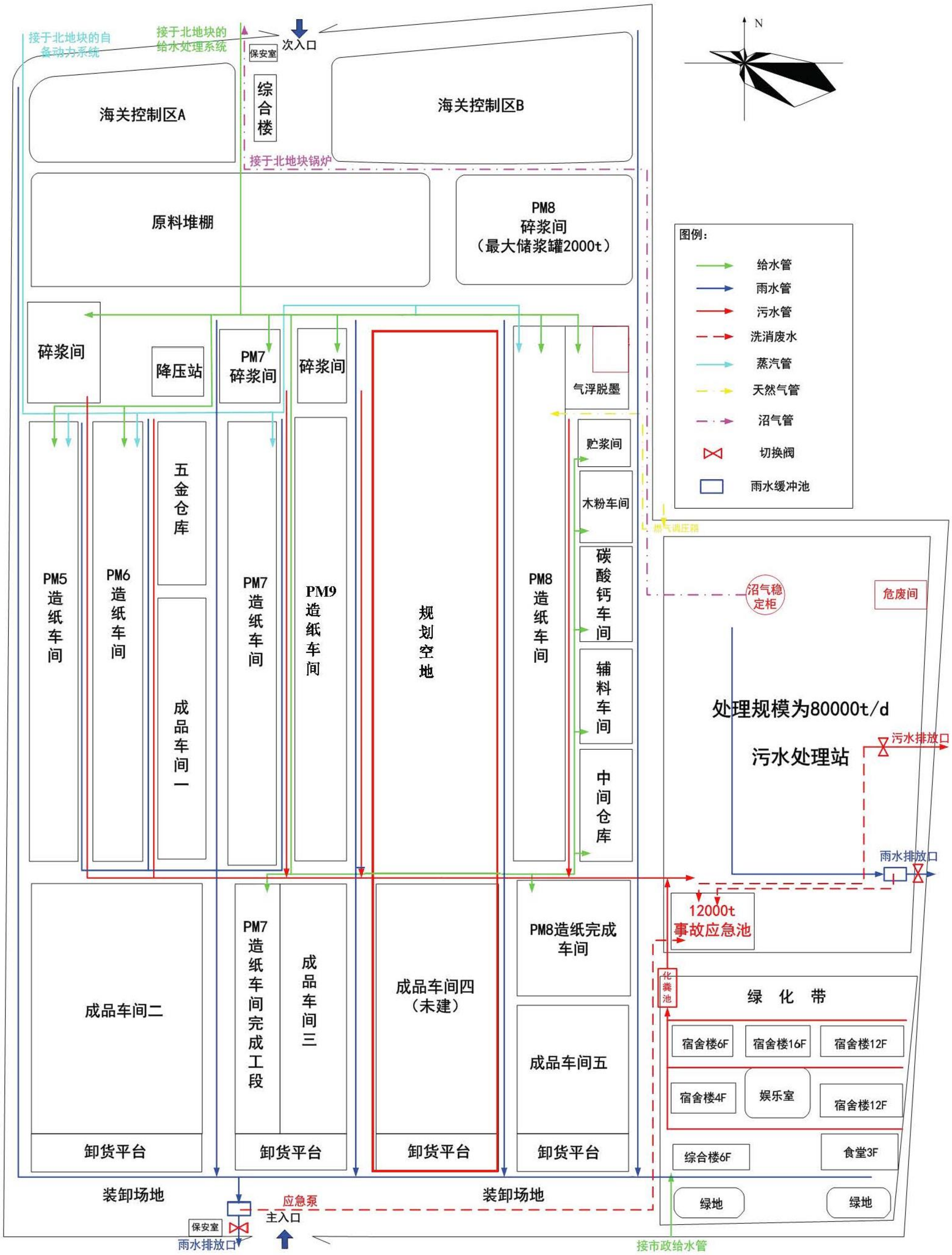
Project water drainage is divided into such three parts as industrial water drainage from captive powerhouse, other drainage and production wastewater from papermaking workshop. Wastewater from pulp production workshop are mainly those from papermaking workshop, sewage treatment station and domestic sewage; drainage from captive powerhouse are mainly the drainage for feedwater chemical treatment and circulating cooling water drainage, both of which will be collected to be used in coal yard and for sootblowing of boiler. Other drainage are mainly drainage for feedwater treatment, grounding washing water and drainage of greening and fire water, etc.

现有污水处理站，设计规模为 80000m^3/d，现有制浆造纸生产线已用去污水处理能力约为 44230m^3/d，污水处理站剩余处理能力为 35770m^3/d。

The existing sewage treatment station has a design scale of 80,000 m3/d. The existing pulp and papermaking production line has taken up a sewage treatment capacity of about 44,230 m3/d, and the remaining treatment capacity of the sewage treatment station is 35,770 m3/d.

项目的排水实行清污分流，按排水水质的污染程度不同划分为二个部分，其一为雨水排水，拟采用明沟排水方式收集场地、道路、屋面的雨水及生产车间排出的可直排下水就近排入市政雨水管道；其二为生产废水和生活污水的排水，通过独自的管道系统排至污水处理站，进入二级生化处理过程。废水经污水处理站处理达标后，通过专用污水管道污水排放口排入九龙江口北港（排放口坐标：24°29'1.40"N、117°52'0.40"E）。

Separate clear and sewage water drainage system is implemented in the project, which system is divided into two parts according to pollution degree of drainage quality. One part is rainwater drainage, for which open ditch is proposed to be used to collect rainwater from site, roads and roof as well as directly drainage water from production workshop to drain them in nearby municipal rainwater pipes. The other part is drainage of production wastewater and domestic sewage which are drained to sewage treatment station through separate piping system so as to proceed to two-stage biochemical treatment process. Upon up-to-standard treatment by sewage treatment station, wastewater is drained into North Port at estuary of of Jiulong River via dedicated sewage pipes & drain outlet (coordinate of the drain outlet: 24°29'1.40"N、117°52'0.40"E).


接于北地块的自备动力系统
接于北地块的给水处理系统
保安室
次入口
N
综合楼
海关控制区A
海关控制区B
接于北地块锅炉
原料堆棚
PM8
碎浆间
（最大储浆罐2000t）
图例：
给水管
雨水管
污水管
洗消废水
蒸汽管
天然气管
沼气管
切换阀
雨水缓冲池
碎浆间
降压站
PM7
碎浆间
碎浆间
气浮脱墨
贮浆间
木粉车间
燃气调压箱
碳酸钙车间
辅料车间
中间仓库
PM5
造纸车间
PM6
造纸车间
五金仓库
成品车间一
PM7
造纸车间
PM9
造纸车间
规划空地
PM8
造纸车间
沼气稳定柜
危废间
处理规模为80000t/d
污水处理站
污水排放口
雨水排放口
12000t
事故应急池
成品车间二
PM7
造纸车间完成工段
成品车间三
成品车间四
（未建）
PM8造纸完成车间
成品车间五
化粪池
绿 化 带
宿舍楼6F
宿舍楼16F
宿舍楼12F
宿舍楼4F
娱乐室
宿舍楼12F
综合楼6F
食堂3F
卸货平台
卸货平台
卸货平台
卸货平台
装卸场地
装卸场地
应急泵
主入口
保安室
雨水排放口
绿地
绿地
接市政给水管

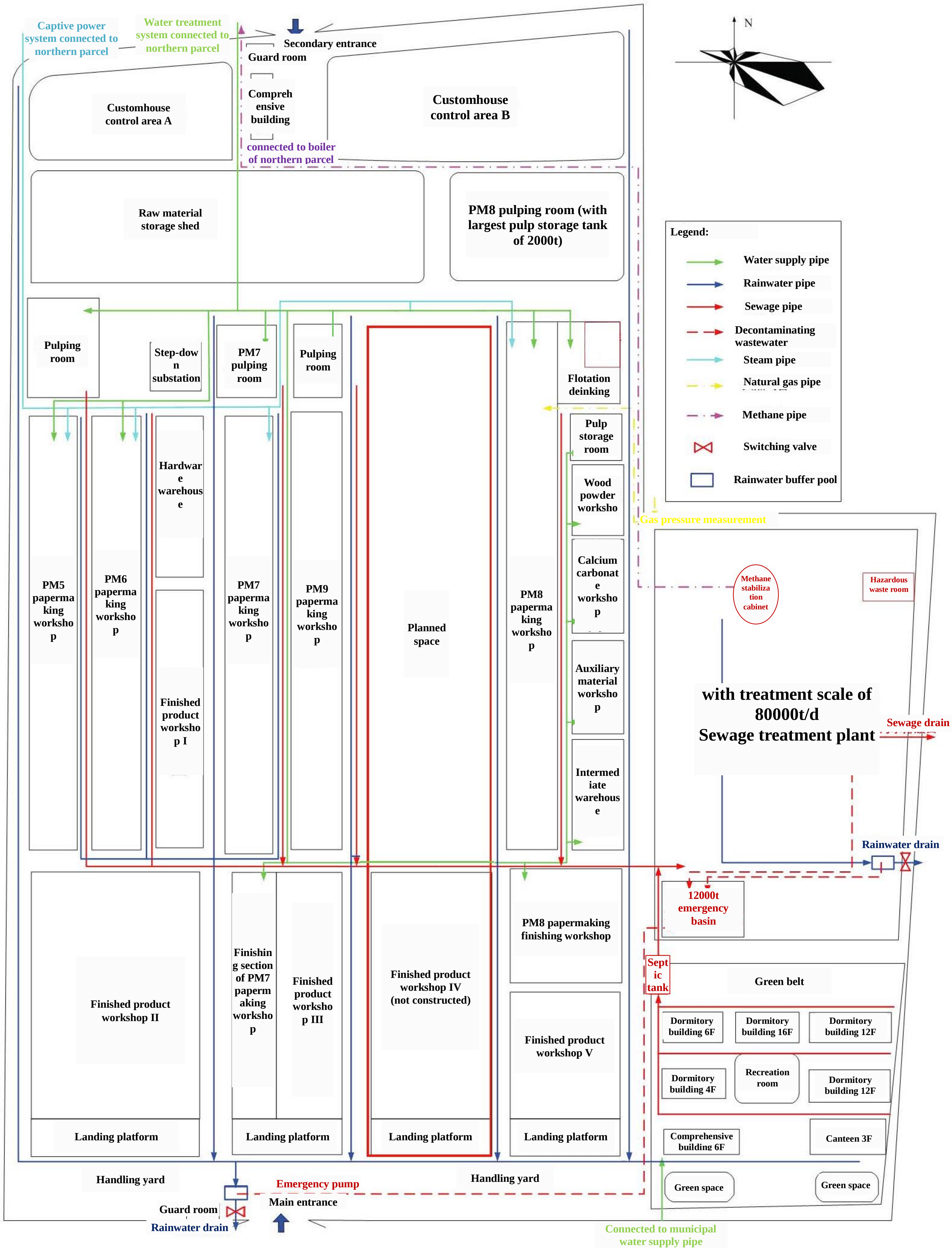
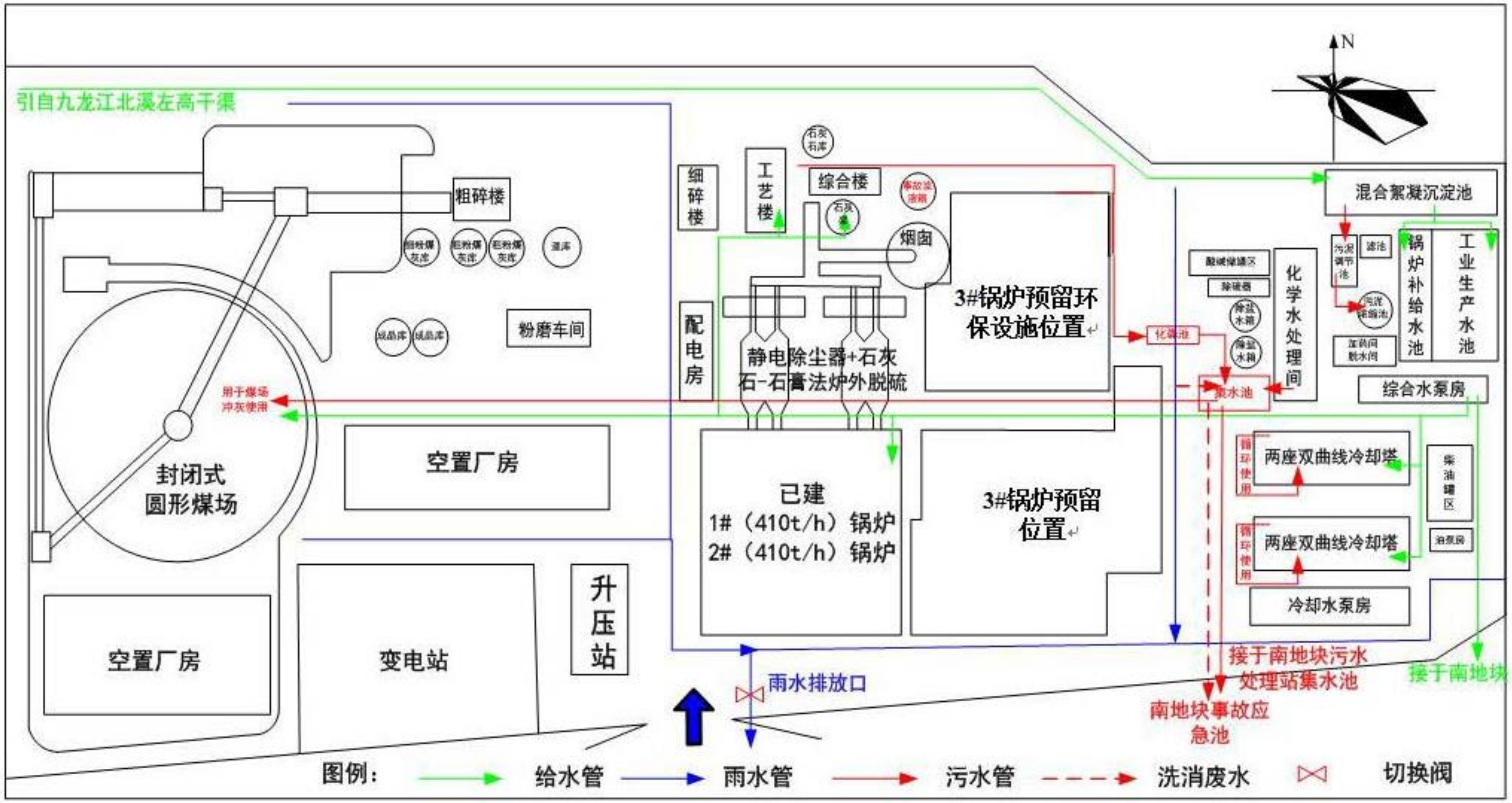


图 2.2-11　南地块给排水管网现状图

Figure 2.2-11 Current Condition of Drainage Pipe Network in South Block


引自九龙江北溪左高干渠
粗碎楼
粉磨车间
封闭式
圆形煤场
空置厂房
空置厂房
变电站
升压站
细碎楼
工艺楼
综合楼
配电房
烟囱
静电除尘器+石灰石-石膏法炉外脱硫
3#锅炉预留环保设施位置
已建
1#（410t/h）锅炉
2#（410t/h）锅炉
3#锅炉预留位置
混合絮凝沉淀池
锅炉补给水池
工业生产水池
化学水处理间
综合水泵房
两座双曲线冷却塔
两座双曲线冷却塔
冷却水泵房
雨水排放口
接于南地块污水处理站集水池
南地块事故应急池
接于南地块
图例：
给水管
雨水管
污水管
洗消废水
切换阀

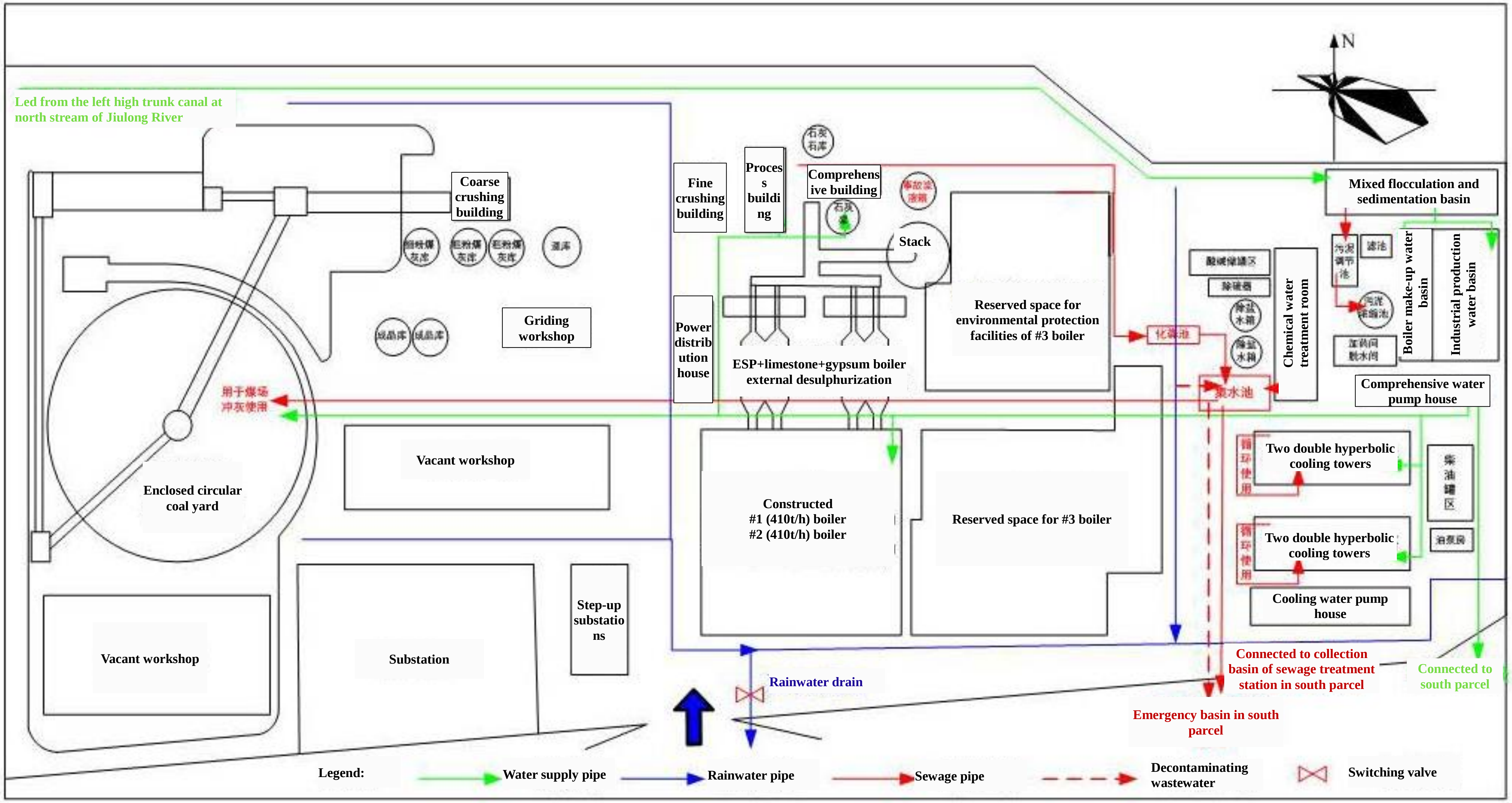


图 2.2-12　北地块给排水管网现状图

Figure 2.2-12 Current Condition of Drainage Pipe Network in North Block

2.2.5.4 供气工程

2.2.5.4 Steam supply works

全厂项目平均总用汽量 432t/h，锅炉产生的蒸汽由母管引往汽轮机，汽轮机低压可调抽（排）汽（0.58MPa）接入分汽缸，由分汽缸接出蒸汽管道供至各车间的用汽点。各车间可回收的蒸汽凝结水全部回到自备动力车间经处理后循环使用。全厂热负荷见表 2.2-1。

Total steam consumption of the whole plant in the project is 432t/h. The steam generated by boilers is led from main pipe to the steam turbine, and the low-pressure adjustable steam extraction (discharge) (0.58MPa) of the steam turbine is connected to steam distribution header, from which steam pipes are connected to the tapping points in individual workshops. Recyclable steam condensate from individual workshops all will be returned to captive powerhouse for recycling upon treatment. For thermal load of the whole plant, refer to Table 2.2-1.

表 2.2-1 全厂热负荷一览表

Table 2.2-1 Schedule of Thermal Load of Whole Plant

序号 Seq no.	用汽部门 Steam consumption department	用汽性质 Nature of steam consumption		用汽量 Steam consumption		回水量 Return water flow
		压力(Mpa) Pressure (MPa)	温度(℃) Temperature (℃)	平均(t/h) Average (t/h)	最大(t/h) Maximum (t/h)	t/h
1	PM5制浆造纸车间 PM5 pulping and papermaking workshop	0.49	饱和 Saturate	90	98	90
2	PM6制浆造纸车间 PM6 pulping and papermaking workshop	0.49	饱和 Saturate	65	71.5	65
3	PM9制浆造纸车间 PM9 pulping and papermaking workshop	0.49	饱和 Saturate	86	98	86
4	PM7制浆造纸车间 PM7 pulping and papermaking workshop	0.49	饱和 Saturate	47	71.5	47
5	PM8制浆造纸车间 PM8 pulping and	0.49	饱和 Saturate	144	153.2	144

	papermaking workshop					
6	合计 Total	0.49	饱和 Saturate	432	568.8	432

2.2.5.5　供电工程

2.2.5.5　Power Supply Works

项目用电设备总装机容量约为209.9MW，有效负荷计算值约为136.3MW，年耗电量约为10.48亿kw/h，全厂用电负荷详见表 2.2-2。

Total installed capacity of power consumers in the project is about 209.9MW, and calculated effective load is around 136.3MW with annual power consumption of around 1.048 billion kWh. For power load of whople plant, refer to Table 2.2-2.

表 2.2-2　全厂用电负荷

Table 2.2-2 Power Load of Whole Plant

项目名称 Designation		装机容量MW Installed capacity MW	平均负荷MW Average load MW	年用电量（万度） Annual power consumption (ten thousand kWh)
一期 Phase I	PM5	76.36	49.63	23512.5
	PM6			14962.5
二期 Phase II	PM9	76.36	49.63	23512.5
	PM7			14962.5
三期 Phase III	PM8	50.53	32.84	25460
给水处理和废水处理 Feedwater treatment and wastewater treatment		3.71	2.60	2016
机修、门卫、厂前区及其他 Mechanical repair, guard house, plant front area and others		2.91	1.60	414
合计 Total		209.87	136.31	104840

为了节约能源，充分利用余热，自备动力车间，其具体参数见表 2.2-3。

In order to save energy and make full use of waste heat, specific parameters of captive powerhouse are as shown in Table 2.2-3

表 2.2-3　全厂电负荷平衡表

Table 2.2-3 Power Load Balance Table of Whole Plant

项目名称	平均负荷 MW	最大负荷 MW

Designation		Average load MW	Maximum load MW
一期 Phase I	PM5	49.63	55.15
	PM6		
二期 Phase II	PM9	49.63	55.15
	PM7		
三期 Phase III	PM8	32.84	41.05
给水处理和废水处理 Feedwater treatment and wastewater treatment		2.60	2.60
机修、门卫、厂前区及其他 Mechanical repair, guard house, plant front area and others		1.60	1.60
合计 Total		136.31	155.55
自备动力车间 Captive powerhouse		-111.10	-111.10
外网受电量 Power received from external grid		25.21	44.45
注：*自备动力车间的电量已经扣除了其自用电部分。 Note: * auxiliary power portion has been deducted from the power consumption of captive powerhouse.			

根据表 2.2-3，正常情况工程需从外电网补充额外的 25.21MW（28.01MVA）电力，全年需补充 1.95 亿千瓦小时电量。外电网引入单回路 110KV 专线，经 40MVA 主变压器降压后，在 35KV 侧以单母线不分段方式运行。

According to Table 2.2-3, the project need to be supplemented with extra power of 25.21MW (28.01MVA) from external power grid under normal conditions, totaling 195 million kilowatt hours throughout a year. The power from external grid will be led in via a single-circuit 110kV dedicated power line, which will operate at 35kV side by means of single non-sectionalized busbar after stepping down the power by 40MVA main transformer.

2.2.5.6 废渣处理

2.2.5.6 Waste Slag Treatment

厂内设有年处理 55 万吨造纸废渣回收生产线，目前该项目实际废渣处理量为 1215t/d（41.31 万 t/a），剩余处理能力为 13.69 万 t/a。

The plant is provided with a waste slag recycling and production line with annual processing capacity of 550,000 tons. Presently this project has an actual waste slag processing rate of 1215t/d (taking up a processing capacity of 41.31 million t/a) so that the remaining treatment capacity is 13.69 million t/a.

2.2.6 现有工程平衡关系

2.2.6 Balance relationship of existing project

2.2.6.1 水平衡

2.2.6.1 Water Balance

全厂项目的用水量表详见表 2.2-4；全厂项目排水量表详见表 2.2-5；厂内现有工程（一期+二期+三期工程）水平衡图详见图 2.2-13。

Water consumption of whole plant in this project is detailed in -; water drainage of whole plant in this project is detailed in-; water balance diagram in plant of the existing project is detailed in Figure 2.2-13.

项目工业废水重复利用率详见表 2.2-6。项目生产线生产生产废水部分引进清水，部分采用循环水重复利用，以减少生产废水外排量。根据计算，联盛纸业（龙海）有限公司工业用水重复利用率可达到 96.14%。

Reuse rate of industrial wastewater of the project is detailed in Table 2.2-6. Part of production wastewater of the production line in the project is provided with clean water and the other part is reused by means of circulating water so as to reduce discharge of production wastewater outside. According to calculation, reuse rate of industrial water of Liansheng Paper (Longhai) Co., Ltd can reach up to 96.14%.

2.2.6.2 蒸汽平衡

2.2.6.2 Steam balance

现有工程蒸汽平衡详见图 2.2-14。

Steam balance of existing project is detailed in Figure 2.2-14.

表 2.2-4 现有工程项目用水量表（单位：m³/d）

Table 2.2-4 Water Consumption List of Existing Project (in m³/d)

<table>
<tr><th rowspan="2">序号
Seq no.</th><th rowspan="2" colspan="2">用水部门或用水名称
Water consumption department or designation</th><th colspan="2">一期
Phase I</th><th colspan="2">二期
Phase II</th><th>三期
Phase III</th><th rowspan="2">合计
Total</th></tr>
<tr><th>PM5
（投产）
(in service)</th><th>PM6
（投产）
(in service)</th><th>PM9
（投产）
(in service)</th><th>PM7
（投产）
(in service)</th><th>PM8
（投产）
(in service)</th></tr>
<tr><td>1</td><td colspan="2">造纸车间
Papermaking workshop</td><td>9105</td><td>8235</td><td>9105</td><td>8235</td><td>15882</td><td>50562</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">自备动力车间
Captive powerhouse</td><td>化学补充水
Chemical make-up water</td><td>1347</td><td>983</td><td>1468</td><td>1072</td><td>890</td><td>5760</td></tr>
<tr><td>工业冷却水补水
Industrial cooling water make-up water</td><td>1600</td><td>1167</td><td>1745</td><td>1272</td><td>1056</td><td>6840</td></tr>
<tr><td>3</td><td colspan="2">生活用水
Domestic water</td><td colspan="2">140</td><td>60</td><td>60</td><td>100</td><td>360</td></tr>
<tr><td>4</td><td colspan="2">其他用水（绿化、冲洒道路）</td><td colspan="2">725</td><td>350</td><td>375</td><td>624</td><td>2074</td></tr>
</table>

	Other water consumption (greening and road spraying)					
5	全厂用水量合计 Total of water consumption of whole plant	23302	23742		18552	65596

表 2.2-5 现有工程项目排水量表（单位：m^3/d）
Table 2.2-5 Water Drainage List of Existing Project (in m^3/d)

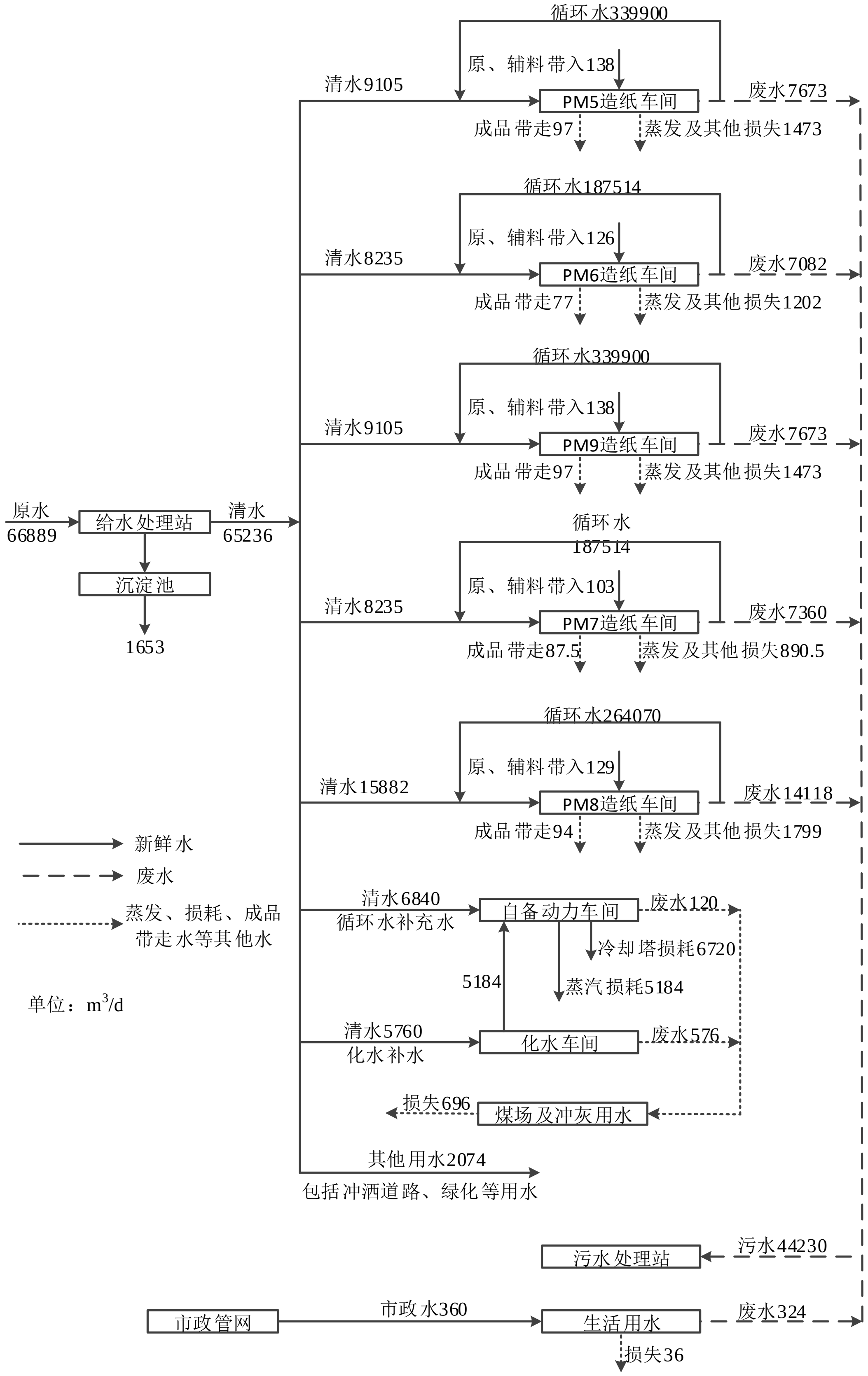
<table>
<tr><th rowspan="2">序号
Seq no.</th><th rowspan="2" colspan="2">排水部门或排水名称
Water drainage department and designation</th><th colspan="2">一期
Phase I</th><th colspan="2">二期
Phase II</th><th>三期
Phase III</th><th rowspan="2">合计
Total</th><th rowspan="2">废水去向
Destination of wastewater</th></tr>
<tr><th>PM5
（投产）
(in service)</th><th>PM6
（投产）
(in service)</th><th>PM9
（投产）
(in service)</th><th>PM7
（投产）
(in service)</th><th>PM8
（投产）
(in service)</th></tr>
<tr><td>1</td><td colspan="2">造纸车间
Papermaking workshop</td><td>7673</td><td>7082</td><td>7673</td><td>7360</td><td>14118</td><td>43906</td><td>污水处理站
Sewage treatment station</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">自备动力车间
Captive power house</td><td>化学水排水
Chemical water drainage</td><td colspan="2">233</td><td>147</td><td>107</td><td>89</td><td>576</td><td rowspan="2">用于煤场及冲灰、损耗
For coal yard, ash washing and loss</td></tr>
<tr><td>工业冷却水排水
Industrial cooling water drainage</td><td colspan="2">48.5</td><td>31</td><td>22</td><td>18.5</td><td>120</td></tr>
<tr><td>3</td><td colspan="2">生活污水
Domestic sewage</td><td colspan="2">126</td><td>54</td><td>54</td><td>90</td><td>324</td><td>污水处理站
Sewage Treatment Station</td></tr>
<tr><td>4</td><td colspan="2">给水处理站排水
Water treatment station drainage</td><td colspan="2">607</td><td>305</td><td>313</td><td>428</td><td>1653</td><td>清净下水，沉淀处理后直接排放
Clean effluent to be directly drained upon</td></tr>
</table>

							sedimentation & treatment
5	全厂排水量合计 Total of water drainage of whole plant	16878.5	17223		15604.5	49706	
6	全厂排入污水处理站水量合计 Total of water drainage to sewage treatment station in whole plant	14881	15141		14208	44230	

表 2.2-6　现有工程工业废水重复利用率一览表

Table 2.2-6 Schedule of Reuse Rate of Industrial Wastewater of Existing Project

生产线 Production line	清水（m^3/d） Clean water (m^3/d)	循环水（m^3/d） Circulating water (m^3/d)	合计（m^3/d） Total (m3/d)	工业用水重复利用率（%） Reuse rate of industrial water (%)
PM5	9105	339900	349005	97.39
PM6	8235	187514	195749	95.79
PM9	9105	339900	349005	97.39
PM7	8235	187514	195749	95.79
PM8	15882	264070	279952	94.33
平均用水重复利用率 Average reuse rate of water	/	/	/	96.14


循环水339900
原、辅料带入138
清水9105
PM5造纸车间
废水7673
成品带走97
蒸发及其他损失1473
循环水187514
原、辅料带入126
清水8235
PM6造纸车间
废水7082
成品带走77
蒸发及其他损失1202
循环水339900
原、辅料带入138
清水9105
PM9造纸车间
废水7673
成品带走97
蒸发及其他损失1473
原水
66889
给水处理站
清水
65236
沉淀池
1653
循环水
187514
原、辅料带入103
清水8235
PM7造纸车间
废水7360
成品带走87.5
蒸发及其他损失890.5
循环水264070
原、辅料带入129
清水15882
PM8造纸车间
废水14118
成品带走94
蒸发及其他损失1799
新鲜水
废水
蒸发、损耗、成品
带走水等其他水
清水6840
循环水补充水
自备动力车间
废水120
冷却塔损耗6720
5184
蒸汽损耗5184
单位：m3/d
清水5760
化水补水
化水车间
废水576
损失696
煤场及冲灰用水
其他用水2074
包括冲洒道路、绿化等用水
污水处理站
污水44230
市政管网
市政水360
生活用水
废水324
损失36

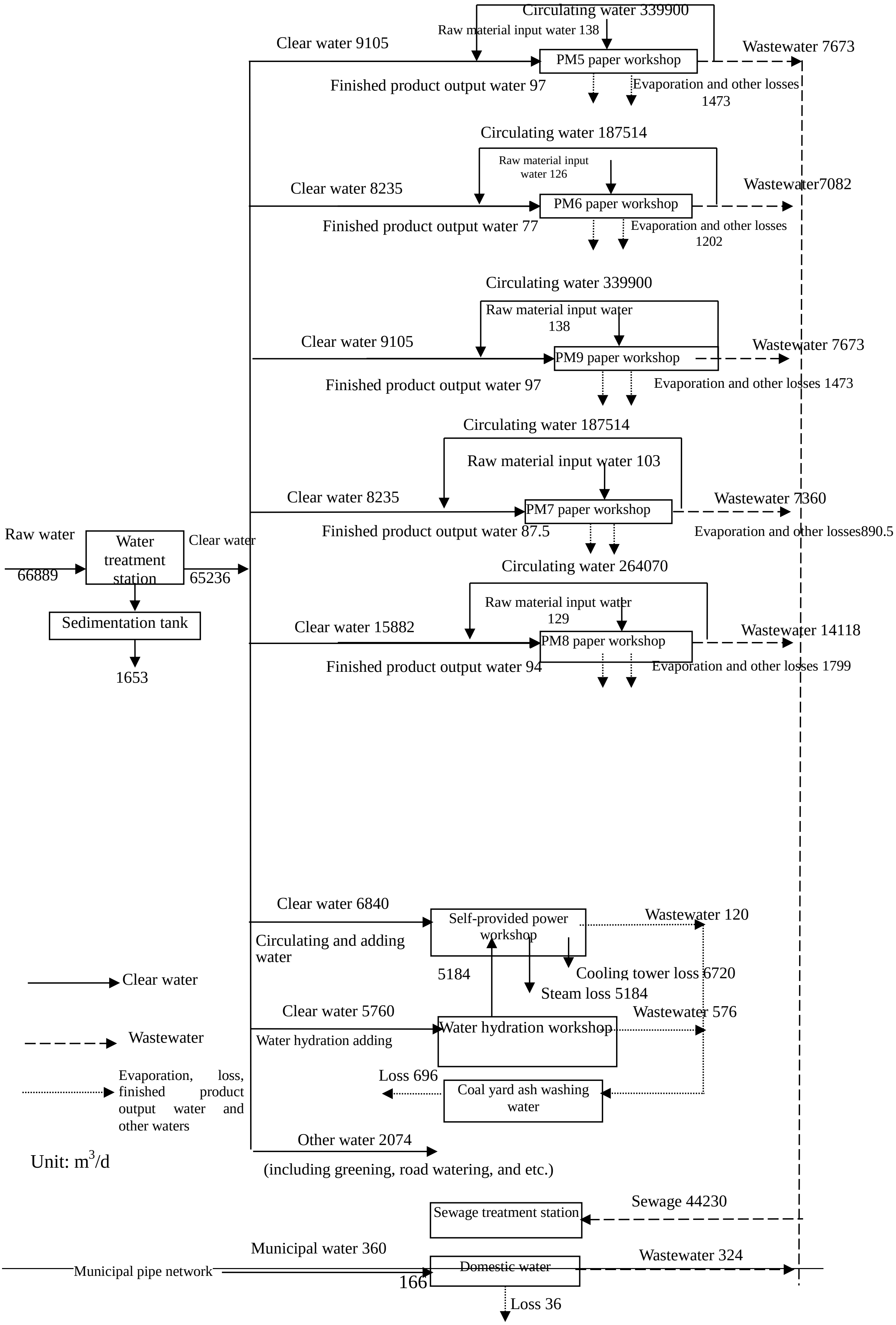
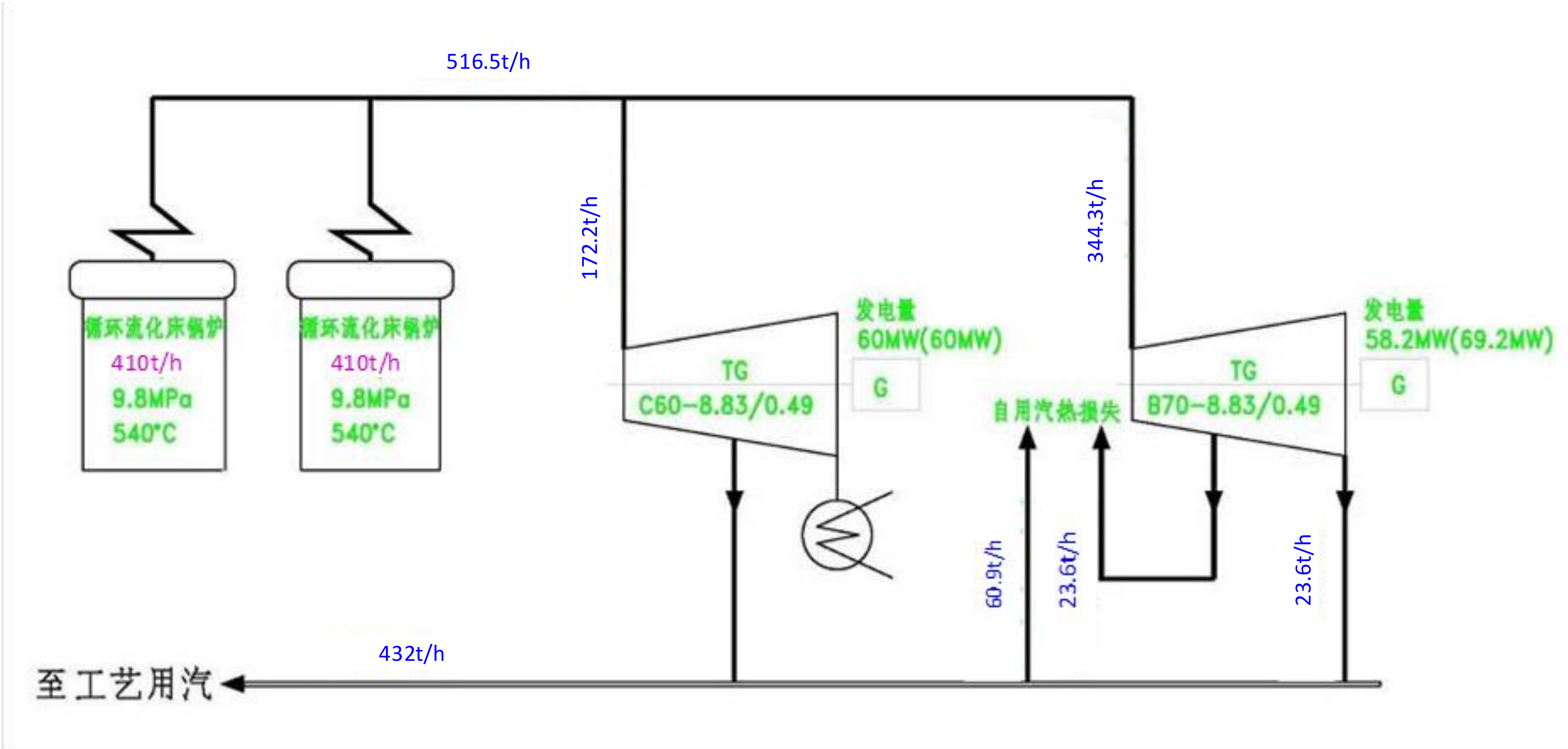

Circulating water 339900
Raw material input water 138
Clear water 9105
PM5 paper workshop
Wastewater 7673
Finished product output water 97
Evaporation and other losses 1473
Circulating water 187514
Raw material input water 126
Clear water 8235
PM6 paper workshop
Wastewater7082
Finished product output water 77
Evaporation and other losses 1202
Circulating water 339900
Raw material input water 138
Clear water 9105
PM9 paper workshop
Wastewater 7673
Finished product output water 97
Evaporation and other losses 1473
Circulating water 187514
Raw material input water 103
Clear water 8235
PM7 paper workshop
Wastewater 7360
Finished product output water 87.5
Evaporation and other losses890.5
Raw water
66889
Water treatment station
Clear water
65236
Sedimentation tank
1653
Circulating water 264070
Raw material input water 129
Clear water 15882
PM8 paper workshop
Wastewater 14118
Finished product output water 94
Evaporation and other losses 1799
Clear water 6840
Self-provided power workshop
Wastewater 120
Circulating and adding water
5184
Cooling tower loss 6720
Steam loss 5184
Clear water
Wastewater
Evaporation, loss, finished product output water and other waters
Clear water 5760
Water hydration workshop
Wastewater 576
Water hydration adding
Loss 696
Coal yard ash washing water
Other water 2074
(including greening, road watering, and etc.)
Unit: m3/d
Sewage treatment station
Sewage 44230
Municipal water 360
Municipal pipe network
Domestic water
Wastewater 324
166
Loss 36

图 2.2-13　现有工程（一期+二期+三期工程）水平衡图

Figure 2.2-13 Water Balance Diagram of Existing Project (Phase I + Phase II + Phase III)


516.5t/h
循环流化床锅炉
410t/h
9.8MPa
540°C
循环流化床锅炉
410t/h
9.8MPa
540°C
172.2t/h
344.3t/h
发电量
60MW(60MW)
TG
C60-8.83/0.49
G
发电量
58.2MW(69.2MW)
TG
B70-8.83/0.49
G
自用汽热损失
60.9t/h
23.6t/h
23.6t/h
432t/h
至工艺用汽

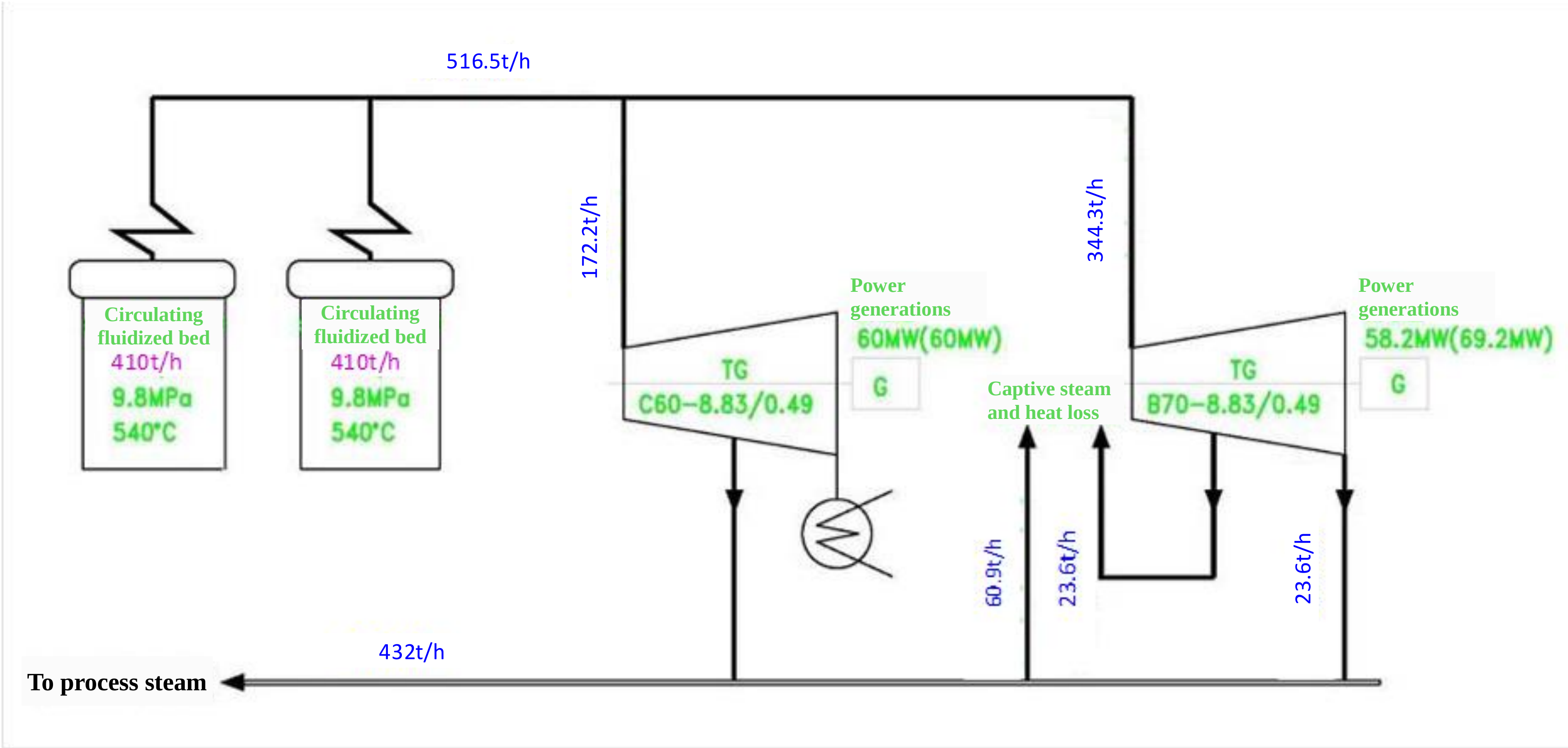


图 2.2-14　现有工程蒸汽平衡图

Figure 2.2-14 Steam Balance Diagram of Existing Project

2.3 工程污染物排放情况及环保措施

2.3 Pollutants emission condition and environmental protection measures of project

2.3.1 废水排放及其达标情况

2.3.1 Wastewater drainage and up-to-standard condition

2.3.1.1 废水来源及特性分析

2.3.1.1 Source of wastewater and characteristic analysis

项目生产过程中产生的各类废水及主要污染物如下：

Various wastewater and major pollutants generated during production of the project are as follows:

（1）制浆造纸车间废水：主要是来自打浆、废纸处理和抄造等工段，湿纸幅压榨出的水分、辅料备制、浆料中添加的辅助化学品和助剂随着用于冲洗纸网上悬浮纤维的喷淋水流向网下，这些废水含有纤维碎屑、细小纤维、颜料、淀粉等，是低浓度有机废水，主要污染物是 COD、BOD_5、SS。

(1) Wastewater from pulping and papermaking workshop: mainly from the sections of beating, waste paper processing and papermaking, the moisture of the wet paper web, the preparation of auxiliary materials, and the auxiliary chemicals and additives added in the pulp. The spray water of suspended fiber on the fourdrinier flows to the fourdrinier. These waste water contain fiber debris, fine fibers, pigments, starch, etc. It is a low-concentration organic wastewater. The main pollutants are COD, BOD5, SS.

（2）自备动力车间废水：主要来源于化学水处理系统和工业冷却系统的清洁下水，这两股废水用于煤场和锅炉冲灰用水，不外排。

(2) Wastewater from captive powerhouse: mainly from the clean water of chemical water treatment system and industrial cooling system. These two wastewaters are used for coal field and boiler ash water without drainage outside.

（3）职工生活污水：主要含 COD、BOD_5、氨氮等。

(3) Domestic sewage of employees: mainly containing COD, BOD5, ammonia nitrogen, etc.

（4）给水处理站废水：制水过程中产生的废水主要来自沉淀池的排泥水和滤池的反冲洗水，主要的污染物是 SS，废水中的 SS 浓度为 420mg/L（最高）。该股废水经沉淀处理后上清液直接排入市政雨水管网，含水率 80%的湿污泥经干化后进入垃圾填埋场。

(4) Water treatment station wastewater: the wastewater generated during the water production process mainly comes from the sludge in the sedimentation tank and the backwash water in the filter tank. The main pollutant is SS, and the SS concentration in the wastewater is 420 mg/L (maximum). After the sedimentation treatment of this wastewater, the supernatant liquid is directly discharged into the municipal rainwater pipe network, and the wet sludge with water content of 80% is dried and then dumped into landfill.

（6）其它废水：地坪冲洗水、绿化用水等为清净下水，直接排放。

(6) Other wastewater: floor flushing water, greening water, etc. are clean effluent and discharged directly.

2.3.1.2 废水处理措施

2.3.1.2 Wastewater treatment measures

现有工程的主要废水产生及处理措施见表 2.3-1。

Main wastewater production and treatment measures of existing project are as shown in Table 2.3-1.

表 2.3-1 现有工程各类废水治理措施一览表

Table 2.3-1 Schedule of Various Wastewater Treatment Measures for Existing Project

污染源 Source of pollution	废水类别及主要污染物 Wastewater category and major pollutants	废水治理措施 Wastewater treatment measures
PM5制浆造纸车间 PM5 pulping and papermaking workshop	高浓尾浆水、洗涤、冲网白水等；产生于高浓除渣、网部等；主要污染物为细小纤维等； High concentration tail water, white water for rinsing and flushing of fourdrinier, etc., which are produced	送污水处理站 Delivered to sewage treatment station
PM6制浆造纸车间 PM6 pulping and papermaking workshop		

PM7制浆造纸车间 PM7 pulping and papermaking workshop	in high concentration slag, net parts, etc.; major pollutants are fine fibers, etc.	
PM8制浆造纸车间 PM8 pulping and papermaking workshop		
PM9制浆造纸车间 PM9 pulping and papermaking workshop		
生活污水 Domestic sewage	办公楼、宿舍和车间 Office building, dormitory and workshop	送污水处理站 Delivered to sewage treatment station
自备动力车间 Captive powerhouse	给水化学处理废水、循环冷却水、机械冷却水等排水 Feedwater chemical treatment wastewater, circulating cooling water, mechanical cooling water and other drainage water	用于煤场及冲灰、损耗 For coal yard, ash washing and loss
给水处理站 Feedwater treatment station	排泥水和反冲洗水 Sludge water and backwash water	沉淀处理作清净水直接排放 Clean water to be directly discharged upon sedimentation treatment
其它排水 Other drainage	地坪冲洗水，给水处理废水、绿化、消防等预留 Floor flushing water, feedwater treatment wastewater and drainage reserved for greening and firefighting, etc.	就近排入市政雨水管道 Drained into nearby municipal rainwater pipe

2.3.1.3 主要废水污染物排放

2.3.1.3 Major wastewater pollutants emission

污水处理站二期工程已全部建成，处理规模 80000m^3/d，采用“预处理+厌氧（IC）+好氧+深度处理”处理工艺。

Phase II project of sewage treatment station has been fully completed with treatment scale of 80000m^3/d, adopting the treatment process of “pretreatment + anaerobic (IC) + aerobic + deep treatment”.

（1）在线监测情况

(1) On-line monitoring condition

根据 2017 年 12 月 1 日至 2018 年 1 月 31 日在线监测数据，现有工程污水处理站废水出水水质主要污染物 COD、氨氮均可满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 制浆和造纸联合生产企业水污染物直接排放限值要求（即 COD80mg/L、氨氮 8mg/L）。具体详见表 2.3-2。

According to the online monitoring data from December 1, 2017 to January 31, 2018, COD and ammonia nitrogen of major pollutants of wastewater from the wastewater from sewage treatment station of existing project both may meet the requirements in Table 1 Direct Emission Limits of Water Pollutants from Pulping and Papermaking Coproduction Enterprises in DB35/1310-2013 *Emission Standards for Water Pollutants in the Pulp and Paper Industry* (i.e.: COD80mg/L, ammonia nitrogen 8mg/L). For details, refer to Table 2.3-2

表 2.3-2 现有工程污水处理站在线监测情况

Table 2.3-2 On-line Monitoring Conditions of Sewage Treatment Station in Existing Project

时段 Period	内容 Contents	排放浓度（mg/L） Emission concentration (mg/L)		流量 Flow （m^3/h） (m^3/h)
		COD	氨氮 Ammonia nitrogen	
2017.12.01 ～ 2018.01.31	平均值 Average value	64.22	0.8195	1685.25
排放标准（GB3544-2008） Emission standards (GB3544-2008)		90	8	/
排放标准（DB35/1310-2013） Emission standards (DB35/1310-2013)		80	8	/
达标与否 Up to standard Yes/No		达标 Yes	达标 Yes	/

（2）验收监测情况

(2) Monitoring condition in acceptance

根据《联盛纸业（龙海）有限公司年产 200 万吨高档包装纸板工程竣工环境保护阶段性验收监测报告》中 2018 年 1 月 23 日~24 日对现有工程厂区污水处理站进出水水质监测数据，其水污染物监测结果详见表 2.3-3。

According to influent and effluent quality monitoring data of sewage treatment station in plant area of existing project from January 23-24, 2018 in *Monitoring Report for Phased Environmental Protection Acceptance on Completion of High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa*, monitoring results of water pollutants thereof are detailed in Table 2.3-3.

委托监测结果表明，现有工程废水经污水处理站"预处理+厌氧+好氧+深度处理"工艺处理后出水水质各污染物均DB35/1310-2013《制浆造纸工业水污染物排放标准》表1制浆和造纸联合生产企业水污染物直接排放限值要求（即COD80mg/L、SS30mg/L、$BOD_5$20mg/L）。污水处理站运行良好。

As revealed by results of commissioned monitoring, major pollutants and effluent quality of wastewater from existing project after being treated using "pretreatment + anaerobic (IC) + aerobic + deep treatment" process both may meet the requirements in Table 1 Direct Emission Limits of Water Pollutants from Pulping and Papermaking Coproduction Enterprises in DB35/1310-2013 *Emission Standards for Water Pollutants in the Pulp and Paper Industry* (i.e.: COD80mg/L, SS30mg/L, $BOD_5$20mg/L) Sewage treatment station is in good service.

综合在线监测数据、验收监测情况以及类比《制浆造纸工程技术规范》（HJ2011-2012）等资料，现有工程废水污染物产排情况详见表 2.3-4。

Comprehensively considering on-line monitoring data, monitoring conditions in acceptance and comparing with *Technical Specifications for Pulp and Papermaking Projects* (HJ2011-2012) and other data, production and emission conditions of wastewater pollutants from existing project are detailed in Table 2.3-4.

表 2.3-3　现有工程污水处理站验收监测情况

Table 2.3-3 Monitoring Conditions in Acceptance of Sewage Treatment Station in Existing Project

监测日期 Monitoring date	污染物 Pollutant	进水浓度（mg/L，pH、色度除外）Influent concentration (mg/L, pH, except chromaticity)					出水浓度（mg/L，pH、色度除外）Effluent concentration (mg/L, pH, except chromaticity)					去除效率 Removal efficiency（%）(%)	排放标准 Emission standard		达标与否 Up to standard Yes/No
		第一次 1st time	平行样 Parallel samples	第二次 2nd time	第三次 3rd time	平均值 Average value	第一次 1st time	平行样 Parallel samples	第二次 2nd time	第三次 3rd time	平均值 Average value		GB3544-2008	DB35/1310-2013	
2018.1.23	pH	7.1	7.1	7.1	7.2		6.7	6.7	6.8	6.8	/	/	6～9	6～9	达标 Yes
	SS	1220	1210	1230	1200	1220	6	7	10	8	8	99.3	30	30	达标 Yes
	BOD_5	1110	1220	1080	1340	1200	17.3	18.2	16.4	17.5	17.2	98.6	20	20	达标 Yes
	COD	2690	2690	2700	2700	2700	70	72	78	76	75	97.2	90	80	达标 Yes
	氨氮 Ammonia nitrogen	11.5	11.3	11.6	11.1	11.4	0.934	0.933	0.928	0.925	0.929	91.9	8	8	达标 Yes
	色度 Chroma	128	128	128	128	128	16	16	16	16	16	/	50	50	达标 Yes

	ticity													
	总磷 Total phosphorus	2.19	2.16	2.03	1.95	2.05	0.09	0.08	0.12	0.06	0.09	95.6	0.8	0.8	达标 Yes
	总氮 Total nitrogen	34.2	36.1	32.5	36.3	34.6	9.76	9.73	9.58	9.66	9.66	72.1	/	12	达标 Yes
2018.1.24	pH	6.9	6.9	7.0	7.0	/	6.8	6.8	6.9	6.9	/	/	6～9	6～9	达标 Yes
	SS	1420	1410	1400	1390	1400	8	7	7	7	7	99.5	30	30	达标 Yes
	BOD_5	1380	1440	1570	1290	1430	17.4	16.1	15.6	16.5	16.3	98.8	20	20	达标 Yes
	COD	2840	2840	2850	2850	2840	76	74	77	77	76	97.3	90	80	达标 Yes
	氨氮 Ammonia nitrogen	4.19	4.16	4.13	4.17	4.16	1.48	1.46	1.43	1.47	1.46	64.9	8	8	达标 Yes
	色度 Chromaticity	64	64	64	64	64	8	8	8	8	8	/	50	50	达标 Yes
	总磷 Total phospho	1.75	1.69	1.55	1.63	1.63	0.2	0.18	0.12	0.13	0.13	92.0	0.8	0.8	达标 Yes

	rus														
	总氮 Total nitrogen	16.5	16.9	18.3	17.7	17.6	7.61	7.58	7.75	7.52	7.62	57.3	/	12	达标 Yes

表 2.3-4　现有工程废水污染物产生及排放情况一览表

Table 2.3-4 Schedule of Production and Emission Conditions of Wastewater Pollutants from Existing Project

类别 Category	指标 Index	废水量 Wastewater flow	浓度 Concentration mg/L	污染物产生量 Pollutants production		污染控制措施 Pollution control measures	浓度 Concentration mg/L	污染物排放量 Pollutants emission	
				t/d	t/a			t/d	t/a
现有工程废水 Wastewatre from existing project	pH	$44230m^3/d$ 1503.82 万 m^3/a 15.0382 million m^3/a	9～10	——	——	厌氧+好氧生化处理 anaerobic + aerobic biochemical treatment	6～9	——	——
	色度 Chromaticity		130	——	——		35	——	——
	COD		2900	128.27	43610.78		78	3.45	1172.98
	BOD_5		1450	64.13	21805.39		20	0.88	300.76
	SS		1400	61.92	21053.48		20	0.88	300.76
	氨氮 Ammonia nitrogen		15	0.66345	225.573		2.0	0.088	30.08
	总氮 Total nitrogen		——	——	——		10	0.44	150.38
	总磷 Total phosphorus		——	——	——		0.4	0.018	6.02

2.3.1.4 九龙江北港水质变化趋势

2.3.1.4 Change trend of water quality in North Port of Jiulong River

引用《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程一期工程竣工环境保护验收监测报告》的 2013 年 4 月 23 日和 6 月 27 日监测数据（监测期间联盛纸业 PM5、PM6 生产线已投产，PM7、PM8、PM9 生产线未投产）。监测结果表明，九龙江北港各监测断面水质指标符合《海水水质标准》（GB3097-1997）中的第二类标准。

Monitoring data on April 23, 2013 and June 27, 2013 in *Monitoring Report for Environmental Protection Acceptance on Completion of High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa* are referenced (PM5 and MP6 production line of Liansheng Paper have been put into service during the monitoring period while PM7, PM8 and PM9 have not). As revealed by monitoring results, water quality indexes of individual monitoring cross-sections comply with Grade II standard in *Sea Water Quality Standard* (GB3097-1997).

表 2.3-5 九龙江北港联盛纸业总排口上下游水质情况

Table 2.3-5 Upstream and Downstream Water Quality Conditions at Main Drain Outlet of Liansheng Paper at North Port of Jiulong River

监测点位 Monitoring point location	监测时间 Monitoring time	pH	DO	COD_{Mn}	SS	氨氮 Ammonia nitrogen	亚硝酸盐氮 Nitrite nitrogen
上游 200m 左 200m upstream left	2013.4.23	7.14	6.89	2.55	74	1.1487	0.1392
	2013.6.27	7.74	6.34	2.0	55	/	/
上游 200m 中 200m upstream middle	2013.4.23	7.11	7.04	6.2	100	1.23	/
	2013.6.27	7.63	6.37	2.7	44	/	/
上游 200m 右 200m upstream left	2013.4.23	7.05	6.85	3.53	156	1.0050	0.1228
	2013.6.27	7.63	6.38	2.4	44	/	/
下游 400m 左	2013.4.23	7.15	6.96	3.76	160	0.9247	0.1297

监测点位 Monitoring point location	监测时间 Monitoring time	pH	DO	COD_{Mn}	SS	氨氮 Ammonia nitrogen	亚硝酸盐氮 Nitrite nitrogen
400m downstream left	2013.6.27	7.52	6.13	3.0	33	/	/
下游 400m 中 400m downstream middle	2013.4.23	7.03	6.80	2.45	51	1.1586	0.1180
	2013.6.27	7.26	6.18	3.2	44	/	/
下游 400m 右 400m downstream right	2013.4.23	7.10	6.98	2.85	83	1.0698	0.1210
	2013.6.27	7.30	6.42	2.8	59	/	/
标准 Standard		7.8~8.5	＞5	≤3	/	/	/

引用《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程环境影响后评价报告书》2014 年 7 月 11 日～13 日监测数据（监测期间联盛纸业 PM5、PM6 生产线已投产，PM7、PM8、PM9 生产线未投产）。监测结果表明，九龙江北港各监测断面除无机氮超标外，其他水质指标符合《海水水质标准》（GB3097-1997）中的第二类标准，九龙江北港水环境质量现状一般。超标原因主要是区域大部分生活污水没有得到良好的收集和处理，多数仅经化粪池处理后经排水沟渠直接排入九龙江北港所致。但无机氮并非项目的特征污染因子，本项目外排的废水未对九龙江北港造成明显的不良影响。

Monitoring data from July 11 through 27, 2014 in *Monitoring Report for Post-project EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa* are referenced (PM5 and PM6 production line of Liansheng Paper have been put into service during the monitoring period while PM7, PM8 and PM9 have not). As revealed by monitoring results, except for the inorganic nitrogen which exceeds beyond standard, the rest of water quality indexes of individual monitoring cross-sections in North Port of Jiulong River comply with Grade II standard in *Sea Water Quality Standard* (GB3097-1997). The reason for exceeding the standard lies in that most of the domestic sewage in the area has not been well collected and treated, and most of them are only discharged into North Port of Jiulong River through the drainage ditch after being treated by the septic tank. However, inorganic nitrogen is not a characteristic pollution factor of the project. The wastewater discharged from the project has not caused obvious adverse effects on Jiulongjiang Beigang.

表 2.3-6 九龙江北港联盛纸业总排口上下游水质情况

Table 2.3-6 Upstream and Downstream Water Quality Conditions at Main Drain Outlet of Liansheng Paper at North Port of Jiulong River

监测点位 Monitoring point location	监测时间 Monitoring time	pH	SS	DO	COD_{Mn}	BOD_5	无机氮 Inorganic nitrogen
上游 500m 左 500m upstream left	2014.7.11	7.15	31	5.40	2.42	0.9	1.83
	2014.7.12	7.18	33	5.32	2.48	0.7	1.53
	2014.7.13	7.18	36	5.34	2.38	1.1	1.98
下游 1000m 右 1000m downstream right	2014.7.11	7.18	23	5.50	1.78	0.7	1.56
	2014.7.12	7.20	19	5.29	1.63	1.0	1.81
	2014.7.13	7.21	22	5.30	1.68	0.6	1.77
标准 Standard		7.8~8.5	/	＞5	≤3	≤3	≤0.30

《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程环境影响报告书》2017 年 11 月 6 日～8 日监测数据（监测期间联盛纸业 PM5、PM6、PM7、PM8 生产线已投产，PM9 生产线未投产）。监测结果表明，九龙江北港各监测断面水质指标符合《海水水质标准》（GB3097-1997）中的第二类标准。

Monitoring data from November 6 through 8, 2017 in *Monitoring Report for Environmental Protection Acceptance on Completion of High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa* are referenced (PM5, PM6, PM7, and PM8 production line of Liansheng Paper have been put into service during the monitoring period while PM9 have not). As revealed by monitoring results, water quality indexes of individual monitoring cross-sections comply with Grade II standard in *Sea Water Quality Standard* (GB3097-1997).

表 2.3-7 九龙江北港联盛纸业总排口上下游水质情况

Table 2.3-7 Upstream and Downstream Water Quality Conditions at Main Drain Outlet of Liansheng Paper at North Port of Jiulong River

	监测点位 Monitoring point location		监测时间 Monitoring time	pH	水温 Water temperature	DO	COD_{Mn}	BOD_5	SS
低平潮 Low tide	上游 500m 500m upstream	左 Left	2017.11.06	7.3	17.6	5.55	2.45	1.1	48
			2017.11.07	7.3	16.7	5.77	2.52	0.8	56
			2017.11.08	7.4	17.7	5.88	2.66	1.2	53
		中 Middle	2017.11.06	7.5	17.4	5.85	2.07	0.8	53
			2017.11.07	7.4	16.4	5.93	2.22	0.7	56
			2017.11.08	7.3	17.5	5.98	2.34	0.9	51
		右 Right	2017.11.06	7.6	17.4	5.27	2.27	0.9	51
			2017.11.07	7.2	16.5	5.89	2.28	0.9	45
			2017.11.08	7.4	17.4	5.81	2.59	1.1	56
	下游 1000m 1000m downstream	左 Left	2017.11.06	7.3	17.5	5.91	2.07	0.9	53
			2017.11.07	7.3	16.6	5.85	2.18	1.1	61
			2017.11.08	7.4	17.6	5.95	2.05	0.8	57
		中 Middle	2017.11.06	7.4	17.4	6.05	1.86	0.8	57
			2017.11.07	7.4	16.3	5.97	1.95	0.9	61
			2017.11.08	7.4	17.	6.05	1.92	0.8	56
		右 Right	2017.11.06	7.4	17.4	5.83	1.92	0.8	57
			2017.11.07	7.3	16.5	5.81	2.13	1.0	51
			2017.11.08	7.4	17.5	6.01	2.12	0.8	61
高	上游 500m	左	2017.11.06	7.2	17.5	6.11	2.42	0.9	33

	监测点位 Monitoring point location		监测时间 Monitoring time	pH	水温 Water temperature	DO	COD_{Mn}	BOD_5	SS
平潮 High tide	500m upstream	Left	2017.11.07	7.3	16.4	6.08	2.48	0.7	38
			2017.11.08	7.5	17.3	6.18	2.38	1.1	36
		中 Middle	2017.11.06	7.5	17.3	6.25	2.31	0.8	36
			2017.11.07	7.6	16.3	6.25	2.18	0.7	38
			2017.11.08	7.4	17.2	6.32	2.22	0.9	35
		右 Right	2017.11.06	7.6	17.4	6.06	2.38	0.9	35
			2017.11.07	7.1	16.5	6.20	2.33	0.8	31
			2017.11.08	7.6	17.3	6.21	2.29	1.0	38
	下游 1000m 1000m downstream	左 Left	2017.11.06	7.5	17.4	6.34	1.78	0.7	36
			2017.11.07	7.6	16.5	6.15	1.63	1.0	41
			2017.11.08	7.5	17.4	6.25	1.68	0.6	39
		中 Middle	2017.11.06	7.5	17.3	6.55	1.66	0.7	39
			2017.11.07	7.5	16.2	6.27	1.61	0.9	41
			2017.11.08	7.5	17.3	6.37	1.62	0.6	38
		右 Right	2017.11.06	7.4	17.5	6.33	1.72	0.8	39
			2017.11.07	7.3	16.4	6.61	1.78	0.9	35
			2017.11.08	7.4	17.5	6.31	1.72	0.6	41
标准限值 Standard limits				7.8~8.5	/	＞5	≤3	≤3	/

引用《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程竣工环境保护阶段性验收监测报告》的 2018 年 1 月 23 日～24 日监测数据（监测期间联

盛纸业 PM5、PM6、PM7、PM8 和 PM9 生产线均已投产）。监测结果表明，九龙江北港各监测断面水质指标符合《海水水质标准》（GB3097-1997）中的第二类标准。

Monitoring data on January 23 through 24, 2018 in *Monitoring Report for Phased Environmental Protection Acceptance on Completion of High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa* are referenced (PM5, PM6, PM7, PM8 and PM9 production line of Liansheng Paper all have been put into service during the monitoring period). As revealed by monitoring results, water quality indexes of individual monitoring cross-sections comply with Grade II standard in *Sea Water Quality Standard* (GB3097-1997).

表 2.3-8 九龙江北港联盛纸业总排口上下游水质情况

Table 2.3-8 Upstream and Downstream Water Quality Conditions at Main Drain Outlet of Liansheng Paper at North Port of Jiulong River

监测时间 Monitoring time		监测项目 Monitoring items	上游 300m 300m upstream			下游 500m 500m downstream			标准 Standard
			左 Left	中 Middle	右 Right	左 Left	中 Middle	右 Right	
高平潮 High tide	2018.1.23	pH	7.0	7.2	7.1	7.2	7.2	7.2	7.8~8.5
		水温 Water temperature	19.6	19.5	19.4	195	19.7	19.3	/
		DO	6.53	6.35	6.21	6.53	6.74	6.47	＞5
		SS	43	45	46	36	33	31	/
		COD	2.36	2.54	1.98	1.48	0.93	1.07	≤3
		总磷 Total phosphorus	0.09	0.10	0.08	0.09	0.09	0.10	/
	2018.1.24	pH	7.0	7.2	7.2	7.2	7.2	7.0	7.8~8.5
		水温 Water temperature	19.7	19.6	19.8	19.6	19.4	19.3	/

监测时间 Monitoring time		监测项目 Monitoring items	上游 300m 300m upstream			下游 500m 500m downstream			标准 Standard
			左 Left	中 Middle	右 Right	左 Left	中 Middle	右 Right	
		DO	6.64	6.42	6.32	6.68	6.63	6.42	＞5
		SS	46	48	43	37	35	38	/
		COD	2.32	2.66	1.79	1.36	0.78	1.12	≤3
		总磷 Total phosphorus	0.09	0.11	0.10	0.09	0.10	0.10	/
低平潮 Low tide	2018.1.23	pH	7.0	6.9	7.0	7.0	7.1	7.1	7.8~8.5
		水温 Water temperature	21.2	21.6	22.1	20.2	20.3	20.5	/
		DO	5.96	5.78	5.30	5.94	5.98	5.69	＞5
		SS	49	43	51	52	55	51	/
		COD	2.41	2.84	1.98	1.92	2.12	1.73	≤3
		总磷 Total phosphorus	0.17	0.13	0.14	0.18	0.14	0.12	/
	2018.1.24	pH	7.0	7.1	7.0	7.0	7.0	7.1	7.8~8.5
		水温 Water temperature	21.4	21.6	21.8	20.6	20.4	20.7	/
		DO	6.01	5.79	5.41	5.97	5.99	5.69	＞5
		SS	50	46	42	52	57	50	/
		COD	2.37	2.76	1.77	1.91	1.27	1.93	≤3
		总磷 Total phosphorus	0.20	0.14	0.16	0.17	0.15	0.11	/

评价引用《漳州台商投资区凤山埔尾片区产业发展规划环境影响报告书》2018 年 3 月 9 日和 3 月 17 日的监测数据（监测期间联盛纸业 PM9 生产线已投产）。监测结果表明，九龙江北港各监测断面水质指标符合《海水水质标准》（GB3097-1997）中的第二类标准。

Monitoring data from March 9 through 17, 2018 in *EIA Report on Industrial Development Plan of Fengshanpuwei Area in Zhangzhou Taiwanese Investment Zone* are referenced (PM9 production line of Liansheng Paper has been put into service during the monitoring period). As revealed by monitoring results, water quality indexes of individual monitoring cross-sections comply with Grade II standard in *Sea Water Quality Standard* (GB3097-1997).

表 2.3-9 九龙江北港联盛纸业总排口上下游水质情况

Table 2.3-9 Upstream and Downstream Water Quality Conditions at Main Drain Outlet of Liansheng Paper at North Port of Jiulong River

<table>
<tr><th colspan="2" rowspan="2">监测时间
Monitoring time</th><th rowspan="2">监测项目
Monitoring items</th><th colspan="3">上游 300m
300m upstream</th><th colspan="3">下游 500m
500m downstream</th><th rowspan="2">标准
Standard</th></tr>
<tr><th>左
Left</th><th>中
Middle</th><th>右
Right</th><th>左
Left</th><th>中
Middle</th><th>右
Right</th></tr>
<tr><td rowspan="12">高平潮
High tide</td><td rowspan="6">2018.3.9</td><td>水温
Water temperature</td><td>20.1</td><td>20.3</td><td>20.3</td><td>20.2</td><td>20.1</td><td>20.4</td><td>7.8~8.5</td></tr>
<tr><td>pH</td><td>7.2</td><td>7.1</td><td>7.2</td><td>7.2</td><td>7.2</td><td>7.0</td><td>/</td></tr>
<tr><td>DO</td><td>6.32</td><td>6.31</td><td>5.99</td><td>6.16</td><td>6.18</td><td>6.21</td><td>＞5</td></tr>
<tr><td>SS</td><td>46</td><td>45</td><td>41</td><td>35</td><td>39</td><td>23</td><td>/</td></tr>
<tr><td>COD_{Mn}</td><td>2.32</td><td>2.65</td><td>1.62</td><td>1.38</td><td>0.81</td><td>1.05</td><td>≤3</td></tr>
<tr><td>BOD_5</td><td>1.2</td><td>1.4</td><td>0.8</td><td>0.8</td><td>0.5</td><td>0.6</td><td>/</td></tr>
<tr><td rowspan="6">2018.3.17</td><td>水温
Water temperature</td><td>22.2</td><td>24.0</td><td>25.7</td><td>21.9</td><td>22.9</td><td>23.6</td><td>7.8~8.5</td></tr>
<tr><td>pH</td><td>7.4</td><td>7.3</td><td>7.4</td><td>7.0</td><td>7.3</td><td>7.5</td><td>/</td></tr>
<tr><td>DO</td><td>6.82</td><td>6.73</td><td>6.53</td><td>6.55</td><td>6.63</td><td>6.61</td><td>＞5</td></tr>
<tr><td>SS</td><td>48</td><td>52</td><td>58</td><td>45</td><td>60</td><td>52</td><td>/</td></tr>
<tr><td>COD_{Mn}</td><td>2.50</td><td>2.70</td><td>2.05</td><td>2.28</td><td>2.22</td><td>1.48</td><td>≤3</td></tr>
<tr><td>BOD_5</td><td>1.3</td><td>1.3</td><td>1.0</td><td>1.3</td><td>1.3</td><td>0.9</td><td>/</td></tr>
<tr><td rowspan="3">低平潮
Low tid</td><td rowspan="3">2018.3.9</td><td>pH</td><td>22.4</td><td>23.6</td><td>24.2</td><td>21.2</td><td>21.4</td><td>21.8</td><td>7.8~8.5</td></tr>
<tr><td>水温
Water temperature</td><td>7.0</td><td>6.9</td><td>6.9</td><td>7.0</td><td>7.1</td><td>7.1</td><td>/</td></tr>
<tr><td>DO</td><td>5.98</td><td>5.85</td><td>5.29</td><td>5.94</td><td>5.98</td><td>5.69</td><td>＞5</td></tr>
</table>

e		SS	47	42	50	51	56	52	/
		COD	2.37	2.74	1.72	1.90	1.25	1.91	≤3
		总磷 Total phosphorus	1.2	1.4	0.9	1.0	0.7	1.0	/
	2018.3.17	pH	20.5	21.0	21.2	21.3	21.2	21.0	7.8~8.5
		水温 Water temperature	7.2	7.1	7.1	7.2	7.1	7.0	/
		DO	6.69	6.75	6.79	6.56	6.65	6.55	＞5
		SS	52	64	37	47	42	50	/
		COD	2.60	2.71	2.25	2.24	2.34	2.45	≤3
		总磷 Total phosphorus	1.4	1.4	1.2	1.2	1.2	1.3	/

综上分析，九龙江北港水质总体较为稳定，水质均能满足《海水水质标准》（GB3097-1997）中的第二类标准，没有因联盛污水处理厂废水排入而发生明显变化。

In summary, the water quality of Jiulong Jiangbei Port is generally stable, and the water quality can meet the Grade II standard in the *Sea Water Quality Standards* (GB3097-1997), with no significant change due to the wastewater discharge from the sewage treatment plant of Liansheng Paper.

2.3.2 废气排放及其达标情况

2.3.2 Waste gas drainage and up-to-standard condition

2.3.2.1 废气污染源及污染物

2.3.2.1 Source of Pollution and Pollutants of Waste Gas

项目运营过程中大气排放源分有组织排放源和无组织排放源。

Atmospheric emission sources are organized and unorganized sources during project operations.

（1）有组织排放源

(1) Organized emission source

①自备动力车间动力锅炉烟囱，主要污染物为烟尘、SO_2和氮氧化物；

① Boiler stack of captive powerhouse, of which major pollutants are soot, SO2 and nitrogen oxide;

②煤炭破碎工段产生的粉尘。

② Dust generated by coal crushing section

（2）无组织排放源

(2) Unorganized emission source

①贮煤场煤粉尘；

① Flyash of coal yard;

②灰库装卸灰粉尘；

② Dust from ash handling in ash silo

③污水处理站恶臭，主要污染物为 NH_3、H_2S 和臭气浓度；

③ Foul odor in sewage treatment station, of which major pollutants are NH3, H2S and odor concentration;

④污水处理厌氧处理过程中产生的沼气主要成分为甲烷，送锅炉燃烧处理。

④ The main component of the biogas produced during the anaerobic treatment of sewage treatment is methane, which is sent to the boiler for combustion treatment.

2.3.2.2 废气污染治理措施

2.3.2.2 Waste gas pollution treatment measures

现有工程废气污染防治措施情况详见表 2.3-10。

Waste gas pollution prevention and control measures are detailed in Table 2.3-10.

表 2.3-10 现有工程废气污染防治措施一览表

Table 2.3-10 Schedule of Waste Gas Pollution Prevention and Control Measures

排放形式 Form of emission	污染物 Pollutant	废气污染防治措施 Waste gas pollution control & prevention measures
有组织 Organized	锅炉燃煤：烟尘 Boiler fuel coal: smoke and dust	静电除尘（2套，双室五电场） ESPs (2 sets, double-chamber five-field)
	锅炉燃煤：SO_2 Boiler fuel coal: SO_2	石灰石-石膏炉外湿法脱硫 Limestone-gypsum boiler external wet desulphurization
	锅炉燃煤：NOx	低氮燃烧技术

	Boiler fuel coal: NOx	Low-nitrogen combustion technology
	煤炭粗碎工段粉尘 Dust from coal coarse crushing section	静电除尘（1套）15m高排气筒排放 Emission of 15m-high exhaust pipe of ESP (1 set)
	煤炭细碎工段粉尘 Dust from coal fine crushing section	静电除尘（1套）15m高排气筒排放 Emission of 15m-high exhaust pipe of ESP (1 set)
无组织 Unorganized	贮煤场粉尘 Dust in coal yard	全封闭球形煤场 Fully-enclosed spherical coal yard
	灰库装卸灰粉尘 Dust from ash handling in ash silo	封闭式，布袋除尘器（5套）无组织排放 Enclosed, unorganized emission by bag filters (5 sets)
	污水处理站恶臭 Odor of sewage treatment station （NH_3、H_2S、臭气浓度） (NH3, H2S and odor concentration)	对部分污水处理池进行密封，臭气经抽风管送至生物除臭设备，经2套生物除臭设备净化处理后经2根15m高排气筒排放 Part of the sewage treatment tank is sealed, and the odor is sent to the biological deodorization equipment through the exhaust pipe, and after being purified by 2 sets of biological deodorization equipment, it is discharged through two 15m high exhaust pipes.

2.3.2.3 废气污染物排放分析

2.3.2.3 Analsys of waste gas pollutants emission

（1）锅炉烟气

(1) Flue gas of boiler

现有工程自备动力车间配备 2×410t/h 循环硫化床锅炉，以山西煤为燃料，烟气中的主要污染物为烟尘、SO_2 以及 NO_X。

Captive powerhouse of existing project is equipped with 2×410t/h CFB boilers with coal from Shanxi Province as fuel so that major pollutants in flue gas are smoke & dust, SO_2 and NO_X.

现有工程 2×410t/h 锅炉每天运行时长为 24h，年运行时间 340d，满负荷耗煤量约为 65.41 万 t/a，现有工程燃煤量约为 60.6 万 t/a。

Daily operating hours and annual operating days of the 2×410t/h boilers in existing project is 24h and 340d respectively with coal consumption at full load of 654,100 t/a, rendering fuel coal consumption of existing project of 606,000 t/a.

锅炉基本情况详见下表 2.3-11。

Basic conditions of boilers are detailed in Table 2.3-11 below.

表 2.3-11 现有工程循环硫化床锅炉基本情况一览表

Table 2.3-11 Schedule of Baisc Conditions of CFB boilers in Existing Project

<table>
<tr><td colspan="3" rowspan="2">项目
Item</td><td rowspan="2">单位
Unit</td><td colspan="2">内容
Contents</td></tr>
<tr><td>1#循环流化床锅炉
#1 CFB boiler</td><td>2#循环流化床锅炉
#2 CFB boiler</td></tr>
<tr><td colspan="3">燃料种类
Fuel category</td><td></td><td colspan="2">燃煤
Fuel coal</td></tr>
<tr><td colspan="3">试生产时间
Trial production time</td><td></td><td>2012年10月
October, 2012</td><td>2014年4月
April, 2014</td></tr>
<tr><td colspan="3">竣工环保验收时间
Environmental protection acceptance on completion</td><td></td><td>2013年10月
October, 2013</td><td>2015年3月
March, 2015</td></tr>
<tr><td colspan="3">竣工环保验收文号
Document no. of environmental protection acceptance on completion</td><td></td><td>漳环验[2013]42号
ZHY [2013] No. 42</td><td>漳环验[2015]7号
ZHY [2015] No. 7</td></tr>
<tr><td colspan="3">锅炉蒸发量
BMCR</td><td>t/h</td><td>410</td><td>410</td></tr>
<tr><td rowspan="8">烟气治理措施
Flue gas prevention & control measures</td><td rowspan="3">烟囱
Stack</td><td>型式
Type</td><td></td><td colspan="2">1#、2#炉合用单筒烟囱
Single-cylinder stack commonly shared by #1 and #2 boiler</td></tr>
<tr><td>高度
Height</td><td>m</td><td colspan="2">150</td></tr>
<tr><td>出口内径
Outlet inner diameter</td><td>m</td><td colspan="2">5.2</td></tr>
<tr><td rowspan="2">烟气除尘装置
Flue gas dust remover</td><td>种类
Category</td><td></td><td>双室五电场静电除尘器
Double-chamber five-field ESP</td><td>双室五电场静电除尘器
Double-chamber five-field ESP</td></tr>
<tr><td>设计效率
Design efficiency</td><td>%</td><td colspan="2">总效率≥99.5
Total efficiency ≥99.5
（除尘器效率99%，脱硫除尘效率50%）
(ESP efficiency: 99%, desulphurization and dust removal efficiency: 50%)</td></tr>
<tr><td rowspan="2">烟气脱硫装置
Flue gas desulfurizer</td><td>种类
Category</td><td></td><td colspan="2">石灰石-石膏炉外湿法脱硫
Limestone-gypsum boiler external wet desulphurization</td></tr>
<tr><td>设计效率
Design efficiency</td><td>%</td><td colspan="2">效率≥96%
Efficiency ≥96%</td></tr>
<tr><td>NOx控制</td><td>方式</td><td></td><td colspan="2">低氮燃烧</td></tr>
</table>

	措施 NOx control measures	Method		Low-nitrogen combustion
		效果 Outcome		/

①在线监测情况

(1) On-line monitoring condition

根据 2017 年 12 月 1 日至 2018 年 2 月 28 日在线监测数据（具体详见表 2.3-12），现有工程 2×410t/h 锅炉烟气主要污染物烟尘、SO_2、NOx 均可 GB13223-2011《火电厂大气污染物排放标准》表 1 排放浓度。

According to on-line monitoring data from December 01, 2017 through February 28, 2018 (which are detailed in -), major pollutants, namely smoke & dust, SO_2 and NOx of flue gas from 2×410t/h boilers of existing project all can comply with Table 1 Emission Concentration in GB13223-201 *Emission Standards for Air Pollutants in Thermal Power Plants.*

表 2.3-12　现有工程 2×410t/h 锅炉烟气在线监测情况

Table 2.3-12 On-line Monitoring Condition of Flue Gas from 2×410t/h Boilers in Existing Project

时段 Period	内容 Contents	排放浓度（mg/m^3） Emission concentration (mg/m^3)			流量 Flow （m^3/h） (m^3/h)
		烟尘 Smoke and dust	SO_2	NOx	
2017.12.01～2018.02.28	平均值 Average value	13.919	46.654	125.653	622209.2
排放标准（GB13223-2011） Emission standards (GB13223-2011)		30	200	200	/
达标与否 Up to standard Yes/No		达标 Yes	达标 Yes	达标 Yes	/

注：排放浓度均为折算后的数值。

Note: emission concentrations above are the converted values.

②验收监测情况

(2) Monitoring condition in acceptance

根据《联盛纸业（龙海）有限公司年产 200 万吨高档包装纸板工程竣工环境保护阶段性验收监测报告》中 2018 年 1 月 23 日~24 日对现有工程 2×410t/h 锅炉

烟气进出口监测数据，进口监测点前处理设施为低氮燃烧+双室五电场静电除尘器，进口监测点后处理设施为石灰石-石膏炉外湿法脱硫。其大气污染物监测结果详见表 2.3-13。

According to influent and effluent quality monitoring data at flue gas inlet and outlet of 2×410t/h boilers in existing project from January 23-24, 2018 in *Monitoring Report for Phased Environmental Protection Acceptance on Completion of High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa*, the treatment facilities in front of inlet monitoring points are low-nitrogen combution + double-chamber five-field ESP and those at rear of the same are limestone-gypsum boiler external wet desulphurization facilities. Monitoring results of air pollutants thereof are detailed in Table 2.3-13.

监测结果表明，现有工程 2×410t/h 锅炉烟气主要污染物烟尘、SO_2、NOx 均可达到 GB13223-2011《火电厂大气污染物排放标准》表 1 排放浓度限值（即烟尘 30mg/m^3、$SO_2$200mg/m^3、NOx200mg/m^3）。

According to on-line monitoring data from December 01, 2017 through February 28, 2018 (which are detailed in), major pollutants, namely smoke & dust, SO_2 and NOx of flue gas from 2×410t/h boilers of existing project all can comply with Table 1 Emission Concentration in GB13223-201 *Emission Standards for Air Pollutants in Thermal Power Plants.*

综合燃煤产污分析、验收监测情况、在线监测数据以及类比等资料，现有工程 2×410t/h 锅炉烟气污染物产排情况详见表 2.3-14。

Comprehensive fuel coal pollution production analysis, monitoring condition in acceptance, on-line monitoring data and comparison and other data as well as pollutants production and emission condition of 2×410t/h boilers in existing project are detailed in Table 2.3-14.

表 2.3-13 现有工程 2×410t/h 锅炉烟气委托监测情况

Table 2.3-13 Commissioned On-line Monitoring Condition of Flue Gas from 2×410t/h Boilers in Existing Project

监测结果 Monitoring results / 检测项目 Monitoring items		检测时间 Monitoring time	锅炉排气筒进口（脱硫前） Boiler exhaust pipe inlet (prior to desulphurization)				锅炉烟气出口 Boiler flue gas outlet				处理效率 Treatment efficiency（%）(%)	排放标准 Emission standard	达标与否 Up to standard Yes/No
			第一次 1st time	第二次 2nd time	第三次 3rd time	平均值 Average value	第一次 1st time	第二次 2nd time	第三次 3rd time	平均值 Average value		GB13223-2011	
标干流量（m^3/h） Benchmark flow		2018年1月23日 Tuesday, January 23, 2018	850983	883178	829736	854632	755059	792539	728261	758620	/	/	达标 Yes
颗粒物 Particulate matter	浓度（mg/m^3） Concentration (mg/m^3)		33.4	36.5	35.1	35.0	27.1	27.2	28.2	27.5	/	30	达标 Yes
	速率（kg/h） Rate (kg/h)		28.3	32.4	28.7	19.8	23.3	26.2	21.6	23.7	/	/	/
SO_2	浓度（mg/m^3） Concentration (mg/m^3)		744	730	739	738	57	58	52	56	92.4	200	达标 Yes
	速率（kg/h） Rate (kg/h)		629	649	605	628	45.3	49.9	40.1	45.1		/	/
NOx	浓度（mg/m^3）		133	140	153	142	117	121	122	120	/	200	达标 Yes

	Concentration (mg/m^3)												
	速率（kg/h）Rate (kg/h)		112	125	125	121	93.6	104	93.2	96.9	/	/	/
烟气参数 Flue gas parameters	温度（℃）Temperature (℃)		141.2	142.1	141.5	/	53.4	56.3	54.8	/	/	/	达标 Yes
	含氧量（%）Oxygen content (%)		6.4	5.9	6.2	/	5.1	4.7	5.2	/	/	/	达标 Yes
标干流量（m^3/h）Benchmark flow		2018年1月24日 Wednesday, January 24, 2018	887031	847749	857845	864208	770530	812812	754297	779213	/	/	达标 Yes
颗粒物 Particulate matter	浓度（mg/m^3）Concentration (mg/m^3)		33.4	30.8	33.4	32.5	27.3	25.5	28.1	27.0	/	30	达标 Yes
	速率（kg/h）Rate (kg/h)		29.0	26.4	28.8	28.1	21.7	23.5	21.6	22.3	/	/	/
SO_2	浓度（mg/m^3）Concentration (mg/m^3)		756	724	731	737	56.4	50.3	47.2	51.3	93.04	200	达标 Yes
	速率（kg/h）Rate (kg/h)		657	622	631	637	45.5	43.9	38.5	42.6			
NOx	浓度（mg/m^3）		132	134	143	136	107	112	110	110	/	200	达标 Yes

	Concentration (mg/m^3)												
	速率（kg/h） Rate (kg/h)		114	115	124	118	86.3	98.4	89.8	91.5	/	/	/
烟气参数 Flue gas parameters	温度（℃） Temperature (℃)		144.1	139.7	141.8	/	55.2	49.8	53.5	/	/	/	达标 Yes
	含氧量（%） Oxygen content (%)		6.3	5.8	5.9	/	5.3	4.9	4.8	/	/	/	达标 Yes

注：排放浓度均为折算后的数值。

Note: emission concentrations above are the converted values.

表 2.3-14 现有工程 2×410t/h 锅炉烟气主要污染物产生及排放情况一览表

Table 2.3-14 Schedule of Production and Emission Conditions of Major Pollutants of Flue Gas from 2×410t/h Boilers in Existing Project

<table>
<tr><td colspan="2" rowspan="2">项目
Item
源强
Source intensity</td><td colspan="3">烟尘
Smoke and dust</td><td colspan="3">SO_2</td><td colspan="3">NO_x</td><td rowspan="2">烟气量
Flue gas flow
(m^3/h)</td></tr>
<tr><td>浓度
Concentration
(mg/m^3)</td><td>速率
Rate
（kg/h）
(kg/h)</td><td>总量
Total flow
(t/a)</td><td>浓度
Concentration
(mg/m^3)</td><td>速率
Rate
（kg/h）
(kg/h)</td><td>总量
Total flow
(t/a)</td><td>浓度
Concentration
(mg/m^3)</td><td>速率
Rate
（kg/h）
(kg/h)</td><td>总量
Total flow
(t/a)</td></tr>
<tr><td colspan="2">处理前
Prior to treatment</td><td>4785</td><td>4402.2</td><td>35921.95</td><td>2250</td><td>2070</td><td>16891.2</td><td>/</td><td>/</td><td>/</td><td rowspan="4">920000</td></tr>
<tr><td colspan="2">环保装置运行效率
Operating efficiency of environmental protection device</td><td colspan="3">99.5%</td><td colspan="3">96%</td><td colspan="3">/</td></tr>
<tr><td colspan="2">处理后
Upon treatment</td><td>25</td><td>23.00</td><td>187.68</td><td>90</td><td>82.80</td><td>675.65</td><td>150</td><td>138.00</td><td>1126.08</td></tr>
<tr><td>排放标准
Emission standard</td><td>GB13223-2011</td><td>30</td><td>/</td><td>/</td><td>200</td><td>/</td><td>/</td><td>200</td><td>/</td><td>/</td></tr>
</table>

（2）煤炭破碎工段粉尘

(2) Dust of coal crushing section

项目煤炭粗碎工段、细碎工段各配备 1 套静电除尘设施收集处理产生的粉尘，根据《联盛纸业（龙海）有限公司年产 200 万吨高档包装纸板工程竣工环境保护阶段性验收监测报告》中 2018 年 1 月 23 日~24 日对煤炭破碎工段粉尘粗、细碎进出口浓度监测数据，测结果见下表 2.3-15。结合监测报告及实际运行情况，煤炭破碎工段粉尘排放情况见表 2.3-16。

Coal coarse and fine crushing section each is equipped with a set of ESP for collection of dust generated by treatment. According to dust monitoring data at coarse and fine crushing inlet and outlet of coal crushing section from January 23-24, 2018 in *Monitoring Report for Phased Environmental Protection Acceptance on Completion of High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa*, monitoring results are shown in Table 2.3-15 below. Based on monitoring report and actual operation condition, dust emission condition of the coal crushing section is as shown in Table 2.3-16.

表 2.3-15　煤炭破碎粉尘监测结果

Table 2.3-15 Coal Crushing Dust Monitoring Results

采样点位 Sampling point location	检测项目 Monitoring items	监测结果 Monitoring results			
		2018.1.23 1/23/2018		2018.1.24 1/24/2018	
		折算浓度 Converted concentration（mg/m^3） (mg/m^3)	排放速率 Emission rate（kg/h） (kg/h)	折算浓度 Converted concentration（mg/m^3） (mg/m^3)	排放速率 Emission rate（kg/h） (kg/h)
粗碎排气筒出口 Coarse crushing exhaust pipe outlet	粉尘 Dust	3.5	0.0632	6.4	0.130
细碎排气筒出口 fine crushing exhaust pipe outlet	粉尘 Dust	10	0.218	10.9	0.196

注：排放浓度均为折算后的数值。

Note: emission concentrations above are the converted values.

监测结果表明，煤炭破碎工段粉尘排放符合《大气污染物综合排放标准》

（GB16297-1996）表 2 二级标准限值（即：排放浓度 150mg/m^3，排放速率 3.5kg/h）。

As revealed by monitoring results, dust emission of coal crushing section complies with Table 2 Limits of Grade II Standard in *Integrated Emission Standards for Air Pollutants* (GB16297-1996) (i.e.: emission concentration of 150mg/m^3, emission rate of 3.5kg/h).

（3）贮煤场煤粉尘

(3) Dust of coal yard

现有工程采用全封闭式球形贮煤场，从根本上控制了贮煤过程中的煤粉尘排放，同时安装了喷淋系统，当球型煤场内扬尘较大时进行喷淋，能有效减少煤场的扬尘。

Existing project is equipped with fully enclosed spherical coal yard, which fundamentally controls the coal dust emission during the coal storage process. Also a sprinkler system is installed, which is capable of sprinkling when in case of dense dust in the coal coal yard, allowing flying dust to be effectively reduced.

（4）灰库装卸灰粉尘

(4) Dust from ash handling in ash silo

项目灰库配备布袋除尘设施收集处理产生的粉尘，除尘效率 99%。

Ash silo of the project is equipped with bag filter for collection dust from treatment with dust removal efficiency of 99%.

表 2.3-16 现有工程煤炭破碎粉尘产生及排放情况一览表

Table 2.3-16 Schedule of Production and Emission Conditions of Dust from Coal Crushing in Existing Project

污染源 Source of pollution	主要污染物 Major pollutants	废气量 Waste gas flow (m^3/h)	初始源强 Original source intensity			污染防治措施 Pollution control & prevention measures			有组织排放情况 Organized emission condition			允许排放情况 Allowable emission condition		达标与否 Up to standard Yes/No
			产生浓度 Generation concentration (mg/m^3)	产生速率 Generation rate（kg/h）(kg/h)	产生量 Generation flow（t/a）(t/a)	治理措施 Prevention & control measures	除尘效率 Dust removal efficiency（%）(%)	削减量 Reduction flow（t/a）(t/a)	排放浓度 Emission concentration (mg/m^3)	排放速率 Emission rate（kg/h）(kg/h)	排放量 Emission flow（t/a）(t/a)	排放浓度 Emission concentration (mg/m^3)	排放速率 Emission rate（kg/h）(kg/h)	
煤炭 Coal 粗碎 coarse crushing 排气筒 Exhaust pipe	粉尘 Dust	7500	2500	19	30	静电除尘器 ESP	99.0	29.7	25.0	0.19	0.30	150	3.5	达标 Yes

污染源 Source of pollution	主要污染物 Major pollutants	废气量 Waste gas flow (m^3/h)	初始源强 Original source intensity			污染防治措施 Pollution control & prevention measures			有组织排放情况 Organized emission condition			允许排放情况 Allowable emission condition		达标与否 Up to standard Yes/No
			产生浓度 Generation concentration (mg/m^3)	产生速率 Generation rate（kg/h）(kg/h)	产生量 Generation flow（t/a）(t/a)	治理措施 Prevention & control measures	除尘效率 Dust removal efficiency（%）(%)	削减量 Reduction flow（t/a）(t/a)	排放浓度 Emission concentration (mg/m^3)	排放速率 Emission rate（kg/h）(kg/h)	排放量 Emission flow（t/a）(t/a)	排放浓度 Emission concentration (mg/m^3)	排放速率 Emission rate（kg/h）(kg/h)	
煤炭 Coal 细碎 Fine crushing 排气筒 Exhaust pipe	粉尘 Dust	7500	2500	19	30	静电除尘器 ESP	99.0	29.7	25.0	0.19	0.30	150	3.5	达标 Yes

（5）恶臭气体

(5) Odor gas

根据《联盛纸业（龙海）有限公司年产 200 万吨高档包装纸板工程竣工环境保护阶段性验收监测报告》中 2018 年 1 月 23 日~24 日对厂界臭气浓度、氨、硫化氢的监测数据，具体详见表 2.3-17，结果表明现有工程臭气浓度、氨、硫化氢厂界厂界浓度均满足 GB14554-1993《恶臭污染物排放标准》标准要求。

According to monitoring data for odor concentration, ammonia and hydrogen sulfide at battery limit from January 23-24, 2018 in Monitoring Report for Phased Environmental Protection Acceptance on Completion of High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa, which are detailed in -, the results show that odor concentration, ammonia and hydrogen sulfide at battery limit all comply with standard requirements in GB14554-1993 *Emission Standards for Odor Pollutants*.


1#
2#
3#
4#
南厂区
Image © 2018 DigitalGlobe
无组织臭气监测点位

图 2.3-1　臭气浓度监测点位示意图

Figure 2.3-1 Schematic Diagram of Odor Concentration Monitoring Point Location

表 2.3-17　无组织排放臭气浓度监测结果（单位：无量纲）

Table 2.3-17 Monitoring Results of Unorganized Emission Odor Concentration (Dimensionless)

检测点 Monitoring points	检测项目 Monitoring items	2018年1月23日 Tuesday, January 23, 2018				2018年1月24日 Wednesday, January 24, 2018				标准值 Standard value	达标情况 Up to standard Yes/NO
		第一次 1st time	第二次 2nd time	第三次 3rd time	第四次 4th time	第一次 1st time	第二次 2nd time	第三次 3rd time	第四次 4th time		
上风向1# Windward direction #1	臭气浓度 Odor concentration	<10	<10	<10	<10	<10	<10	<10	<10	20	达标 Yes
	氨 Ammonia	0.015	0.017	0.014	0.012	0.011	0.013	0.014	0.013	1.5	达标 Yes
	硫化氢 Hydrogen sulfide	0.001	0.002	0.001	0.002	0.002	0.002	0.002	0.002	0.06	达标 Yes
下风向2# Leeward direction #2	臭气浓度 Odor concentration	14	16	14	15	16	17	17	15	20	达标 Yes
	氨 Ammonia	0.075	0.077	0.076	0.058	0.068	0.066	0.070	0.053	1.5	达标 Yes
	硫化氢 Hydrogen sulfide	0.001	0.002	0.002	0.002	0.003	0.003	0.002	0.003	0.06	达标 Yes
下风向3# Leeward direction #3	臭气浓度 Odor concentration	19	18	16	15	17	16	12	15	20	达标 Yes
	氨 Ammonia	0.096	0.088	0.075	0.053	0.053	0.054	0.046	0.055	1.5	达标 Yes

	硫化氢 Hydrogen sulfide	0.003	0.002	0.002	0.002	0.003	0.002	0.003	0.003	0.06	达标 Yes
下风向4# Leeward direction #4	臭气浓度 Odor concentration	16	17	16	17	16	16	18	14	20	达标 Yes
	氨 Ammonia	0.057	0.068	0.070	0.081	0.054	0.053	0.076	0.049	1.5	达标 Yes
	硫化氢 Hydrogen sulfide	0.003	0.002	0.003	0.002	0.002	0.002	0.003	0.003	0.06	达标 Yes

2.3.2.4 评价范围环境空气质量变化情况

2.3.2.4 Change Conditions of Environmental Air Quality within Scope of EIA

本次评价采用联盛纸业原环评、后评价及《漳州台商投资区凤山埔尾片区产业发展规划环境影响报告书》中的监测数据进行比较，选取 4 个共同监测点位沙板村、上房村、吴宅村、杨厝村。进行比较的监测项目包括 TSP、PM_{10} 日均浓度，SO_2、NO_2 小时浓度和日均浓度，NH_3、H_2S 一次浓度。

In this assessment, monitoring data in original EIA and post-assessment of Liansheng Paper and *EIA Report on Industrial Development Plan of Fengshanpuwei Area in Zhangzhou Taiwanese Investment Zone* are compared and 4 common monitoring points are selected, namely, Shanban, Shangfang, Wuzhai and Yangcuo Village. Compared monitoring items include daily average concentration of TSP and PM10, hourly concentration and daily average concentration of SO2 and NO2, primary concentration of NH3 and H2S.

由监测结果可知，2010 年、2014 年、2018 年环评监测期间，各监测因子均未超标，环境空气质量均符合二类功能区划要求；TSP、PM_{10} 日均浓度总体呈下降趋势；SO_2、NO_2 小时浓度和日均浓度基本保持平稳，NH_3、H_2S 一次浓度基本不变。

As can be seen from monitoring results, during the monitoring period of EIA in 2010, 2014 and 2018, the monitoring factors did not exceed the standard, and the ambient air quality met the requirements of the second-class functional zoning; the daily average concentrations of TSP and PM10 showed a downward trend; SO2 and NO2 hours. The concentration and daily average concentration remained basically stable, and the concentrations of NH3 and H2S were basically unchanged.

综上所述，评价区近几年大气污染物浓度无明显变化，环境空气质量基本维持不变。

To sum up, the concentration of atmospheric pollutants in the evaluation area has not changed significantly in recent years, and the ambient air quality has remained basically unchanged.

表 2.3-18 评价范围内环境空气质量变化情况一览表

Table 2.3-18 Change Conditions of Environmental Air Quality within Scope of EIA

项目 Item		监测点位 Monitoring point location	浓度范围（mg/m³） Concentration range (mg/m³)			评价区浓度范围（mg/m³） Concentration range in assessment area (mg/m³)			评价区超标率（%） Out-of-standard rate of assessment area (5)		
			2010年原环评期间 Original EIA period in 2010	2014年后评价期间 Post-assessment period in 2014	2018年规划环评期间 Planned assessment period in 2018	2010	2014	2018	2010	2014	2018
TSP	日均值 Daily mean value	沙坂村 Shaban Village	0.153~0.168	0.094~0.121	0.093~0.106	0.153~0.194	0.091~0.128	0.091~0.113	0	0	0
		上房村 Shangfang Village	0.156~0.170	0.097~0.128	0.094~0.113				0	0	0
		吴宅村 Wuzhai Village	0.155~0.178	0.091~0.124	0.094~0.112				0	0	0
		杨厝村 Yangcuo Village	0.175~0.194	0.102~0.128	0.091~0.106				0	0	0

PM_{10}	日均值 Daily mean value	沙坂村 Shaban Village	0.073~0.076	0.048~0.067	0.055~0.063	0.073~0.094	0.044~0.072	0.056~0.077	0	0	0
		上房村 Shangfang Village	0.068~0.073	0.046~0.067	0.056~0.072				0	0	0
		吴宅村 Wuzhai Village	0.074~0.078	0.044~0.068	0.060~0.077				0	0	0
		杨厝村 Yangcuo Village	0.088~0.094	0.049~0.072	0.057~0.067				0	0	0
SO_2	日均值 Daily mean value	沙坂村 Shaban Village	0.020~0.024	0.009~0.013	0.017~0.022	0.020~0.026	0.009~0.021	0.017~0.025	0	0	0
		上房村 Shangfang Village	0.023~0.026	0.012~0.021	0.018~0.025				0	0	0
		吴宅村 Wuzhai Village	0.020~0.024	0.012~0.021	0.018~0.025				0	0	0

		杨厝村 Yangcuo Village	0.021~0.025	0.009~0.015	0.017~0.022				0	0	0
NO_2	日均值 Daily mean value	沙坂村 Shaban Village	0.022~0.025	0.023~0.042	0.021~0.028	0.022~0.030	0.023~0.045	0.020~0.030	0	0	0
		上房村 Shangfang Village	0.023~0.026	0.024~0.045	0.021~0.029				0	0	0
		吴宅村 Wuzhai Village	0.022~0.026	0.025~0.033	0.023~0.030				0	0	0
		杨厝村 Yangcuo Village	0.026~0.030	0.023~0.041	0.020~0.025				0	0	0
SO_2	小时值 Hourly value	沙坂村 Shaban Village	0.020~0.030	0.007~0.015	0.014~0.027	0.020~0.040	0.007~0.029	0.014~0.030	0	0	0
		上房村 Shangfang Village	0.022~0.040	0.008~0.024	0.016~0.030				0	0	0

		吴宅村 Wuzhai Village	0.020~0.036	0.008~0.029	0.017~0.030				0	0	0
		杨厝村 Yangcuo Village	0.022~0.030	0.007~0.028	0.017~0.028				0	0	0
NO_2	小时值 Hourly value	沙坂村 Shaban Village	0.022~0.036	0.018~0.043	0.018~0.035	0.021~0.040	0.017~0.049	0.018~0.035	0	0	0
		上房村 Shangfang Village	0.024~0.040	0.017~0.049	0.018~0.033				0	0	0
		吴宅村 Wuzhai Village	0.021~0.035	0.018~0.038	0.022~0.035				0	0	0
		杨厝村 Yangcuo Village	0.026~0.039	0.018~0.048	0.018~0.032				0	0	0
NH_3	一次值 Primar	沙坂村 Shaban Village	0.011~0.030	0.02~0.06	0.008~0.041	0.011~0.030	0.02~0.06	0.008~0.041	0	0	0

H_2S	y value	沙坂村 Shaban Village	＜0.005	0.001~0.015	＜0.001	＜0.005	0.001~0.015	＜0.001	0	0	0

2.3.3 固体废弃物产生及处置措施

2.3.3 Solid waste generation and disposal measures

现有工程产生固体废物主要有造纸车间固废（包括浆渣、塑料、铁钉铁丝、砂石、污泥等）、动力车间粉煤灰、炉渣、脱硫石膏、给水处理站污泥、污水处理站污泥及气浮池产生脱墨污泥等。固体废物产生及处置情况详见表 2.3-19。

The solid waste generated in the existing projects consist of, among others, solid waste in the papermaking workshop (including, inter alia, pulp residue, plastic, iron nail & wire, sand & stone, and sludge), fly ash, slag, desulfurization gypsum of powerhouse, sludge of water treatment station, sludge of sewage treatment station and deinking sludge generated by flotation cell. Solid waste generation and disposal conditions are detailed in Table 2.3-19.

表 2.3-19　现有工程固体废物处置利用情况汇总表

Table 2.3-19 Summary to Disposal and Utilization Conditions of Solid Waste from Existing Project

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	现有工程 Existing project	
			产生量 Generation flow （t/a） (t/a)	处置方式 Disposal method
PM5制浆造纸车间 PM5 pulping and papermaking workshop PM6制浆造纸车间 PM6 pulping and papermaking workshop PM7制浆造纸车间 PM7 pulping and papermaking workshop PM8制浆造纸车间 PM8 pulping and papermaking	浆渣（木片、纤维束等） Pulp residue (wood chip, fibre bundle and so on)	一般固废 General solid waste	96750	送漳州市益盛环保能源有限公司垃圾发电工程燃烧处置 Delivered to Zhangzhou Yisheng Environmental Protection Energy Co., Ltd for disposal by incineration
	铁丝、塑料等 Iron wire, plastic and so on	一般固废 General solid waste	75500	铁丝和塑料经收集后进入联盛纸业的年处理55万吨造纸废渣厂区进行清洗、筛分后铁丝出售给物资回收部门（铁丝等金属出售给漳州皖润物资回收有限公司；塑

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	现有工程 Existing project	
			产生量 Generation flow （t/a） (t/a)	处置方式 Disposal method
workshop PM9制浆造纸车间 PM9 pulping and papermaking workshop				料等出售给福建友峰塑胶有限公司） After collecting the wire and plastic, they enter the Liansheng Paper's annual processing of 550,000 tons of papermaking waste slag plant area for cleaning and screening. The wire is sold to the material recycling department (the metal such as wire is sold to Zhangzhou Yurun Material Recovery Co., Ltd.; plastics, etc. are sold to Fujian Youfeng Plastic Co., Ltd.)
	砂石、污泥等 Sand, stone, sludge and so on	一般固废 General solid waste	62750	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
动力锅炉 Power boiler	粉煤灰 Flyash	一般固废 General solid waste	186708	外售给厦门嘉鹭德贸易有限公司 Sold to Xiamen Jialude Trade Co., Ltd.
	炉渣 Boiler slag	一般固废 General solid waste	80018	
	脱硫石膏 Desulfurization gypsum	一般固废 General solid waste	25000	
浅层气浮池 Shallow flotation cell	脱墨污泥（含水率80%）（危废类别HW12）	危险废物 Hazardous waste	12948	采用脱墨污泥自行利用资源化处理工艺进行处理，脱墨污泥经处理后

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	现有工程 Existing project	
			产生量 Generation flow （t/a） (t/a)	处置方式 Disposal method
	Deinking sludge (with water content of 80%) (Classification of hazardous waste: HW12)			作为PM7线的原料 The deinking sludge is treated by the resource treatment process, and the deinked sludge is treated as the raw material of the PM7 line
污水处理站 Sewage Treatment Station	污泥（含水率80%） Sludge (with water content of 80%)	一般固废 General solid waste	91120	送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置 Delivered to Zhangzhou Yisheng Environmental Protection Energy Co., Ltd for disposal by incineration
给水处理站 Water treatment plant	污泥（含水率80%） Sludge (with water content of 80%)	一般固废 General solid waste	1926.3	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
办公生活区 Office and living quarter	生活垃圾 Domestic waste	一般固废 General solid waste	459	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
生产车间 Production workshop	废润滑油（危废类别HW08） Waste lube oil (Classification of hazardous waste: HW08)	危险废物 Hazardous waste	8	暂存于危废仓库，委托给漳州联办环保产业有限公司进行处置 Tentatively stored in hazardous waste warehouse to be commissioned to Zhangzhou Joint Office Environmental Protection Industry Co., Ltd for disposal

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	现有工程 Existing project	
			产生量 Generation flow （t/a） (t/a)	处置方式 Disposal method
合计 Total			633187.3	

2.3.4 噪声产生及控制措施

2.3.4 Noise Generation and Control Measures

现有工程噪声源主要包括三个部分：

Noise source in existing project consists of three parts:

（1）制浆造纸项目噪声源，主要为造纸生产机械设备如碎浆机、双盘磨浆机、各类浆泵和抄纸机、配套的空压机等工艺设备噪声及动力车间发电设备，水力碎浆机、空压机、和发电机等机械设备，是重点控制的噪声源。

(1) Noise source of the pulping and papermaking project is mainly production machinery equipment for papermaking, such as pulper, double disc refiner, various pulp pumps and paper machines, associated air compressors and other process equipment and power generation equipment in powerhouse, with focus on control of such noise source as hydraulic pulpers, air compressors, power generators and other mechanical equipment.

（2）自备动力车间（北侧厂区）噪声源，主要包括锅炉鼓风机、引风机、空压机、碎煤机、研磨机、冷却塔等，尤以引风机和锅炉鼓风机噪声对厂界影响较大，此外，还有原料及产品运输时也会产生交通运输噪声。

(2) The noise source of the captive powerhouse (north side of plant area) consists of, among others, boiler blowers, induced draft fans, air compressors, coal crushers, grinders, cooling towers, etc., especially the noise of induced draft fans and boiler blowers with significant impact on the battery limit. In addition, there are also transportation noises generated when raw materials and products are transported.

（3）污水处理站污泥脱水设备、水泵等设备噪声。

(3) Noise from sludge dewatering equipment, water pumps and other equipment in sewage treatment station.

项目通过对自备动力车间循环流化床锅炉、风机、抽凝式蒸汽轮机、背压式蒸汽轮机、风机设备、碎煤机等高噪声设备采用基础减振以及厂房隔声、厂区周边绿化降噪等措施；对制浆造纸车间碎浆机、磨浆机、空压机等高噪声设备采用减振、厂房构筑物隔声等措施进行降噪。

The project adopts basic vibration reduction for the high-noise equipment such as circulating fluidized bed boiler, fan, condensing steam turbine, back pressure steam turbine, fan equipment, coal crusher, etc., and the sound insulation of the plant and the greening around the plant. For high-noise equipment such as pulper, refiner, air compressor in pulp and paper mill, measures such as vibration reduction, sound insulation of plant structures and so on are taken to reduce noise

2.4 现有工程污染物排放汇总

2.4 Summary to Pollutant Emission of Existing Project

现有工程污染物排放情况见表 2.4-1。

Pollutant emission condition of existing project is as shown in 2.4-1.

表 2.4-1 现有工程污染物排放一览表

Table 2.4-1 Summary to Pollutant Emission of Existing Project

项目 Item		总体工程全部投产后 After principal works all put in service		总量控制指标 Total amount controlling index （t/a） (t/a)
		产生量（t/a） Generation flow (t/a)	排放量（t/a） Emission flow (t/a)	
废水 Wastewater	废水量 Wastewater flow	1503.82 万 15.0382 million	1503.82 万 15.0382 million	1508 万 15.08 million
	COD	43610.78	1172.98	1342.12
	BOD_5	21805.39	300.76	/
	SS	21053.48	300.76	/

		氨氮 Ammonia nitrogen	/	30.08	/
		总氮 Total nitrogen	/	150.38	/
		总磷 Total phosphorus	/	6.02	/
废气 Waste gas	有组织 Organized（锅炉烟气）(boiler flue gas)	烟气量 Flue gas flow	750720 万 m^3 7507.2 million m3	750720 万 m^3 7507.2 million m3	
		烟尘 Smoke and dust	35921.95	187.68	/
		SO_2	16891.2	675.65	2263.55
		NOx	/	1126.08	3594.96
	有组织 Organized	破碎粉尘 Crushing dust	60	0.6	/
固体废物 Solid waste		一般工业固体废物 General industrial solid waste	815350	0	0
		危险废物 Hazardous waste	10.0	0	
		生活垃圾 Domestic waste	550.8	0	
		合计 Total	815910.8	0	

2.5 现有工程环保审批要求落实情况

2.5 Implementation of Requirements for Environmental Protection Approval in Existing Project

对照现有工程的环评、竣工环保验收批复文件及后评价报告的要求，现有工程的环保审批要求落实情况见表 2.5-1。

Compared with EIA of existing project, approval documents of environmental protection acceptance on completion and requirements in post-project EIA report, implementation conditions of requirements for environmental protection approval in existing project are as shown in Table 2.5-1

表 2.5-1 现有工程环保审批落实情况

Table 2.5-1 Implementation Conditions of Requirements for Environmental Protection Approval in Existing Project

项目 Item	内容 Contents	企业目前状况 Status quo of enterprises	环保要求符合性 Compliance with environmental protection requirements
年产200万吨高档包装板纸工程环评批复要求 EIA approval requirements for high-grade cardboar	最大限度减少废水排放量，工业用水重复利用率不低于95%，排水系统应实行雨、污分流并且建设单位应建设专用排污管道，加强污水处理设施运行管理和维护，保证废水稳定、达标排放 The discharge of wastewater is to be minimized. Reuse rate of industrial water is not less than 95%. Separate rainwater and sewage drainage shall be implemented in the drainage system and construction company shall construct special sewage pipelines to strengthen operation management and maintenance of sewage treatment facilities so as to ensure stable and up-to-standard discharge of wastewater.	废水处理设施稳定，达标排放 Wastewater treatment facilities are stable with up-to-standard discharge	符合 Compliant
	设置2万m^3应急事故池，严格杜绝生产废水超标事故性排放。 20,000 m3 emergency basin is to be set up to strictly eliminate the accidental discharge of production wastewater exceeding the standard.	设置1.2万m^3应急事故池（平时空置），并制定相应应急预案 12,000 m3 emergency basin (not in service under normal condition) is to be set up and relevant contingency plans are to be formulated.	基本符合 Substantially compliant

d paper project with annual production of 2 mtpa	生产用煤含硫量超过0.8%时，应采用炉外脱硫设施等措施进一步提供脱硫效率，控制SO_2的排放量。 When the sulfur content of production coal exceeds 0.8%, measures such as desulfurization facilities outside the furnace shall be used to further provide desulfurization efficiency and control the emission of SO2.	煤含硫量平均值约1%，超过0.8%，采取石灰石-石膏炉外湿法脱硫 Average sulfur content of coal is around 1%. In case of the sulfur content exceeding 0.8%, limestone-gypsum boiler external wet desulphurization will be adopted	符合 Compliant
	煤、石灰石、灰渣堆场应设棚盖，四周围档，并定时喷淋，减少粉尘的排放 Coal, limestone and ash & slag storage yards shall be provided with sheds, covers and surrounding fencing and sprayed on a regular basis to reduce dust emissions.	煤、石灰石、灰渣堆均全封闭 Coal, limestone and ash & slag storage yards are all fully enclosed.	基本符合 Substantially compliant
	原料废纸和固废堆场应加设棚盖，固体废物应按国家有关规定，分类收集并妥善处理处置。 Storage yards for raw material waste paper and solid wastes shall be provided with sheds and covers, of which solid wastes shall be classified, collected and carefully disposed of in accordance with relevant national regulations.	原料废纸和固废堆场均全封闭，固体废物基本做到分类妥善收集 These storage yards are all be fully enclosed and solid wastes are substantially classified and carefully collected.	基本符合 Substantially compliant
	建立健全的环境管理制度，环保档案，加强环境管理和环境监测，编制环境事故应急预案，落实各项环保安全措施 A sound environmental management system and environmental protection achieves are to be established. Environmental management and environmental monitoring are to be strengthened. Contingency plans against environmental accidents are to be prepared and various environmental safety measures are to be implemented.	已落实 Implemented	符合 Compliant
	按规范化要求建设污染物排放口，安装主要污染物在线监控仪器设施 Pollutant discharge outlets are to be established in accordance with standardization requirements and major pollutants on-line monitoring instruments and facilities are to be installed	排污口规范化建设，循环硫化床锅炉、污水处理站已在线监控装置 Discharge outlets are constructed in accordance with standardization	符合 Compliant

		requirements and CBF boiler and sewage treatment station have been installed with on-line monitoring devices	
	废水处理站及造纸浆料池设置100米的卫生防护距离，建设单位应向规划部门报告，加强对防护距离范围内的规划控制，禁止商业用房和居民住宅等敏感目标的建设 The wastewater treatment station and papermaking machine chest shall have a sanitary protection distance of 100 meters. The construction company shall report to the planning authorities, so as to strengthen planning & control within the protection distance and prohibit construction of sensitive targets such as commercial and residential buildings.	污水处理站100m范围内沙坂村村民的搬迁工作已完成 Rehabilitation works of villagers in Shaban Village within 100m from sewage treatment station have been completed	符合 Compliant
年产200万吨高档包装板纸工程后评价报告要求 Post-project EIA report requirements for high-grade cardboar	严格执行“三同时”制度，加强环保治理设施的管理，确保污染物达标排放 "Three Simultaneities” system shall be strictly implemented so as to enhance management of pollution prevention & control facilities and ensure up-to-standard discharge of pollutants	项目均严格按照三同时的要求进行，污染治理设施运转良好，主要污染物均能稳定达标排放 The project is implemented strictly in accordance with "Three Simultaneities” requirements and pollution prevention & control facilities are operating well with major pollutants all discharged in a stable and up-to-standard manner.	符合 Compliant
	积极推行环境管理体系认证，按照ISO14001环境管理体系等先进的环境管理模式对生产全过程进行管理，对污染物排放及处置进行全程控制，提高清洁生产水平 Environmental management system certification is to be actively promoted and the whole process of production is to be managed according to the advanced environmental management model such as ISO14001 environmental management system, and the whole process of pollutant discharge and disposal is to be	企业积极的推行环境管理体系，并对污染物的管控采取全过程的方式，企业的清洁生产水平不断提高 The company actively implements the environmental management system and adopts the whole	符合 Compliant

d paper project with annual production of 2 mtpa	controlled to improve the level of clean production.	process of the control of pollutants. The clean production level of the company is continuously improved.	
	采取有效措施防止发生各种事故、制定好各种事故风险防范和应急措施，增强事故防范意识，在发生事故后应停产检修，待一切正常后再生产 Effective measures are to be taken to prevent various accidents and various accidental risk prevention and emergency measures are to be formulated to enhance the awareness of accident prevention. Production shall be suspended for maintenance in the event of an accident and shall not proceed until everything has been normal.	企业目前已经制定了较为完善的突发环境风险应急预案，并且在漳州市环保局完成了备案 The company now has formulated a relatively complete emergency plan for emergency environmental risks, and completed the filing in the Environmental Protection Bureau of Zhangzhou City	符合 Compliant
	加强对防护距离范围内的规划控制，禁止商业用房和居民住宅等敏感目标的建设，控制好厂界周围土地利用性质，尽快做好污水处理站卫生防护距离范围内沙坂村村民的搬迁安置工作 Planning & control within protection distance are to be enhanced and construction of sensitive targets such as commercial and residential buildings are to be prohibited. Nature of land use nature around battery limit of plant is to be properly controlled Rehabilitation and resettlement of villagers in Shaban Village within sanitation protection distance of sewage treatment stations are to be completed as soon as possible.	污水处理站100m范围内沙坂村村民的搬迁工作已完成 Rehabilitation works of villagers in Shaban Village within 100m from sewage treatment station have been completed	符合 Compliant
一期竣工验收要求 Acceptance requirements of Phas	进一步加强热电联产车间锅炉烟气除尘、脱硫系统、污水处理设施和在线监控设备的运行管理，确保废气、废水排放稳定达标，抓紧实施废水、废气设施升级改造，从而达到《制浆造纸工业水污染物排放标准》（DB35/1310-2013）及国家拟新颁布的火电大气污染物排放标准的要求。规范废纸堆场建设，并将堆场废水接入污水处理设施处理。 Operation management of flue gas dust removal & desulphurization system, sewage treatment facilities and on-line monitoring equipment in cogeneration workshop are to be further enhanced so as to ensure stable and up-to-standard discharge of waste gas and	废水、废气排放达标 Waste water and gas discharge are up to standard 废水排放可达到《制浆造纸工业水污染物排放标准》（DB35/1310-2013）。锅炉废气排放可满足《火电厂大气污染物排放标准》（GB13223-2011）。堆	基本符合 Substantially compliant

e I	water. Upgrade and retrofit of wastewater and waste gas facilities are to be implemented as soon as possible so as to fulfill the requirements in *Emission Standards for Water Pollutants in the Pulp and Paper Industry* (DB35/1310-2013) and requirements of air pollutants emission standards for thermal power plant to be promulgated in China. Construction of waste paper stockpiling yards is to be standardized and wastewater therefrom is to be directly drained into sewage treatment facilities for treatment.	场废水接入污水处理设施处理。 Wastewater discharge is up to *Emission Standards for Water Pollutants in the Pulp and Paper Industry* (DB35/1310-2013); Discharge of boiler waste gas is up to *Emission Standards for Air Pollutants in Thermal Power Plants* (GB13223-2011). Wastewater from stockpiling yards is drained into sewage treatment facilities for treatment.	
	项目应安装新鲜水进水、回用水及排放水流量计，进一步规范污水处理中控系统，把氧化沟污泥浓度、DO、新鲜水进水流量等参数接入中控，并能够保存一年的数据备查及绘制趋势线，进一步提高废水回用率，减少废水排放量，确保废水污染物排放浓度、排水量及污染物符合总量控制要求。 The project shall be installed with fresh water inflow, water return and drainage water flow meters to further standardize central control system of sewage treatment to which parameters such as oxidation ditch sludge concentration, DO, and fresh water inflow, etc. shall be connected and storage of one year’s data shall be made available for reference and development of trend curves. Reuse rate of wastewater shall be further improved and wastewater discharge be decreased so as to allow emission concentration of wastewater pollutants, drainage flow and pollutants to be in compliance with total amount control requirements.	项目已安装新鲜水进水、回用水及排放水流量计；进一步规范了污水处理中控系统，且把氧化沟污泥浓度、DO等参数接入中控，并能够保存一年的数据备查及绘制趋势线；最大限度的提高了废水回用率，减少废水的排放；且废水污染物排放浓度、排放量及排水量符合总量控制要求 The project has been installed with fresh water inlet, water return and drainage water flow meters; central control system of sewage treatment is further standardized to which parameters oxidation ditch sludge concentration and DO, etc. are connected with	基本符合 Substantially compliant

		one year's data stored for reference and development of trend curves. Reuse rate of wastewater is maximized and wastewater discharge is decreased. Emission concentration of wastewater pollutants, drainage flow and pollutants are all in compliance with total amount control requirements.	
	建设单位应进一步强化雨污分流改造及应急能力建设，不断完善应急管网和应急阀门，确保应急池科学规范建设并满足事故废水收集容量，事故废水得到全收集全处置。 Construction company shall further enhance separate rainwater and sewage drainage and building of emergency response capability and continuously refine emergency pipe network and valves. It shall ensure that emergency basin to be constructed in a scientific and standardized manner and fulfill emergency wastewater collection capacity, allowing all emergency wastewater to be completely collected and disposed of.	全厂已全部实施雨污分流，且完善了应急管网及应急阀门的建设，应急池满足事故废水收集容量，并制定了相应应急预案 Separate rainwater and sewage drainage has been completely implemented in whole plant and construction of emergency pipe network and valves are refined. Emergency basin fulfills emergency wastewater collection capacity with relevant contingency plan formulated.	基本符合 Substantially compliant
二期、三期竣工验收要求 Acceptance requ	企业要加强与台商投资区管委会的沟通，提请管委会按照环评审批时的承诺，于2015年6月份之前完成卫生防护距离范围内居民的搬迁安置工作 The company shall strengthen communication with the Taiwan Business Investment Zone Management Committee, and submit the management committee to complete the resettlement work of residents within the scope of health protection distance before June 2015 in accordance with the commitments during the EIA approval.	污水处理站100m范围内沙坂村村民的搬迁工作已完成 Rehabilitation works of villagers in Shaban Village within 100m from sewage treatment station have been completed	符合 Compliant

irements of Phase I and II	台商投资区管委会应抓紧建设至角美排污预留区进行深海排放专用管道，企业同步配合完成管道对接工作 Taiwan Business Investment Zone Management Committee shall pay close attention to construct dedicated deep sea marine discharge pipes to the reserved area for sewage discharge in Jiaomei Town and the company shall coordinate to complete pipe connection work therefor	台商投资区管委会正在组织实施排海管道的建设，待建设完成后厂内污水处理站出水统一纳入角美污水处理厂的尾水排海管道 Taiwan Business Investment Zone Management Committee is organizing the implementation of the marine discharge pipes. Once they are completed, effluent from sewage from sewage treatment station in the plant will be uniformed incorporated into the tailings marine discharge pipes in Jiaomei Sewage Treatment Plant.	/
	建设单位应进一步加强热电联产车间锅炉烟气的除尘、脱硫系统运行管理，按照最新工作要求，切断脱硫烟气旁路 The construction company shall further enhance operation management of dust removal and desulphurization system for boiler flue gas in cogeneration workshop and cut off desulphurization flue gas bypass in accordance with latest working requirements.	建设单位已按照要求进一步加强除尘、脱硫系统运行管理，并已落实切断脱硫烟气旁路 The construction company has further enhanced operation management of dust removal and desulphurization system and surely cut off desulphurization flue gas bypass.	符合 Compliant
	进一步完善雨污分流系统，规范做好新鲜水量、废水排放量、污水处理设施加药台账记录；规范厂区制浆过程产生的废塑料等工业固废的储存对方及处理处置 Separate rainwater and sewage drainage system is to be further perfected. Accounting and recording of fresh water flow, wastewater discharge and chemical dosing of sewage treatment facilities are to be	完善了雨污分流系统，规范做好新鲜水量、废水排放量、污水处理设施加药台账记录；规范了厂区制浆过程产生的废塑料等工业固废的储存对方及处理处置 Separate rainwater and	符合 Compliant

	standardized and properly done. Storage, stockpiling and disposal of waste plastics and other industrial solid wastes generated in the course of pulping in plant area are to be standardized.	sewage drainage system is further perfected. Accounting and recording of fresh water flow, wastewater discharge and chemical dosing of sewage treatment facilities are standardized and properly done. Storage, stockpiling and disposal of waste plastics and other industrial solid wastes generated in the course of pulping in plant area are standardized.	
	进一步对高噪声设备采取减振、隔声、降噪等措施、优化物流安排，加强管理，控制运输车辆的交通噪声，确保厂界噪声达标排放 Measures such as vibration reduction, sound insulation and noise reduction are to be further adopted for high-noise equipment; logistics arrangements is to be optimized and management is to be strengthened to control traffic noise of transportation vehicles and ensure up-to-standard noise emission at battery limit.	对高噪声设备采取减振、隔声、降噪等措施、优化物流安排，加强管理，控制运输车辆的交通噪声，且厂界噪声达标排放 Measures such as vibration reduction, sound insulation and noise reduction are adopted for high-noise equipment; logistics arrangements is optimized and management is strengthened. Traffic noise of transportation vehicles is controlled up-to-standard noise emission at battery limit is ensured.	符合 Compliant
	及时清洁道路及车辆，加强物料装卸及运输过程扬尘的控制，减少粉尘的排放 Roads and vehicles are to be cleaned on a timely basis. Dust control during material handling and transportation is to be enhanced and dust emissions are	建设单位通过及时清洁道路，加强物料装卸及运输过程扬尘的控制等措施减少粉尘的排放。 The construction	符合 Compliant

	to be reduced	company reduces dust emissions by means of cleaning roads and vehicles on a timely basis and enhancing dust control during material handling and transportation.	
	建设单位应继续加强生产运行的环保管理，加强环保设施的运行维护，确保各项污染物稳定达标排放，落实环境风险防范措施，杜绝环境事故的发生 The construction company shall continue to strengthen the environmental management of production and operation, strengthen the operation and maintenance of environmental protection facilities, ensure the stable discharge of various pollutants, implement environmental risk prevention measures, and prevent environmental accidents.	已完成《联盛纸业（龙海）有限公司突发性环境事件应急预案》，并于2016年12月01日于漳州台商投资区环境保护和安全生产监督管理局备案 *Contingency plan for sudden environmental incidents of Liansheng Paper Industry (Longhai) Co., Ltd* has been completed and submitted to Administration of Environmental Protection & Work Safety of Zhangzhou Taiwanese Investment Zone on December 1, 2016 for filing.	符合 Compliant
	按照我局下达的安排，于2015年7月25日前完成清洁生产审核 Review of clean production is to be completed prior to July 25, 2015 as per arrangements issued by us	建设单位于2016年11月10日取得漳州市环境保护局和漳州市经济和信息化委员会《关于联盛纸业（龙海）有限公司清洁生产审核的验收意见》（漳环保防[2016]51号） The construction company obtained *Acceptance Comments on Review of Clean Production of f Liansheng Paper*	符合 Compliant

		Industry (Longhai) Co., Ltd on November 10, 2016.	
	加强处理设施的管理，委托有资质的单位定期对项目排放的废水、废气、噪声、现有排污口附近九龙江北港地表水环境进行跟踪监测，发现问题及时采取措施。做好项目新鲜水进水流量计、废水出水流量计、在线监控数据的记录、保证废水污染物排放浓度及排放总量均能控制在总量要求的范围内 Management of treatment facilities is to be strengthened, and qualified entities are to be commissioned to regularly track and monitor wastewater, waste gas, noise and surface water environment at North Port of Jiulong River near the existing sewage outlets. Measures are to be taken on a timely basis in case of any problem discovered. Fresh water inflow meter, wastewater effluent flow meter and on-line monitoring data are to be properly recorded. Discharge concentration and total discharge of wastewater pollutants are to be controlled within the range of total amount requirement	加强处理设施的管理，且定期委托有资质的单位对项目排放的废水、废气、噪声、现有排污口附近九龙江北港地表水环境进行监测。项目新鲜水进水流量计、废水出水流量计、在线监控数据的记录、保证废水污染物排放浓度及排放总量均控制在总量要求的范围内 Management of treatment facilities is strengthened and qualified entities are commissioned to regularly monitor wastewater, waste gas, noise and surface water environment at North Port of Jiulong River near the existing sewage outlets. Fresh water inflow meter, wastewater effluent flow meter and on-line monitoring data are properly recorded. Discharge concentration and total discharge of wastewater pollutants are controlled within the range of total amount requirement	符合 Com pliant
	建立畅通的公众参与平台，及时解决公众提出的环境问题，满足公众合理的环境保护要求，切实维护人民群众的根本利益，创造和谐稳定的社会环境 A smooth public participation platform is to be established so as to timely solve environmental	已落实 Implemented	符合 Com pliant

	problems raised by the public. The public's reasonable environmental protection requirements are to be met and fundamental interests of the people are to be earnestly safeguarded so as to create a harmonious and stable social environment.		

根据上述表格分析，目前项目存在的与环评及相关批复要求不符合之处主要有为角美排污预留区进行深海排放的专用管道还未建成。

According to the analysis of the above table, currently major incompliances of the project with EIA and relevant approval requirements is the dedicated deep sea marine discharge pipes to the reserved area yet to be completed .

企业已经就上述工作与园区管委会进行了深入沟通，根据漳州台商投资区管理委员会的建设规划，角美污水处理厂的排海管道建设正在进行之中。

The company has already conducted in-depth communication with the park management committee on the above work. According to the construction plan of the Zhangzhou Taiwanese Investment Zone Management Committee, the construction of the drainage pipeline of Jiaomei Wastewater Treatment Plant is underway.

2.6 现有工程存在的主要环境问题及解决方案

2.6 Major Environmental Issues and Solutions in Existing Project

根据现有工程的环境监测数据，现有工程排放的各项污染物均已得到有效的控制和治理，且满足相应的排放标准，排污口已进行规范化设置。

According to the environmental monitoring data of the existing projects, all pollutants discharged from the existing projects have been effectively controlled and treated, and the corresponding emission standards have been met, and the sewage outlets have been standardized.

同时，2017 年 11 月起，联盛纸业（龙海）有限公司为了减少污水处理站产生的恶臭气体对环境和周围居民的影响，特委托广西博世科环保科技股份有限公司对除臭系统进行方案设计，并于 2018 年 6 月完成了除臭系统施工改造。

Also since November 2017, Liansheng Paper (Longhai) Co., Ltd. has commissioned Guangxi Boschke Environmental Protection Technology Co., Ltd. to design schemes and carry out construction and retrofit of deodorization system, in order to reduce the impact of the odorous gas generated by the sewage treatment station on the environment and surrounding residents, which construction and retrofit were completed in June 2018

改造完成后，每个臭气源构筑物产生的臭气加盖密封，然后通过收集臭气收集系统集中送入生物除臭塔，臭气在生物除臭塔内进行吸收、分解、氧化等反应，使臭气中的氨、硫化氢等恶臭污染物质有效分解，处理后的气体送入排放烟囱达标排放。

Upon completion of the retrofit, the odor generated by each odor source structure is sealed and sealed, and then collected into the biological deodorization tower through the collection odor collection system, and the odor is absorbed, decomposed, oxidized, etc. in the biological deodorization tower. The odorous pollutants such as ammonia and hydrogen sulfide in the odor are effectively decomposed, and the treated gas is sent to the discharge chimney for discharge.

高效上流式生物除臭是利用微生物对恶臭物质的吸附、吸收和降解功能，对臭气进行处理的一种工艺。高效上流式生物除臭塔结合了好氧活性污泥及生物膜系统，利用曝气池活性污泥液具有较高的碱度及pH，同时具有良好的吸附性能，能经济有效生物地吸附、中和废气中的硫化氢及甲硫醇酸性气体；活性污泥喷淋下来后，与空气进行有效的接触，能够大量溶氧，同时完成对吸附下来有机污染物的沿程生物降解，未完全降解的有机污染物，会随着喷淋下来的活性污泥流回曝气池继续进行生物降解，最终变成无害化的CO_2和H_2O。

High-efficiency upflow biological deodorization is a process of treating odor by utilizing the function of adsorption, absorption and degradation of odorous substances by microorganisms. The high-efficiency upflow biological deodorization tower combines aerobic activated sludge and biofilm system. The activated sludge activated sludge has high alkalinity and pH, and has good adsorption performance, which can be economically and efficiently biosorbed. Neutralizes the hydrogen sulfide and methyl mercaptan acid gas in the exhaust gas; after the activated sludge is sprayed, it can effectively contact with the air, and can dissolve a large amount of oxygen, and at the same time complete the biodegradation of the adsorbed organic pollutants.

Organic pollutants which are not completely degraded will continue to biodegrade as the sprayed activated sludge flows back to the aeration tank, eventually becoming harmless CO2 and H2O.

同时将喷淋液经过生物除臭塔内的填料层，通过挂膜，使其表面形成一定厚度的生物膜，把具有脱臭能力的各种优势菌群固定。含臭气体自下向上通过填料空间，恶臭成分被截留并分解；对NH_3、H_2S等恶臭成份的去除率稳定高效，保证设备出气口达到《恶臭污染物排放标准》（GB14554-1993）排放标准。

Also the spray liquid passes through the filler layer in the biological deodorization tower, and the membrane is formed to form a biofilm with a certain thickness on the surface, and various dominant bacteria groups having deodorizing ability are fixed. The odorous gas passes through the packing space from bottom to top, and the malodorous components are trapped and decomposed; the removal rate of odorous components such as NH3 and H2S is stable and efficient, and the outlet of the equipment is guaranteed to meet the emission standards in *Emission Standards for Odor Pollutants* (GB14554-1993).

综上，不存在超标排放等的环境问题。

To sum up, there is no environmental issue such as excessive emissions.

3 拟建工程概况及工程分析

3 General Description and Engineering Analysis of Proposed Project

3.1 项目概况

3.1 Project Overview

3.1.1 基本情况

3.1.1 General Description

（1）项目名称

(1) Project name

联盛纸业（龙海）有限公司年产 60 万吨高档箱板纸工程

High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 0.6 mtpa

（2）建设单位

(2) Construction company

联盛纸业（龙海）有限公司

Liansheng Paper Industry (Longhai) Co., Ltd

（3）建设性质

(3) Construction type

扩建

Expansion

（4）建设地点及占地面积

(4) Construction site and land occupation

本项目厂址在联盛纸业（龙海）有限公司现有预留场地，项目总用地面积 105.67 亩，总建筑面积 78107m^2。

Plant site of this project is located in existing reserved space of Liansheng Paper Industry (Longhai) Co., Ltd. The project has a total land-use area of 105.67 mu (1 mu=666.67m2) and total building area of 78,107m2.

拟建项目地理位置详见图 2.1-1。

Geographic location of proposed project is detailed in Figure 2.1-1.

（5）建设规模及产品方案

(5) Construction scale and product scheme

建设一条年产 60 万吨高档箱板纸生产线（PM10）

A high-grade cardboard paper production (PM10) line with annual production of 0.6 mtpa is to be constructed

（6）劳动定员及工作制度

(6) Staffing and working system

全年生产天数为 330 天，全天生产 24h；本项目劳动定员 257 人，其中工人 172 人，工程技术、管理和销售人员共计 85 人。

The annual production days are 330 days and the whole day is 24 hours. The project is staffed with 257 employees, including 172 workers, and 85 engineering, management and sales personnel.

（7）总投资

(7) Total investment

该项目总投资 158667 万元，其中建设投资 141622 万元，建设期利息 4268 万元，铺底流动资金 42590 万元。

The project has a total investment of RMB 158.67 million, including construction investment of RMB 141.22 million, interest in construction period of RMB 42.68 million, and initial working capital of RMB 425.9 million.

3.1.2 项目组成

3.1.2 Project Components

项目组成情况详见表 3.1-1。

Project components are detailed in Table 3.1-1.

表 3.1-1 项目组成情况一览表

Table 3.1-1 Schedule of Project Components

类别 Category	工程名称 Project name	内容及规模 Contents and scale
主体工程 Principal works	制浆车间 Pulping workshop	OCC处理线，处理能力为：1850t/d OCC processing line with processing capacity of 1850t/d NUPK处理线，处理能力为：400t/d NUPK processing line with processing capacity of 400t/d
	造纸车间 Papermaking workshop	造纸完成车间，年产60万吨高档箱板纸，定量范围：130～230g/m^2，纸机最大工作车速为1100m/min，成纸幅宽8660mm The papermaking workshop has an annual output of 600,000 tons of high-grade cardboard paper with quantitative range of 130-230g/m2. The maximum working speed of the paper machine is 1100m/min and width of finished paper is 8660mm.
公用工程 Utility Works	给水净化站 Water treatment station	依托厂内现有给水处理车间（规模79200t/d），给水水源由角美工业区附近九龙江北溪左高干渠及九龙江北溪左低干渠引水联合提供； Based on the existing water treatment workshop (sized 79,200t/d) in the plant, the water supply is jointly sourced from left high nd low trunk canal at North Creek of Jiulong River in the vicinity of Jiamei Industrial Zone; 同时，拟建工程拟增加一组处理能力为26400t/d的给水处理设施。 Also proposed project is proposed to be added with a bank of water treatment facilities with treatment capacity of 26,400t/d.
	污水处理站 Sewage Treatment Station	依托厂内现有污水处理站 Based on existing sewage treatment station in plant
	供汽 Steam supply	依托现有工程的动力车间 Based on powerhouse of existing project
	供电 Power supply	市政供电 Municipal power supply
储运工程 Storage & transportation works	仓库 Warehouses	成品仓库、辅料制备仓库、综合仓库各一处 Finished product warehouse, auxiliary material preparation warehouse and comprehensive warehouse each
	厂内运输 In-plant transportation	厂区内物流输运道路 Logistics & transportation road in plant area
	厂外运输 Off-plant transportation	利用324国道和沈海高速 By means of No. 324 National Highway and Shenyang-Haikou Expressway

类别 Category	工程名称 Project name	内容及规模 Contents and scale
储运工程 Storage & transportation works	废水 Wastewater	依托现有工程的污水处理站，纸浆造纸车间废水、生活污水经管道排入厂内现有污水处理站处理达标后排放 Relying on the sewage treatment station of the existing project, the waste water and domestic sewage of the pulp and papermaking workshop are discharged into the existing sewage treatment station in the plant through the pipeline to discharge the standard.
	噪声 Noise	合理布局、基础减振、厂房隔音等措施 Measures such as reasonable layout, foundation vibration reduction, sound insulation in powerhouse and the like
	固体废物 Solid waste	制浆造纸车间产生的浆渣、污水处理站产生的污泥送漳州市益盛环保能源有限公司垃圾发电工程燃烧处置 Pulp residue produced by pulping and papermaking workshop and sludge generated from sewage treatment station are delivered to boiler for combustion. 制浆造纸车间产生的铁丝、塑料等经收集后进入联盛纸业的年处理55万吨造纸废渣厂区进行清洗、筛分后铁丝出售给物资回收部门 After collecting the wires and plastics generated by pulping and papermaking workshop, they will be delivered to the Liansheng Paper's annual processing of 550,000 tons of papermaking waste slag plant area for cleaning and screening with wires sold to the material recycling department. 制浆造纸车间产生的砂石、污泥等，给水处理站产生的污泥，生活垃圾委托环卫部门清运处理 Sandstone, sludge and the like produced by pulping and papermaking workshop, sludge produced by water treatment station and domestic waste are commissioned to environmental protection authorities to clean and dispose of 生产车间产生的废润滑油委托有资质单位回收处置 Wate lube oil produced by production workshop is recycled by qualified entity for disposal

3.1.3 主要技术经济指标

3.1.3 Major economic and technical indicators

项目主要技术经济指标详见表 3.1-2。

Major economic and technical indicators of the project are detailed in Table 3.1-2.

表 3.1-2 拟建工程主要技术经济指标

Table 3.1-2 Major Economic and Technical Indicators of Proposed Project

序号 Seq no.	指　　标 Index	单　位 Unit	数　量 Qty.	备　　注 Remarks
1	产品及其规模 Product and scale	--	--	--
1.1	高档箱板纸 High-grade cardboard paper	t/a	600000	--
2	总投资 Total investment	万元 in RMB ten thousand	158667	--
2.1	建设投资 Construction investment	万元 in RMB ten thousand	141622	
2.2	流动资金 Working capital	万元 in RMB ten thousand	42590	--
3	投资指标 Investment indexes			--
3.1	单位产品的建设投资及利息 Construction investment and interests per unit product	元/t RMB/t	2432	--
3.2	百元销售收入占用流动资金 Working capital used by sales income per RMB hundred	元 RMB	16	
4	本项目劳动定员 Staffing of this project	人 Persons	257	工人172人，工程技术、管理和销售人员共计85人 172 workers and 85 engineering, management and sales personnel.
5	全年生产天数 Annual production days	d	330	
6	年销售收入 Annual sales income	万元 in RMB ten thousand	260330	--
7	利润总额 Total profit	万元 in RMB ten thousand	31292	--

序号 Seq no.	指　　标 Index	单　位 Unit	数　量 Qty.	备　　注 Remarks
8	增值税 VAT	万元 in RMB ten thousand	10087	--
9	项目投资回收期（税前） Project investment payback period (before tax)	年 Year	6.46	包括建设期2年 Including 2 years of construction period

3.1.4 总平面布置

3.1.4 General Plan Layout

总平面布置包括的内容有：PM10 湿式造纸联合厂房（包括上料工段、碎浆工段、制浆工段、造纸工段）、PM10 中间仓库、PM10 辅料仓库、PM10 成品仓库等。原料场考虑利用原有原料堆场。

General plan layout consists of, among others, PM10 wet papermaking combined workshop (including feeding, pulp breaking, pulping and papermaking section), PM10 intermediate warehouse, PM10 auxiliary material warehouse and PM10 finished product warehouse. Original raw material stockpiling yard is considered to serve as raw material yard.

（1）总平面布置的基本原则

(1) Basic principles for general plan layout

满足生产工艺流程和物料搬运的要求，使原材料、成品的物流路线短捷顺畅。将生产联系密切、加工工艺过程连续的车间，以及为主车间服务的仓库和辅助建筑物组成单层或多层联合厂房，以减少占地面积，缩短物流运送距离，方便生产管理。

Requirements of production process and material handling are to be met so as to shorten and smoothen the logistics route of raw materials and finished products. The workshops with close production and continuous processing technology, as well as the warehouses and auxiliary buildings serving the main workshops are to form in a single-storey or multi-storey combined factory so as to reduce land occupation, shorten the logistics transportation distance and facilitate the production management.

尽量做到分区明确，人货分流，运输通畅。满足安全、防火等规范要求，体现可持续发展和以人为本的设计原则。

Best efforts are to be made to allow for clear zoning, separate personnel and cargo transport and smooth transportation. Safety and fire protection requirements are to be met to reflect sustainable development and people-oriented design principles.

厂区道路采用混凝土路面，采用主干道、次干道、支路三级布置。主干道 12 米，次干道 9 米、7 米，支路 4 米。厂区内的每幢建筑物四周均设有环行消防车道。绿化布置采用点、线、面方式，充分利用不宜建筑的边角隙地，对不规则用地进行规则化处理，取得别开生面的环境美化效果，重点在生产厂房的主要入口处，做到绿化层次分明。主要道路两侧利用乔木、灌木及草本植物组成绿带，充分发挥绿化对道路及道路两侧建筑的遮荫、美化等方面的作用。管线用地上考虑种植乔、灌木，但应满足有关间距要求，在不能种植树木的地方，铺设草坪，种植花卉。使整个厂区构成一个优美的空间环境。

The roads in the plant area are to be made of concrete pavement, and the main roads, secondary trunk roads and branch roads are to be arranged in three levels. Main roads, secondary trunk roads and branch roads are to be 12m, 9m and 4m in length respectively. Each building in the plant is to be provided with a circular fire lane therearound. Greening layout shall be arranged in points, lines and planes, making full use of corners and edges unsuitable for building construction. Irregular land use shall be regularized to achieve a unique environmental beautification effect with focus on main entrance of the production plant so as to allow for distinct greening levels. Trees, shrubs and herbaceous plants shall be used to form green belts on both sides of main roads, giving full play to the role of greening in the shading and beautification of roads and buildings on both sides thereof. Plantation of arbors and shrubs shall be considered on the pipeline land, provided however that the spacing requirements shall be met. In places unavailable for plantation of trees, lawns shall be laid and flowers be planted, so that the entire plant area constitutes a beautiful space environment.

选择价廉、易活、速生的树种为主，以取得较高的经济效益，达到调节气温和湿度、吸收有害气体、净化空气和减弱噪声影响等目的。

Low-cost, easy-to-live, fast-growing tree species shall be selected so as to achieve high economic benefits and such objectives as temperature and humidity regulation, absorption of harmful gases, air purification and reduction of noise impacts.

（2）总平面布置的主要参数

(2) Main parameters of general plan layout

总平面布置主要参数见下表 3.1-3。

Main parameters of general plan layout are as shown in Table 3.1-3.

表 3.1-3 拟建项目总平面布置主要参数

Table 3.1-3 Main Parameters of General Plan Layout for Proposed Project

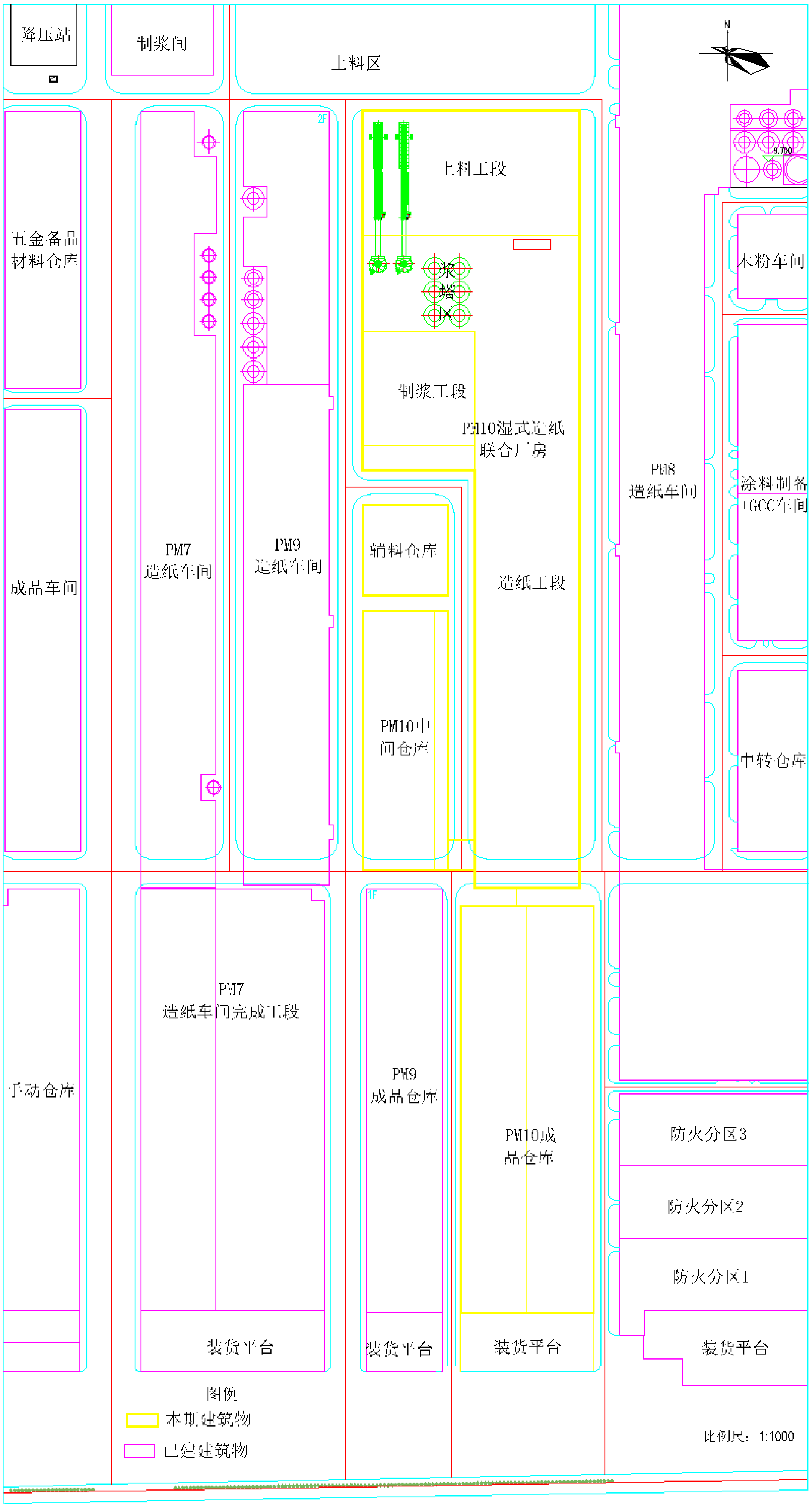
序号 Seq no.	指标名称 Designation	单位 Unit	数量 Qty.	备注 Remarks
1	项目总用地面积 Total land-use area of project	m2	98570（约148亩） 98570 (around 148 mu)	70450（约105.67亩） 70,450 (around 105.67 mu)
2	总建筑面积 Total floor area	m2	419710	拟建项目78104 Proposed project 78104
3	建(构)筑物占地面积 Land occupation of buildings (structures)	m2	339626	拟建项目44697 Proposed project 44,697
4	堆场占地面积 Land occupation of stockpiling yards	m2	132795	
5	道路及广场占地面积 Land occupation of roads and squares	m2	158000	
6	建筑系数 Building coefficient	%	41	
7	场地利用系数 Site utilization factor	%	81.7	
8	容积率 Plot ratio		0.806	
9	绿地率 Green space ratio	%	17.8	

厂区平面布置见图 2.1-3。拟建项目的详细平面布置图见图 3.1-1，拟建项目位于厂区位置示意图见图 3.1-2。

Plan layout of plant area is as shown in Figure 2.1-3. Detailed plan layout of plant area for proposed project is as shown in Figure 3.1-1. Schematic location map of proposed project in plant area is as shown in Figure 3.1-2.

拟建项目所在厂区现状情况见图 3.1-3。

Current conditions of plant area at the locality of proposed project are as shown in Figure 3.1-3.


降压站
制浆间
上料区
上料工段
五金备品
材料仓库
浆
塔
区
木粉车间
制浆工段
PM10湿式造纸
联合厂房
PM8
造纸车间
涂料制备
GCC车间
PM7
造纸车间
PM9
造纸车间
辅料仓库
成品车间
造纸工段
PM10中
间仓库
中转仓库
PM7
造纸车间完成工段
手动仓库
PM9
成品仓库
PM10成
品仓库
防火分区3
防火分区2
防火分区1
装货平台
装货平台
装货平台
装货平台
图例
本期建筑物
已建建筑物
比例尺：1:1000

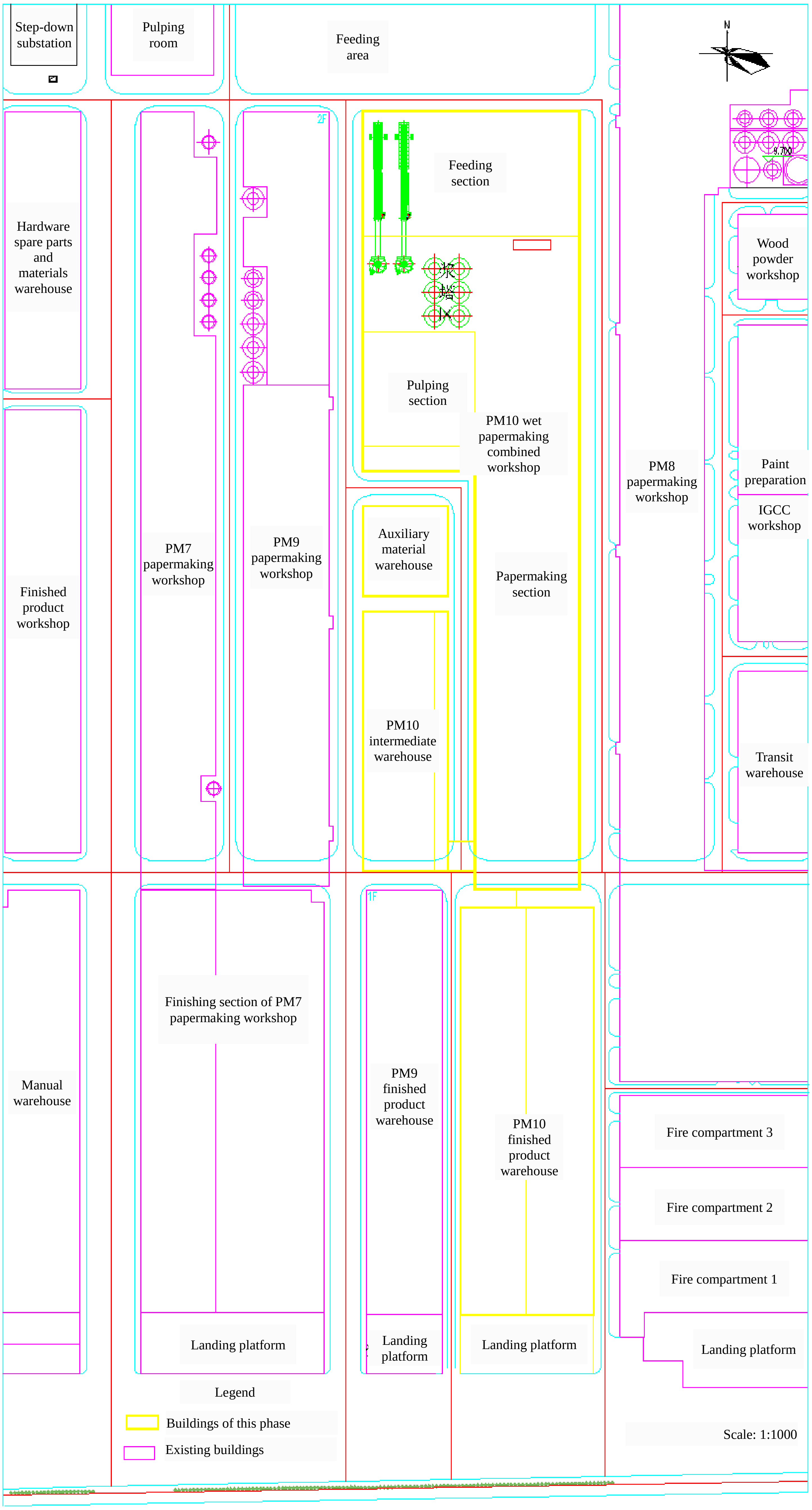

Step-down substation
Pulping room
Feeding area
N
Hardware spare parts and materials warehouse
Feeding section
Wood powder workshop
Pulping section
PM10 wet papermaking combined workshop
PM8 papermaking workshop
Paint preparation
IGCC workshop
PM7 papermaking workshop
PM9 papermaking workshop
Auxiliary material warehouse
Papermaking section
Finished product workshop
PM10 intermediate warehouse
Transit warehouse
Finishing section of PM7 papermaking workshop
Manual warehouse
PM9 finished product warehouse
PM10 finished product warehouse
Fire compartment 3
Fire compartment 2
Fire compartment 1
Landing platform
Landing platform
Landing platform
Landing platform
Legend
Buildings of this phase
Existing buildings
Scale: 1:1000

图 3.1-1　拟建项目平面布置图

Figure 3.1-1 Plan Layout of Proposed Project

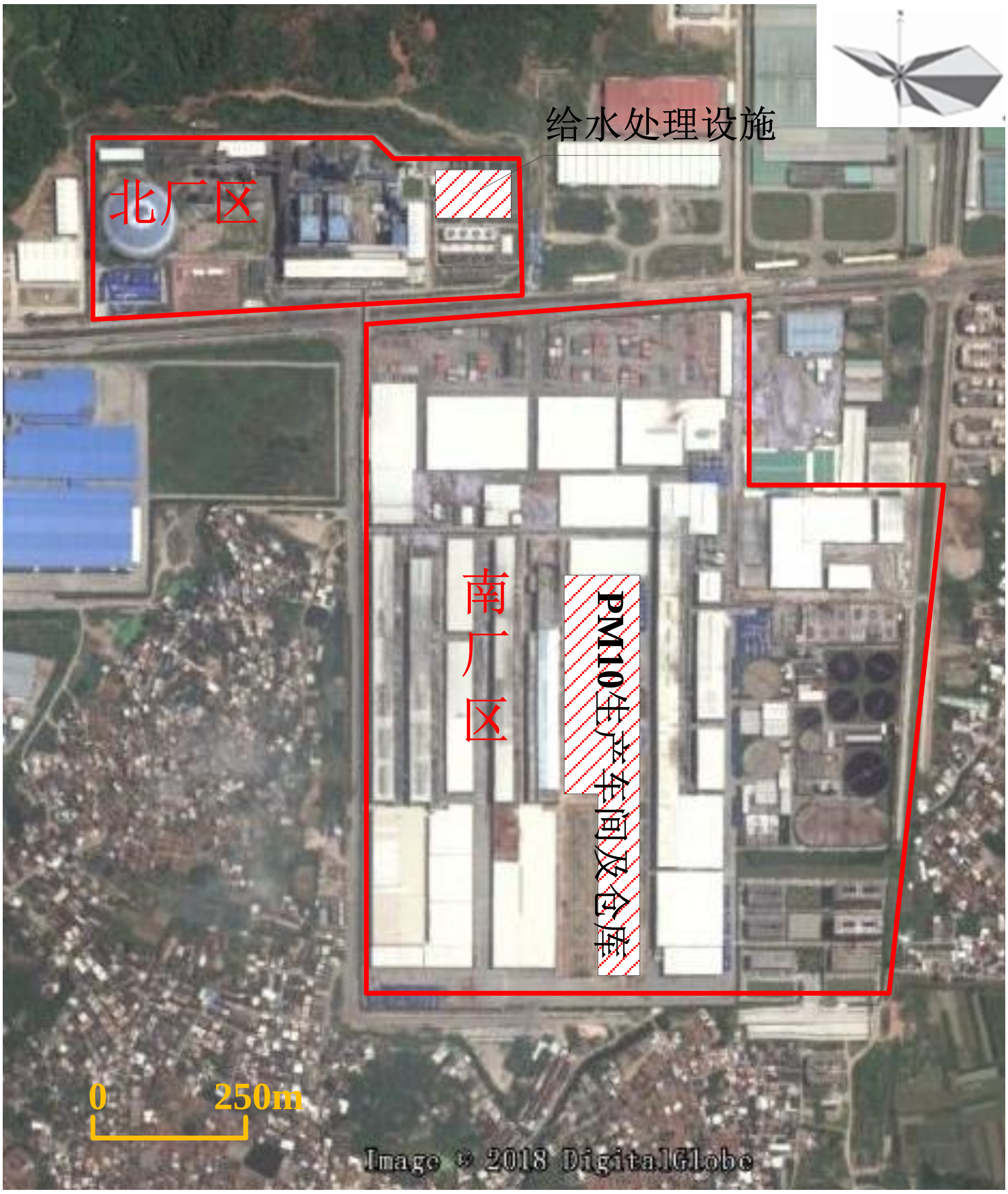

给水处理设施
北厂区
南厂区
PM10生产车间及仓库
0
250m
Image © 2018 DigitalGlobe

图3.1-2　拟建项目位于厂区位置示意图

Figure 3.1-2 Schematic Location Map of Proposed Project in Plant Area

图 3.1-3　拟建项目所在厂区现状图

Figure 3.1-3 Current Conditions of Plant Area at the Locality of Proposed Project

3.1.5 主要原辅材料及能源消耗

3.1.5 Major raw and auxiliary materials and energy consumption

3.1.5.1 主要原辅材料消耗

3.1.5.1 Major raw and auxiliary materials consumption

（1）主要原辅材料消耗情况

(1) Major raw and auxiliary materials consumption condition

拟建工程主要原辅材料详见表 3.1-4。拟建项目完成后，全厂主要原辅材料的使用量情况见表 3.1-4。

Major raw and auxiliary materials of proposed project are detailed in-. Consumption of major raw and auxiliary materials throughout the plant upon completion of the project is as shown in-.

表 3.1-4 主要原辅材料消耗情况一览表

Table 3.1-4 Schedule of Major Raw and Auxiliary Materials Consumption Condition

序号 Seq no.	项目 Item	单耗 Single consumption		年消耗 Annual consumption		备注 Remarks
		单位 Unit	数量 Qty.	单位 Unit	数量 Qty.	
1	NUPK（废纸） NUPK (waste paper)	t/t	0.100	t/a	60000	外购，风干 Outsourced, air dried
2	AOCC（进口） AOCC (imported)	t/t	1.06	t/a	508240	得率85% Yield: 85%
	OCC（国内） OCC (domestic)			t/a	127060	
3	AKD	t/t	0.012	t/a	7200	外购 Outsourced
4	硫酸铝 Aluminum sulfate	t/t	0.036	t/a	21600	外购 Outsourced
5	阳离子淀粉 Cationic starch	t/t	0.02	t/a	12000	外购 Outsourced
6	助留剂 Glidant	kg/t	1.2	t/a	720	外购 Outsourced
7	聚酯网	t/t	0.02	t/a	12000	外购

	Polyester fourdrinier					Outsourced
8	毛布 Coarse cotton cloth	t/t	0.03	t/a	18	外购 Outsourced
9	干网 Dry fourdrinier	t/t	0.022	t/a	13200	外购 Outsourced
10	打包带 Packing strip	t/t	0.002	t/a	1200	外购 Outsourced
11	水 Water	m^3/t	8	万m^3/a ten thousand m^3/a	480	/
12	电 Power	kwh/t	500	万kwh/ a ten thousand kWh/a	3.0×10^8	/
13	汽 Steam	t/t	1.8	万t/a	109.296	/

表 3.1-5　主要原辅理化性质一览表

Table 3.1-5 Schedule of Physical and Chemical Properties of Major Raw and Auxiliary Materials

序号 Seq no.	项目 Item	分子式分子量 Molecular formula and molecular weight	理化性质 Physical and chemical properties	燃烧爆炸性 Flammability and explosibility	毒理特性 Toxicological characteristics
1	AKD	无 None	一种不饱和内酯，产品是不溶于水的蜡状固体，熔点为51～52℃左右。用于造纸施胶剂的AKD必须制成乳液，其产品的颗粒粒径约为0.5～2μm，乳液呈白色，且极易水解 An unsaturated lactone, of which the product is a waxy solid insoluble in water with a melting point of about 51-52 ℃. The AKD used in the paper sizing agent must be made into an emulsion. The product has a particle size of about 0.5-2 μm, of which the emulsion is white and is easily	非易燃易爆物品 Nonflammable and noncombustible articles	基本无毒 Substantially nontoxic

			hydrolyzed.		
2	硫酸铝 Aluminum sulfate	$Al_2(SO_4)_3$	白色晶体，有甜味；熔点(℃)770(分解)；相对密度(水=1)2.71 White crystal, sweet; melting point (℃) 770 (decomposition); relative density (water = 1) 2.71	非易燃物质 Nonflammable substance	急性毒性：LD 50：980±90mg/kg(小鼠经口) Acute toxicity: LD 50: 980±90mg/kg (mouse oral)
3	阳离子淀粉 Cationic starch	（$C_6H_{10}O_5$）$_n$ $(C_6H_{10}O_5)_n$	淀粉是葡萄糖的高聚体，水解到二糖阶段为麦芽糖，完全水解后得到葡萄糖；阳离子淀粉是在淀粉大分子中引入叔氨基或季铵基，赋予淀粉阳离子特性 Starch is a high polymer of glucose, which is hydrolyzed to the disaccharide stage and is maltose, which is completely hydrolyzed to obtain glucose. Cationic starch is a tertiary amino group or a quaternary ammonium group introduced into the starch macromolecule to impart starch cation characteristics.	可燃 Flammable	无毒 Nontoxic

表 3.1-6 全厂主要原辅材料的使用量一览表

Table 3.1-6 Schedule of Consumption of Major and Auxiliary Materials throughout the Plant

序号 Seq no.	单位 Unit	项目 Item	PM5	PM6	PM7	PM8	PM9	PM10	合计 Total
1	t/a	UKP浆板 UKP pulp board	60525	/	/		60525	/	121050
2	t/a	LBKP浆板 LBKP pulp board	/	/	/	50600	/	/	50600
3	t/a	进口OCC废纸 Imported OCC waste paper	327105	291655	/	214960	327105	508240	1960720
4	t/a	国产OCC废纸 Domestic OCC waste paper	147285	124985	192500	92120	147285	127060	831235
5	t/a	ONP废纸 ONP waste paper	/	/	43750	86320	/	/	130070
6	t/a	NUPK（废纸） NUPK (waste paper)	/	/	/	/	/	60000	60000
7	t/a	木片 Wood chips	/	/	42000	/	/	/	42000
8	t/a	硫酸铝	4500	3500	3500	4000	4500	21600	41600

		Aluminum sulfate							
9	t/a	淀粉 Starch	16470	15330	3500	9960	16470	12000	73730
10	t/a	氢氧 Sodium 化钠 hydrate	450	350	350	1800	450	0	3400
11	t/a	过氧 Hydrogen 化氢 peroxide	/	/	/	3600	/	/	3600
12	m^2/a	聚酯网 Polyester fourdrinier	4500	3500	3500	4000	4500	12000	32000
13	t/a	毛布 Coarse cotton cloth	4.5	3.5	3.5	4	4.5	18	38
14	万m^3/a ten thousand m^3/a	水 Water	309.5	280	280	540	309.5	558.492	2277.492
15	万kwh/ a ten thousand kWh/a	电 Power	23512.5	14962.5	14962.5	25460	23512.5	28800	131210

16	万t/a ten thousand t/a	汽 Steam	73.44	53.04	38.35	117.50	70.18	109.296	461.806

1.1.1.1

3.1.5.2 主要能源消耗

3.1.5.2 Major energy consumption

拟建工程所需的蒸汽依托厂内动力车间现有 2 台 410t/h 循环流化床锅炉；生产用水依托厂内给水处理车间；用电由市政供电电网提供。

The steam required for the proposed project is sourced from two 410t/h CFB boilers in the power plant of the plant; the production water is sourced from the water supply treatment plant in the plant; power is supplied by the municipal power supply grid.

拟建项目主要能源消耗情况见表 3.1-7

Major energy consumption condition of proposed project is as shown in -

表 3.1-7 拟建项目主要能源消耗情况一览表

Table 3.1-7 Schedule of Major Energy Consumption Condition of Proposed Project

序号 Seq no.	项目 Item	单耗 Single consumption		年消耗 Annual consumption	
		单位 Unit	数量 Qty.	单位 Unit	数量 Qty.
1	水 Water	t/t	8	万m^3/a ten thousand m^3/a	480
2	电 Power	KWh/t	480	MWh/a	288000
3	汽 Steam	t/t	1.8	t/a	1092960

3.1.6 主要设备

3.1.6 Major Equipment

拟建工程主要设备情况详见表 3.1-8。

Conditions of major equipment in proposed project are detailed in Table 3.1-8.

表 3.1-8 拟建项目主要设备清单

Table 3.1-8 Major Equipment List of Proposed Project

序号 Seq no.	设备名称 Designation	单位 Unit	数量 Qty.	备注 Remarks
制浆车间 Pulping workshop				

序号 Seq no.	设备名称 Designation	单位 Unit	数量 Qty.	备注 Remarks
一 1	NUPK生产线 NUPK production line			
1	链板输送机 Chain conveyor	台 Set	1	
2	立式碎浆机 Vertical pulper	台 Set	1	
3	高浓除砂器 High concentration desander	台 Set	1	
4	磨浆机 Pulp refiner	台 Set	1	
二 2	OCC生产线 OCC production line			
1	链板输送机 Chain conveyor	台 Set	2	
2	碎浆机 Pulper	台 Set	2	
3	高浓除渣器 High concentration desander	套 Set	1	
4	粗选筛 Rough sieve	套 Set	1	
5	精选筛 Fine sieve	套 Set	1	
6	低浓净化器 Low-concentration purifier	套 Set	1	
7	浓缩机 Concentrator	套 Set	1	
8	分散筛 Dispersing sieve	套 Set	1	
9	热分散系统 Heat dispersion system	套 Set	2	引进 Imported
10	双盘磨 Double disc refiner	套 Set	1	
11	浆泵 Pulp pump	台 Set	16	
12	水泵 Water pump	台 Set	6	
13	浆池搅拌器 Pulp chest agitator	台 Set	8	
14	损纸处理 Damaged paper processing	套 Set	1	

序号 Seq no.	设备名称 Designation	单位 Unit	数量 Qty.	备注 Remarks
15	起重设备 Hoisting equipment	套 Set	1	
16	车间化验设备 Chemical examination equipment in workshop	套 Set	1	
造纸车间 Papermaking workshop				
一 1	上浆系统 Pulp delivery system			
1	冲浆泵 Washing pump	台 Set	3	
2	压力筛 Pressure screen	套 Set	3	
3	低浓除砂器 Low concentration desander	套 Set	1	
二 2	三长网纸机 Triple fourdrinier board machine	台 Set	1	
	纸板机参数：幅宽8660mm，车速1100m/min Parameters of board machine: width: 8660mm, speed: 1100m/min			
1	流浆箱 Headbox	台 Set	3	引进 Imported
2	成形部 Forming section	套 Set	3	引进 Imported
3	压榨部 Squeezing section	套 Set	1	引进 Imported
4	干燥部 Drying section	套 Set	1	
5	卷纸机 Paper coiler	台 Set	1	引进 Imported
三 III	复卷机 Recoiler	台 Set	1	引进 Imported
四 IV	卷筒纸包装生产线 Coiled paper packaging production line	套 Set	1	
五 V	损纸稀释处理系统 Damaged paper dilution & processing system	套 Set	1	
六 VI.	加压水系统 Pressurized water system	套 Set	1	
七	真空系统	套	1	引进

序号 Seq no.	设备名称 Designation	单位 Unit	数量 Qty.	备注 Remarks
VII	Vacuum system	Set		Imported
八 VIII	蒸汽冷凝水系统 Steam condensate system	套 Set	1	
九 IX	液压、润滑油系统 Hydraulic and lube oil system	套 Set	1	随纸机引进 Imported together with paper making machine
十 X	表面施胶系统 Surface gluing system	套 Set	1	随纸机引进 Imported together with paper making machine
十一 XI	起重设备 Hoisting equipment	台 Set	3	
十二 XII	压缩空气系统 Compressed air system	套 Set	1	
十三 XIII	升降机 Elevator	台 Set	2	
十四 XIV	浆池搅拌器 Pulp chest agitator	台 Set	10	
十五 XV	浆泵 Pulp pump	台 Set	14	
十六 XVI	辅料制备系统 Auxiliary material preparation system	套 Set	1	
十七 XVII	纸卷捆扎包装线 Coiled paper binding and packaging line	套 Set	1	
十八 XVIII	叉车 Forklift	套 Set	6	
十九 XIX	白水回收设备 White water recycling equipment	套 Set	1	

3.2 公用工程

3.2 Utility Works

3.2.1 给水工程

3.2.1 Water supply works

拟建工程用水包括生产用水和生活用水。生产线用水类比 PM5 及 PM9 生产线用水情况，根据现有工程分析，PM5 及 PM9 单位产品用水量约为 7m^3/t，另外根据单位产品取水量 I 级清洁生产水平（8m^3/t），因此拟建项目单位产品用水量取 8m^3/t。因此，拟建项目制浆造纸生产线用水 16864m^3/d。

Water used in the proposed project consists of production and domestic water. According to the existing engineering analysis, the water consumption of PM5 and PM9 unit products is about 7m^3/t, and the level of water consumption per unit product is Class I clean production level (8m3/t). Therefore, the proposed project is based on the existing engineering analysis. The water consumption per unit of product is 8m^3/t. Therefore, the water used in the pulp and paper production line of the proposed project is 16,864m^3/d.

项目生产用水依托厂内现有给水处理车间（规模 79200t/d），同时，拟建工程拟于给水处理车间增加一组处理能力为 26400t/d 的给水处理设施，主要包括混合、絮凝、沉淀、过滤、加药及污泥处理工艺，处理工艺详见图 2.2-10。给水水源由角美工业区附近九龙江北溪左高干渠及九龙江北溪左低干渠引水联合提供。

The production water of the project depends on the existing water treatment workshop (sized 79,200t/d) in the plant. At the same time, the proposed project is to add a set of water treatment facilities with a treatment capacity of 26,400t/d in the water treatment workshop, including, inter alia, mixing, flocculation and sedimentation, filtration, dosing and sludge treatment processes which are detailed in Figure 2.2-10. The water supply is jointly sourced from left high nd low trunk canal at North Creek of Jiulong River in the vicinity of Jiamei Industrial Zone;

生活用水来自市政自来水。

Domestic water is sourced from municipal running water.

拟建项目生产及生活用水消耗情况见表 3.2-1。

Production and domestic water consumption conditions of proposed project are as shown in Table 3.2-1.

表 3.2-1 拟建项目用水情况一览表

Table 3.2-1 Schedule of Water Consumption Conditions of Proposed Project

序号 Seq no.	车间 Workshop	单耗（m^3/t） Single consumption (m^3/t)	m^3/d
1	制浆造纸车间 Pulping and papermaking workshop	8	14544
2	自备热电站用水 Water consumption of captive cogeneration power plant	/	2020
3	生活用水 Domestic water	/	60
4	其他用水 Other water	/	300
	合计 Total	/	16924

拟建项目建成后，全厂项目的用水情况见表 3.2-2。

Water consumption conditions of proposed project throughout the plant upon its completion are as shown in Table 3.2-2.

表 3.2-2 全厂项目用水情况一览表

Table 3.2-2 Schedule of Water Consumption Conditions of the Project throughout the Plant

<table>
<tr><td rowspan="2">序号
Seq no.</td><td rowspan="2" colspan="2">用水部门或用水名称
Water consumption department or designation</td><td colspan="2">一期
Phase I</td><td colspan="2">二期
Phase II</td><td>三期
Phase III</td><td>拟建项目
Proposed project</td><td rowspan="2">合计
Total</td></tr>
<tr><td>PM5</td><td>PM6</td><td>PM9</td><td>PM7</td><td>PM8</td><td>PM10</td></tr>
<tr><td>1</td><td colspan="2">造纸车间
Papermaking workshop</td><td>9105</td><td>8235</td><td>9105</td><td>8235</td><td>15882</td><td>14544</td><td>65106</td></tr>
<tr><td>2</td><td>自备动力车间
Capt</td><td>化学补充水
Chemical make-up water</td><td>1347</td><td>983</td><td>1468</td><td>1072</td><td>890</td><td>920</td><td>6680</td></tr>
</table>

	ive pow erho use	工业冷却水补水 Industrial cooling water make-up water	1600	1167	1745	1272	1056	1100	7940
3	生活用水 Domestic water		140		60	60	100	60	420
4	其他用水（绿化、冲洒道路） Other water consumption (greening and road spraying)		725		350	375	624	300	2374
5	现有工程用水量 Water consumption of existing project		23302		23742		18552	0	65596
6	全厂用水量合计 Total of water consumption of whole plant		23302		23742		18552	16924	82520

3.2.2 排水工程

3.2.2 Water Drainage Works

根据清污分流原则，联盛纸业厂区排水采用雨污分流，分别建有污水系统和雨水系统，厂区雨水设独立雨水排水系统。厂区场地雨水由道路雨水口收集接入厂区雨水管网，建筑屋面雨水由屋面天沟收集后接入厂区雨水管网，就近排入市政雨水管网。

In accordance with the principle of separate clear and sewage water drainage, separate rainwater and sewage drainage shall be adopted in Liansheng Paper’s plant area, for which sewage system and rainwater system shall be separately constructed and plant area be provided with separate rainwater drainage system. Rainwater in the plant site is collected by the road gully and connected to the rainwater pipe network of the plant. Rainwater on roofs of buildings is collected by the roof gutter and connected to the same and drained into nearby municipal rainwater pipe network.

拟建工程生产废水主要产生于碎浆废水、抄纸废水及冲洗地面等排水。该污

水主要含纤维悬浮物SS及有机污染物BOD、COD，需处理后外排；生活排水为车间卫生间排放的生活污水，需处理后外排。

Wastewater from the proposed project is generated from, among others, water drainage of pulping, papermaking and floor flushing. Such sewage mainly contains fibrous suspension SS and organic pollutants BOD and COD, which need to be treated and discharged; domestic drainage is domestic sewage discharged from the workshop toilet, and needs to be treated and discharged.

拟建项目排水量情况表 3.2-3。

Water drainage conditions of proposed project are shown in Table 3.2-3

表 3.2-3　拟建项目排水情况一览表

Table 3.2-3 Schedule of Water Drainage Conditions of Proposed Project

序号 Seq no.	车间 Workshop	单耗（m^3/t） Single consumption (m^3/t)	m^3/d	排放去向 Destination of discharge
1	制浆造纸车间 Pulping and papermaking workshop	6.9	12560	排入厂区污水管道，送污水处理站 Drained into sewage pipes in plant area and delivered to sewage treatment station
2	生活污水 Domestic sewage	/	54	经化粪池预处理后排入厂区污水沟，送污水处理站 Drained into sewage pipes in plant area upon pretreatment by septic tank and delivered to sewage treatment station
3	自备热电站化学水车间排水 Water drainage of chemical water workshop in captive cogeneration station	/	92	用于煤场及冲灰、损耗 For coal yard, ash washing and loss
4	自备热电站循环冷却水排水 Drainage of circulating cooling water from captive cogeneration station	/	18	用于煤场及冲灰、损耗 For coal yard, ash washing and loss
5	给水处理站排水	/	336	沉淀处理作清净水直接排放

	Water treatment station drainage			Clean water to be directly discharged upon sedimentation treatment
6	其他排水 Other water drainage	/	240	就近排入市政雨水管道 Drained into nearby municipal rainwater pipe
合计 Total		/	13300	

拟建项目建成后，南地块雨污管网图见图 3.2-4，全厂的排水情况见表 3.2-4。

Upon completion of proposed project, rainwater and sewage pipe network at South Block are as shown in Figure 3.2-4 and drainage conditions of whole plant are as shown in Table 3.2-4.


次入口
保安室
综合楼
海关控制区A
海关控制区B
原料堆棚
PM8
碎浆间
（最大储浆罐2000t）
图例：
给水管
雨水管
污水管
洗涤废水
蒸汽管
天然气管
沼气管
切换阀
雨水缓冲池
碎浆间
降压站
PM7
碎浆间
碎浆间
气浮脱墨
贮浆间
木粉车间
碳酸钙车间
辅料车间
中间仓库
PM5造纸车间
PM6造纸车间
五金仓库
成品车间一
PM7造纸车间
PM9造纸车间
PM10
制浆
车间
PM10
辅料
仓库
PM10
中间
仓库
PM10
造纸
车间
PM8造纸车间
沼气稳定柜
危废间
处理规模为80000t/d
污水处理站
污水排放口
雨水排放口
12000t
事故应急池
绿 化 带
宿舍楼6F
宿舍楼16F
宿舍楼12F
宿舍楼4F
娱乐室
宿舍楼12F
综合楼6F
食堂3F
绿地
绿地
成品车间二
PM7造纸车间完成工段
成品车间三
PM9
成品
仓库
PM10
成品
仓库
PM8造纸完成车间
成品车间五
卸货平台
卸货平台
卸货平台
卸货平台
装卸场地
装卸场地
应急泵
主入口
保安室
雨水排放口
接市政给水管

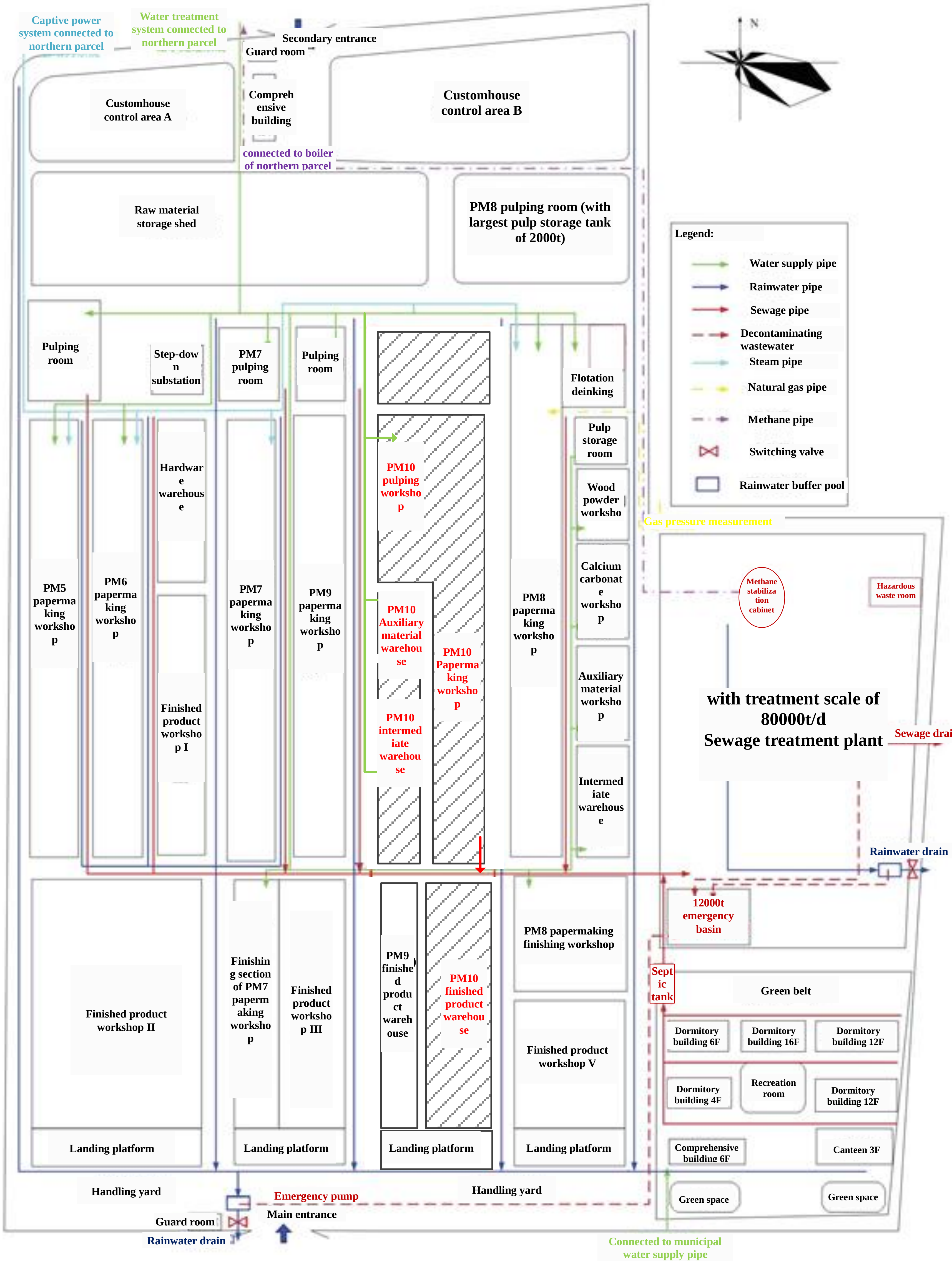


图 3.2-1 拟建项目建成后南地块雨污管网图

Figure 3.2-1 Rainwater and Sewage Pipe Network at South Block of Proposed Project

表 3.2-4 全厂项目排水情况一览表（单位：m^3/d）

Table 3.2-4 Schedule of Water Consumption Conditions of the Project throughout the Plant (in m^3/d)

序号 Seq no.	排水部门或排水名称 Water drainage department and designation		一期 Phase I		二期 Phase II		三期 Phase III	拟建项目 Proposed project	合计 Total	废水去向 Destination of wastewater
			PM5	PM6	PM9	PM7	PM8	PM10		
1	造纸车间 Papermaking workshop		7673	7082	7673	7360	14118	12560	56466	污水处理站 Sewage treatment station
2	自备动力车间 Captive powerhouse	化学水排水 Chemical water drainage	233		147	107	89	92	668	用于煤场及冲灰、损耗 For coal yard, ash washing and loss
		工业冷却水排水 Industrial cooling water drainage	48.5		31	22	18.5	18	138	
3	生活污水 Domestic sewage		126		54	54	90	54	378	污水处理站 Sewage Treatment Station
4	给水处理站排水 Water treatment station drainage		607		305	313	428	336	1989	清净下水，沉淀处理后直接排放 Clean

序号 Seq no.	排水部门或排水名称 Water drainage department and designation	一期 Phase I		二期 Phase II		三期 Phase III	拟建项目 Proposed project	合计 Total	废水去向 Destination of wastewater
		PM5	PM6	PM9	PM7	PM8	PM10		
									effluent to be directly drained upon sedimentation & treatment
5	其他排水 Other water drainage	560		280	280	480	240	1840	绿化、道路冲洒消耗 Water consumption of flushing and spraying for greening and roads
6	现有项目排入污水处理站水量 Water drainage from existing project to sewage treatment station	14881		15141		14208	0	44230	/
7	全厂项目排入污水处理站水量 Water drainage from the project throughout the plant to sewage treatment station	14881		15141		14208	12614	56844	/

3.2.3 供汽工程

3.2.3 Steam Supply Works

拟建工程蒸汽来源依托厂内现有动力车间。

Steam supply of proposed project is sourced from existing powerhouse in the plant.

拟建工程用蒸汽量为 138t/h，厂内现有动力车间完全可以满足拟建工程的用汽要求。拟建项目用气量情况见表 3.2-5。

Proposed project has a steam consumption of 138t/h, so that existing powerhouse in the plant may fully satisfy its steam demand. Steam consumption conditions of proposed project are as shown in Table 3.2-5.

表 3.2-5 拟建项目用气情况一览表

Table 3.2-5 Schedule of Steam Consumption Conditions of Proposed Project

用汽部门 Steam consumption department	用汽性质 Nature of steam consumption		用汽量 Steam consumption		回水量 Return water flow（t/h） (t/h)
	压力(MPa) Pressure (MPa)	温度(℃) Temperature (℃)	（t/t 纸） (t/t paper)	（t/h） (t/h)	
造纸车间 Papermaking workshop	0.49	饱和 Saturate	1.8	138	124

拟建项目建成后，全厂蒸汽消耗情况见下表 3.2-6，全厂工程建成后的蒸汽平衡情况见图 3.2-2。

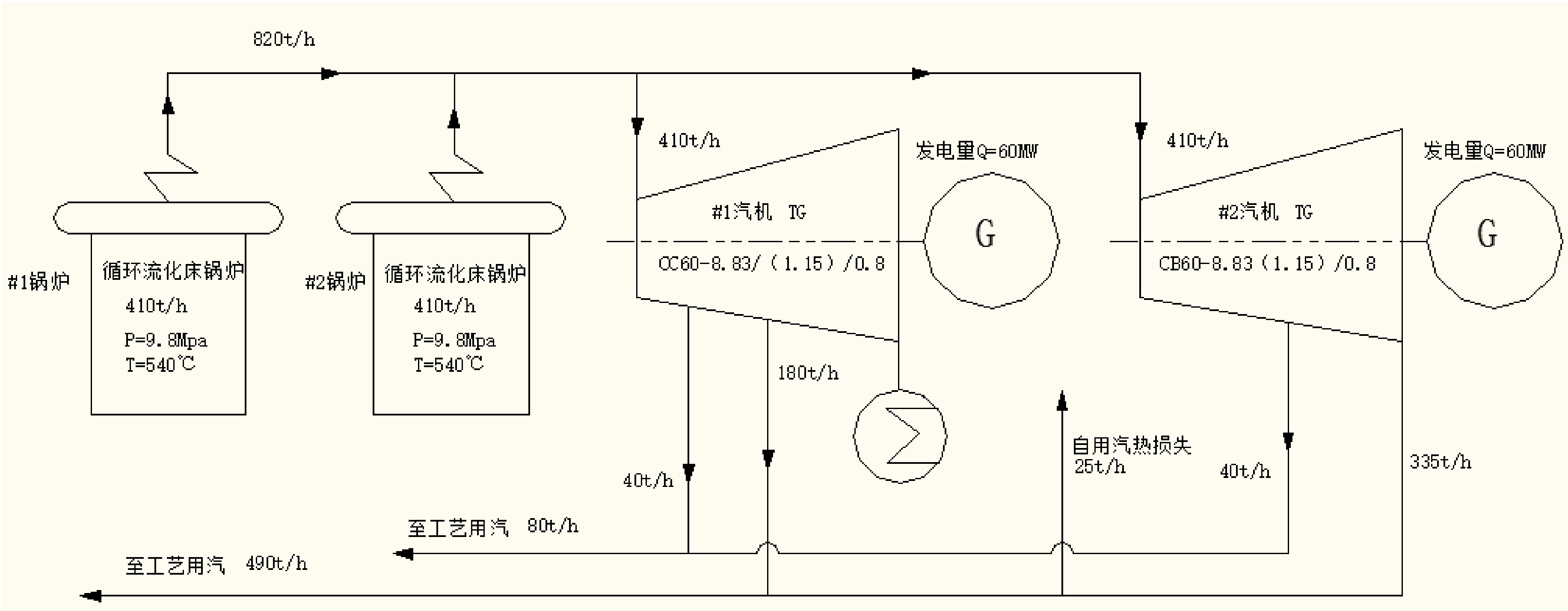
Upon completion of proposed project, steam consumption of the whole plant is as shown in Table 3.2-6 below. Upon completion of projects, steam balance condition throughout the plant is as shown in Figure 3.2-2.

表 3.2-6 全厂蒸汽消耗情况一览表

Table 3.2-6 Schedule of Steam Consumption Conditions throughout the Plant

序号 Seq no.	用汽部门 Steam consumption department	用汽性质 Nature of steam consumption		用汽量 Steam consumption
		压力(Mpa) Pressure (MPa)	温度(℃) Temperature (℃)	平均(t/h) Average (t/h)
1	PM5制浆造纸车间 PM5 pulping and	0.49	饱和 Saturate	90

	papermaking workshop			
2	PM6制浆造纸车间 PM6 pulping and papermaking workshop	0.49	饱和 Saturate	65
3	PM9制浆造纸车间 PM9 pulping and papermaking workshop	0.49	饱和 Saturate	86
4	PM7制浆造纸车间 PM7 pulping and papermaking workshop	0.49	饱和 Saturate	47
5	PM8制浆造纸车间 PM8 pulping and papermaking workshop	0.49	饱和 Saturate	144
6	PM10制浆造纸车间 PM10 pulping and papermaking workshop	0.49	饱和 Saturate	138
7	合计 Total	0.49	饱和 Saturate	570


820t/h
410t/h
发电量Q=60MW
410t/h
发电量Q=60MW
#1汽机 TG
#2汽机 TG
G
G
CC60-8.83/（1.15）/0.8
CB60-8.83（1.15）/0.8
#1锅炉
循环流化床锅炉
410t/h
P=9.8Mpa
T=540℃
#2锅炉
循环流化床锅炉
410t/h
P=9.8Mpa
T=540℃
180t/h
自用汽热损失
25t/h
40t/h
40t/h
335t/h
至工艺用汽 80t/h
至工艺用汽 490t/h

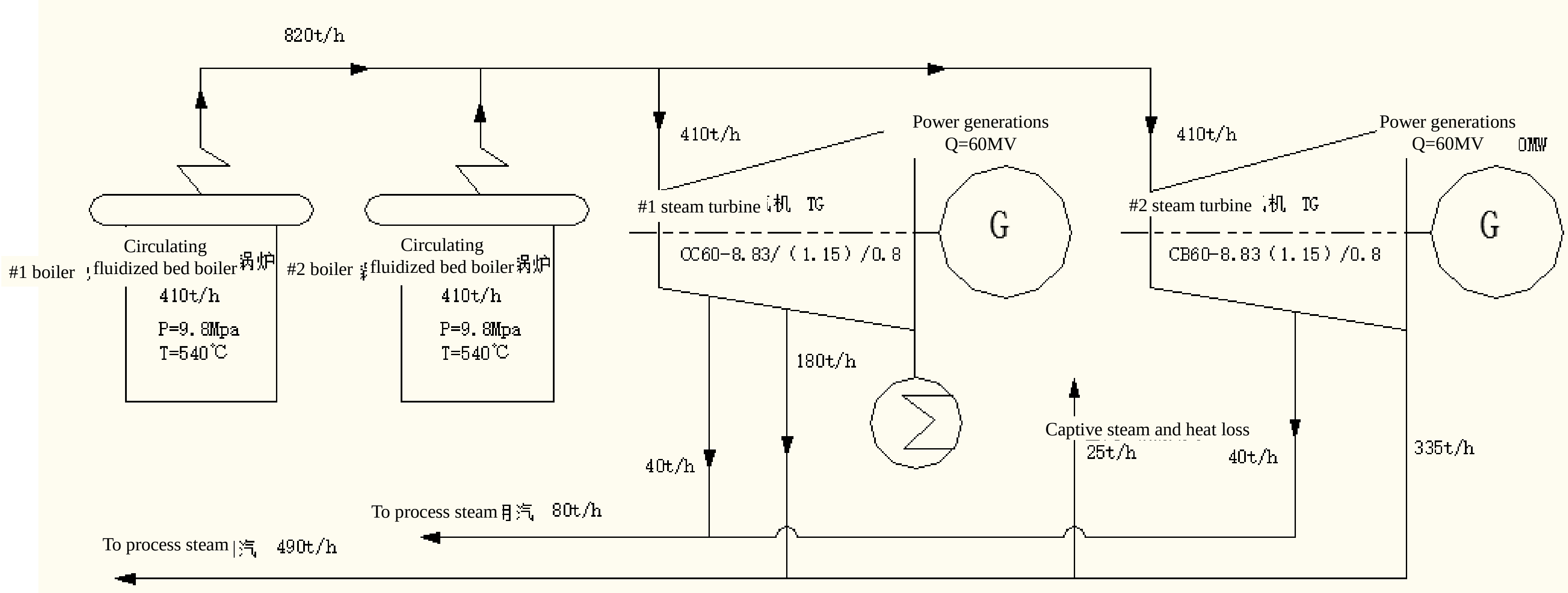


图 3.2-2　全厂项目蒸汽平衡图

Figure 3.2-2 Steam Balance Diagram of Projects throughout the Plant

3.2.4 供电工程

3.2.4 Power Supply Works

本期工程装机容量约为 70MW，总计算负荷约为 46MW，本工程用电通过自备电站 35KV 变电站从供电电网供电，能够满足用项目电需求。

The installed capacity of this project is about 70MW and the total calculation load thereof is about 46MW. Power used in this project is supplied from the power supply grid through the 35kV substation of captive power station, which can meet the power demand of the project.

3.2.5 废渣处理

3.2.5 Waste Slag Treatment

厂内设有年处理 55 万吨造纸废渣回收生产线，目前该项目实际废渣处理量为 1215t/d（41.31 万 t/a），剩余处理能力为 13.69 万 t/a。拟建工程造纸车间产生的铁丝塑料等经收集后进入该生产线进行清洗、筛分处理后出售处置。

The plant is provided with a waste slag recycling and production line with annual processing capacity of 550,000 tons. Presently this project has an actual waste slag processing rate of 1215t/d (taking up a processing capacity of 41.31 million t/a) so that the remaining treatment capacity is 13.69 million t/a. After collecting the wire and plastic generated by papermaking workshop of proposed project, they will be delivered to production line for cleaning and screening and then will be sold for disposal.

3.3 依托工程

3.3 Supporting Project

3.3.1 动力系统及供汽工程

3.3.1 Power System and Steam Supply Works

现有工程自备动力系统主要由以下部分组成：

Captive power system of existing project consists of, among others:

热电机组：2×410t/h 循环流化床锅炉+1×60-8.83/0.8+B70-8.83/0.8 供热发电机组；

Cogeneration unit: 2×410t/h CFB boiler +1×C60-8.83/0.8+B70-8.83/0.8 cogeneration unit;

上煤系统：由贮煤场、栈桥和碎煤机房组成；

Coal handling system: consisting of coal yard, tresle and coal crusher room;

化学水处理车间：一级除盐处理系统 400t/h，混床处理系统 780t/h；

Chemical water treatment workshop: one-stage 400t/h demineralization treatment system, 780t/h mixed bed treatment system;

冷却水循环系统：4 座双曲线冷却塔+1 座冷却池；

Cooling water circulation system: 4 hyperbolic cooling towers + a cooling basin;

输配电系统：110/35kv 总降压站及控制系统房。

Power transmission and distribution system: 110/35kV main step-down substation and control system house

锅炉产生的蒸汽由母管引往汽轮机，汽轮机低压可调抽（排）汽（0.58MPa）接入分汽缸，由分汽缸接出蒸汽管道供至各车间的用汽点。各车间可回收的蒸汽凝结水全部回到自备动力车间经处理后循环使用。

The steam generated by boiler is led from main pipe to the steam turbine, and the low-pressure adjustable steam extraction (discharge) (0.58MPa) of the steam turbine is connected to steam distribution header, from which steam pipes are connected to the tapping points in individual workshops Recyclable steam condensate from individual workshops all will be returned to captive powerhouse for recycling upon treatment.

拟建工程蒸汽来源依托厂内现有工程的动力系统及供汽工程。

Steam supply of proposed project is sourced from the power system and steam supply works of existing project.

两台锅炉满负荷运行时全年需要消耗煤 65.41 万 t/a，现有工程用煤量为 60.6 万 t/a，为现有工程生产线提供蒸汽和用电；拟建工程建成后，两台锅炉满负荷

运行，为全厂生产线提供蒸汽和现有工程的用电。

When operating at full load, both boilers need to consume 654,100 tons of coal for the whole year and coal consumption of existing project is 606,000 t/a to supply itself with steam and power; upon completion of proposed project, both boilers will operate at full load to supply steam to production lines throughout the plant and supply power to existing project.

目前现有动力车间的 2 台循环硫化床锅炉供汽能力为 432t/h，还可供汽量 388t/h，满足拟建工程 138t/h 的蒸汽需求。

Both CBF boilers in the existing powerhouse has a steam supply capacity of 432t/h with an extra steam supply capacity of 388t/h, which can satisfy steam demand of proposed project of 138t/h.

3.3.2 给水净化站

3.3.2 Water treatment station

厂内现有给水处理车间（规模 79200t/d），给水水源由角美工业区附近九龙江北溪左高干渠及九龙江北溪左低干渠引水联合提供。

Based on the existing water treatment workshop (sized 79,200t/d) in the plant, the water supply is jointly sourced from left high nd low trunk canal at North Creek of Jiulong River in the vicinity of Jiamei Industrial Zone;

拟建工程拟于给水处理车间增加一组处理能力为 26400t/d 的给水处理设施，主要包括混合、絮凝、沉淀、过滤、加药及污泥处理工艺。拟建项目投产后全厂给水处理能力为 105600t/d。

The proposed project is to add a set of water treatment facilities with a treatment capacity of 26,400t/d in the water treatment workshop, including, inter alia, mixing, flocculation and sedimentation, filtration, dosing and sludge treatment processes. After putting proposed project in service, water treatment capacity of the whole plant will be 105,600t/d.

拟建工程建成后，生产线用水总量为 82100m^3/d，因此，给水处理站可满足拟建项目的用水量。

Upon completion of proposed project, total water consumption of production lines will be 82,100m^3/d so that water treatment station can satisfy the water consumption thereof.

3.3.3 污水处理站

3.3.3 Sewage Treatment Station

厂内现有污水处理站，设计规模为 80000m^3/d，污水处理采用厌氧处理+好氧处理+深度处理工艺，废水经过处理后满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 要求，目前污水处理站出水暂时排放至九龙江北港；待排海管道建设完成后，拟建项目产生废水及厂内现有工程产生的废水经过厂内污水处理厂处理达标后统一纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

The existing sewage treatment station has a design scale of 80,000 m^3/d, for which “anaerobic + aerobic + deep treatment” process is adopted. Upon treatment, wastewater complies with requirements in Table 1 of DB35/1310-2013 *Emission Standards for Water Pollutants in the Pulp and Paper Industry*. Presently, the effluent from the sewage treatment station supporting the proposed project is temporarily discharged to North Port of Jiulong River. Once marine discharge pipes are completed, both wastewater generated by proposed project and by existing project in the plant will be incorporated into the tailwater marine discharge pipes of Jiaomei Sewage Treatment Plant (250,000 t/d) after being treated by the sewage treatment plant in the plant for uniform discharge to deep sea.

目前，现有工程已用去污水处理站 44230m^3/d 的污水处理能力，富余处理能力为 35770m^3/d，可接纳拟建工程 12614m^3/d 的新增废水的排放量。

The existing project now has taken up a sewage treatment capacity of about 44,230 m3/d, and the remaining treatment capacity of the sewage treatment station is 35,770 m3/d, which is capable of accommodating 12614m^3/d of newly added wastewater discharged from proposed project.

3.3.4 废渣处理

3.3.4 Waste Slag Treatment

厂内设有年处理 55 万吨造纸废渣回收生产线，目前该项目实际废渣处理量为 1215t/d（41.31 万 t/a），剩余处理能力为 13.69 万 t/a。拟建工程造纸车间产生的铁丝塑料等经收集后进入该生产线进行清洗、筛分处理后出售处置。

The plant is provided with a waste slag recycling and production line with annual processing capacity of 550,000 tons. Presently this project has an actual waste slag processing rate of 1215t/d (taking up a processing capacity of 41.31 million t/a) so that the remaining treatment capacity is 13.69 million t/a. After collecting the wire and plastic generated by papermaking workshop of proposed project, they will be delivered to production line for cleaning and screening and then will be sold for disposal.

3.4 工程分析

3.4 Engineering Analysis

3.4.1 制浆工段

3.4.1 Pulping section

为了满足本工程所选纤维原料和产品方案的要求，制浆车间生产线主要为 OCC 处理和 NUKP 处理 2 条生产线。主要技术参数如下表 3.4-1。

In order to satisfy requirements of fiber raw materials and product scheme selected for this project, production lines in pulping workshop are mainly such two productions line as OCC and NUKP processing line Major technical parameters are as shown in Table 3.4-1 below.

表 3.4-1 拟建项目制浆车间主要技术参数

Table 3.4-1 Major Parameter of Pulping Workshop of Proposed Project

序号 Seq no.	名称 Designation	单位 Unit	数量 Qty.
1	年工作日 Annual working days	天 Day	330
2	日工作时	时	24

序号 Seq no.	名称 Designation	单位 Unit	数量 Qty.
	Daily working hours	Hr	
3	生产能力 Production capacity	/	/
	OCC处理线 OCC processing line	t/d	1850
	NUPK处理线 NUPK processing line	t/d	400
4	浆板碎解浓度 Pulp board disintegration concentration	%	3~4
5	废纸碎解浓度 Waste paper disintegration concentration	%	5~6
6	高浓除砂器浓度 Concentration of high concentration desander	%	4
7	低浓除砂器浓度 Concentration of low concentration desander	%	0.8~1
8	热分散浓度 Heat dispersion concentration	%	28~30
9	热分散温度 Heat dispersion temperature	℃	90~105
10	磨浆浓度 Pulp refining concentration	%	4~5
11	成浆浓度 Finished pulp concentration	%	3~4
12	OCC废纸浆得率 OCC waste paper pulp yield	%	85

（1）NUKP 生产线

(1) NUKP production line

未漂针叶木浆板从浆板库用叉车运送至制浆车间，通过链板式输送机送入间歇式立式水力碎浆机碎解成浆，然后用泵送至卸料浆池中贮存，碎解后的浆料通过高浓除砂器除去泥砂等杂质，再进行疏解磨浆，处理后的浆送贮浆池中贮存，配料成浆后，泵送至造纸车间作面浆。

The UKP board is transported from the pulp board warehouse to the pulping workshop by forklift, delivered to the batch vertical hydraulic pulper by the chain conveyor, and then pumped into the dump chest for storage. The disintegrated pulp is passed through a high-concentration desander to remove impurities such as mud and sand, and then is refined. The treated pulp is stored in a stuff chest and mixed into the finished pulp, which is pumped to the papermaking workshop as surface pulp.

NUKP 生产线主要生产工艺流程及产污环节见图 3.4-1。

Main production process flow and pollution chains of NUKP production line are as shown in Fiigure 3.4-1

（2）OCC 废纸浆生产线

(2) OCC waste paper pulp production line

OCC 废纸浆生产线：

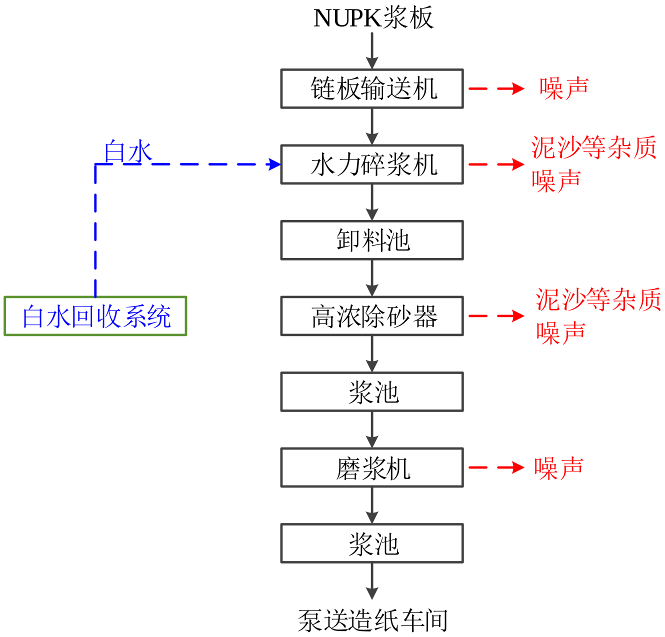
OCC waste paper pulp production line:

废纸从原料堆场用叉车运送至制浆车间，通过链板式输送机送进转鼓碎浆机，碎解后进卸料浆池中贮存，泵送至高浓除砂器除去砂子、石头、铁块等杂质，再经粗筛系统把浆与渣分离后，进行低浓除砂、一级三段低浓筛选后，良浆送入浓缩机经浓缩后进分级筛进行纤维分级。从分级筛分离出来的短纤维经浓缩后泵送至造纸车间作箱板纸的芯浆。从分级筛分离出的长纤维经热分散后，再进磨浆机，然后送浆池贮存，配料成浆后泵送至造纸车间，作箱板纸的底浆。

The waste paper is transported from the raw material yard to the pulping workshop by forklift, and sent to the drum pulper through the chain conveyor. After being disintegrated, it is stored in the dump chest and pumped to the high concentration desander to remove sand, stone and iron. Aftersand, stone, iron block and other impurities are separated by the coarse screening system, the low-concentration sand removal and the first-stage three-stage low-concentration screening are carried out, and the good pulp is delivered to the thickener and concentrated into the grading sieve for fiber grading. The short fibers separated from the grading sieve are concentrated and pumped to the papermaking workshop as core pulp of the cardboard paper. The long fibers separated from the grading sieve are thermally dispersed, then fed into the refiner, and then stored in the pulp chest. The ingredients are mixed into the finished pulp, which is pumped to the papermaking workshop as bottom pulp of the cardboard paper.

OCC 废纸浆生产线主要生产工艺流程及产污环节见图 3.4-2。

Main production process flow and pollution chains of OCC waste pulp production line are as shown in Fiigure 3.4-2



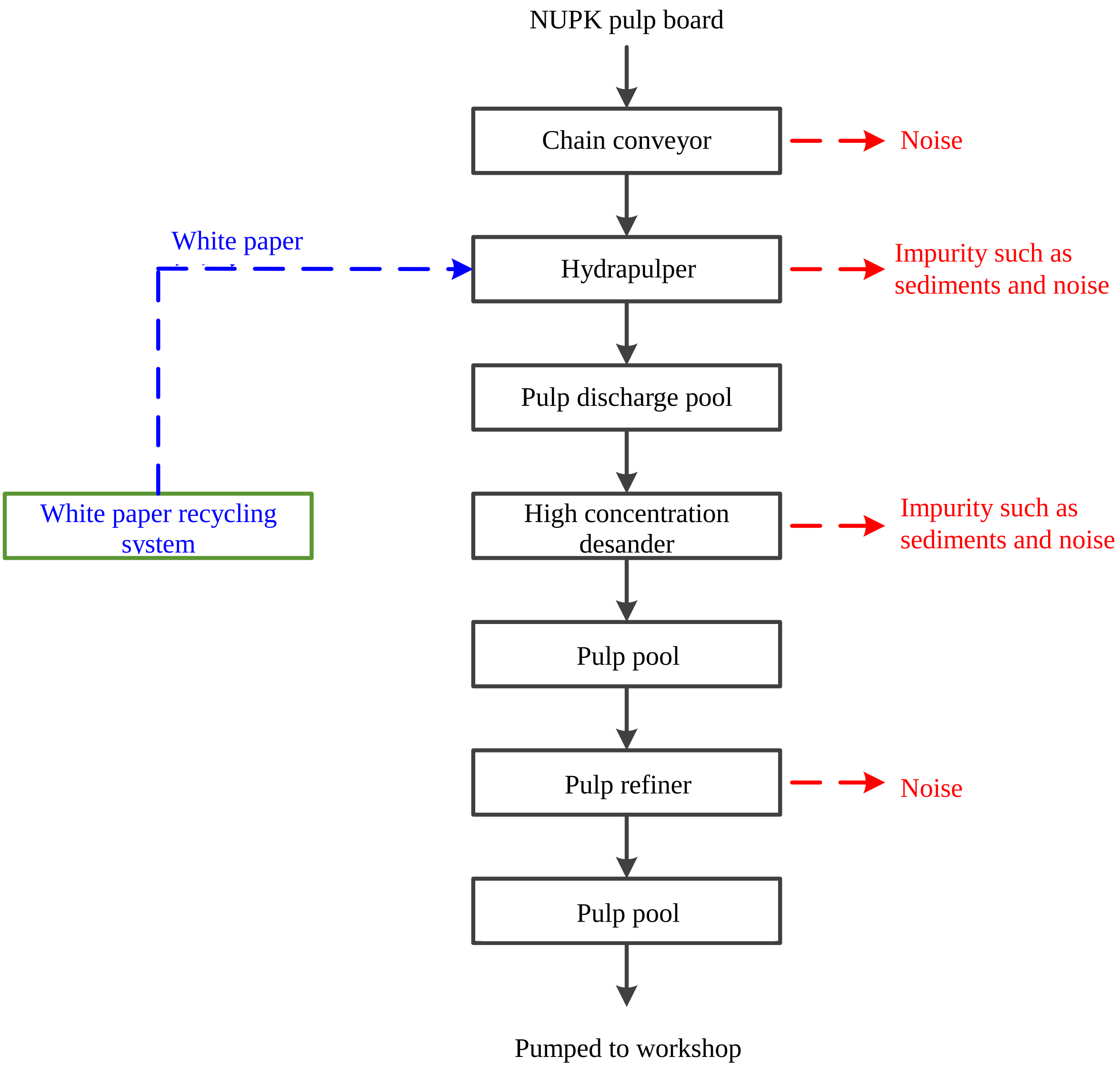
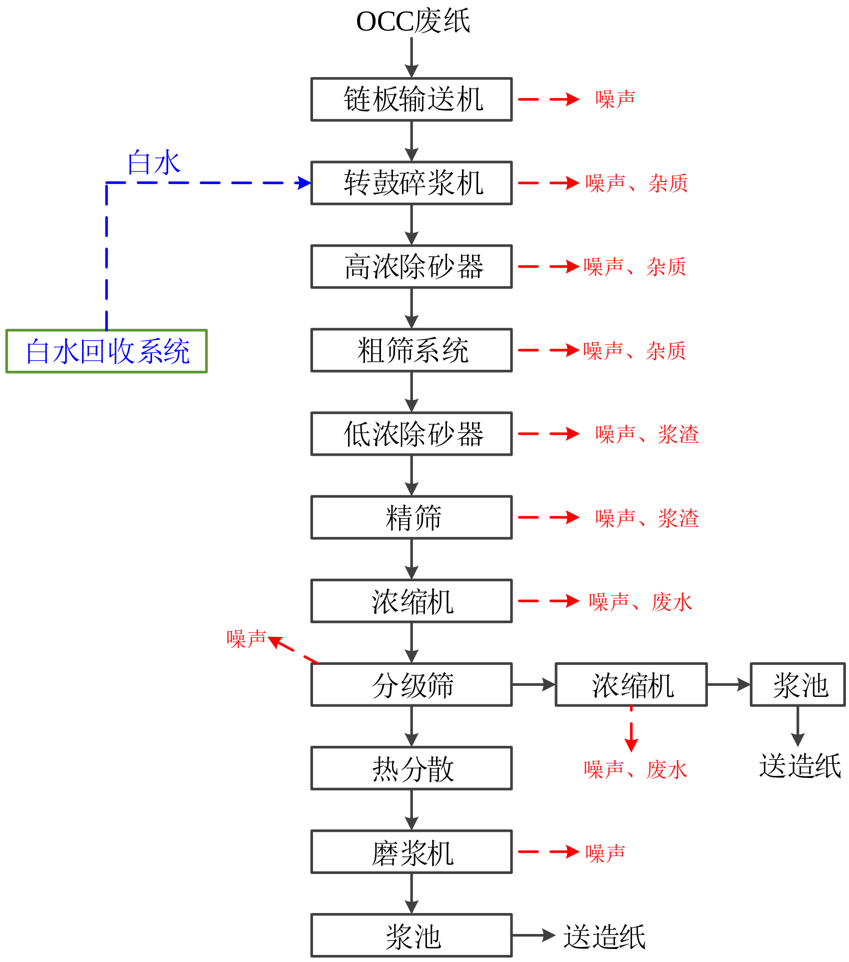


图 3.4-1　NUKP 生产线主要生产工艺流程及产污环节

Figure 3.4-1 Main Production Process Flow and Pollution Chains of NUKP Production Line


OCC废纸
链板输送机
噪声
白水
转鼓碎浆机
噪声、杂质
高浓除砂器
噪声、杂质
白水回收系统
粗筛系统
噪声、杂质
低浓除砂器
噪声、浆渣
精筛
噪声、浆渣
浓缩机
噪声、废水
噪声
分级筛
浓缩机
浆池
热分散
噪声、废水
送造纸
磨浆机
噪声
浆池
送造纸

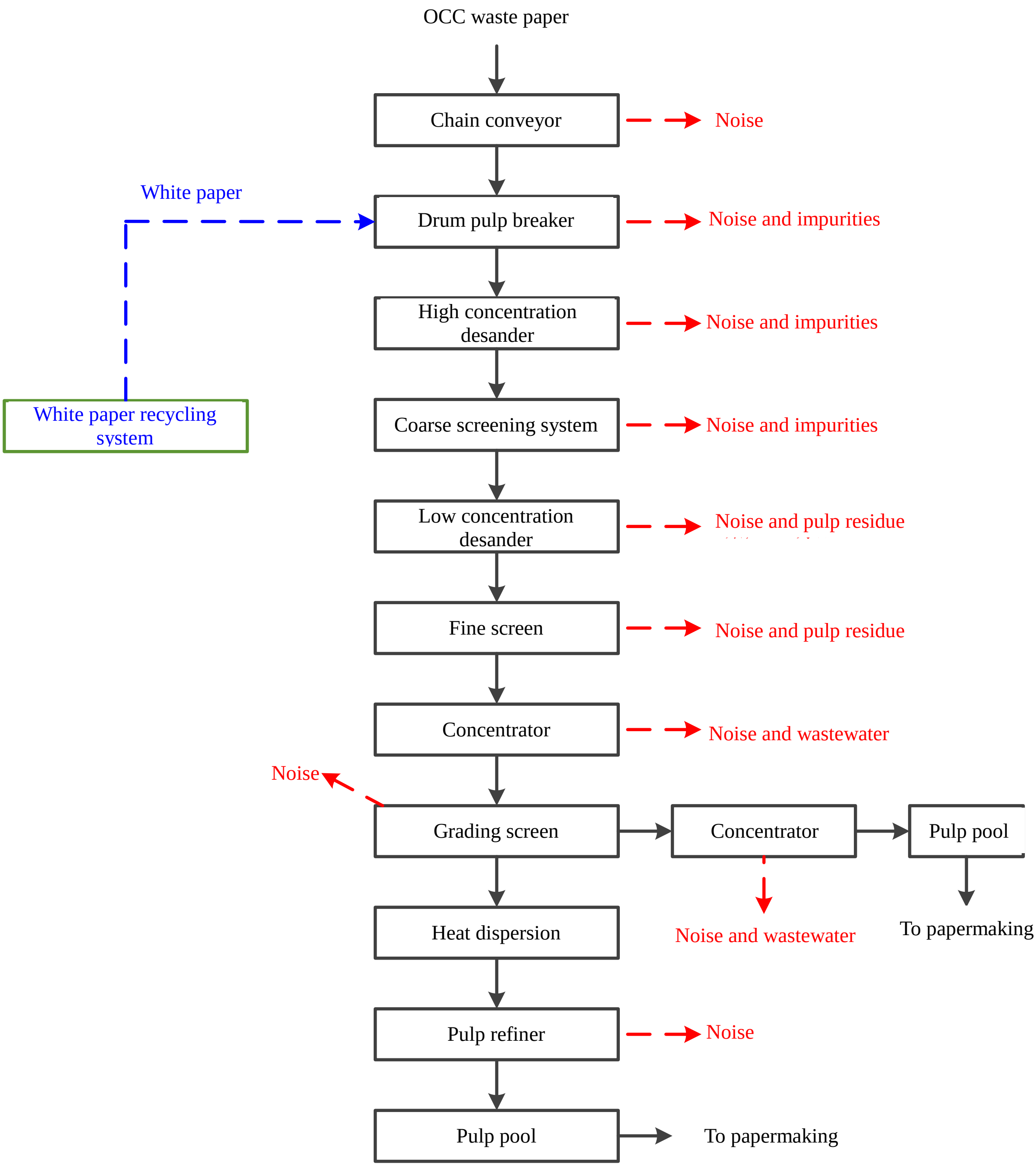


图 3.4-2　OCC 生产线主要生产工艺流程及产污环节

Figure 3.4-2 Main Production Process Flow and Pollution Chains of OCC Production Line

3.4.2 造纸工段

3.4.2 Papermaking Section

从制浆车间成浆池泵送过来的面、芯、底浆料，经配制后送至各纸机抄前浆池，通过调浓浆泵、机外白水槽、冲浆泵、面浆经低浓除砂、一级多段压力筛，进入流浆箱上网，经成形复合、压榨、干燥、表面施胶、再干燥、压光、水平卷纸机卷取，经搁纸架暂存后，再经分切复卷机复卷成不同规格的卷筒纸，最后经纸卷捆扎包装线包装，由升降机和叉车送至成品库。

The surface, core and bottom pulp pumped from the pulping workshop into the pulp chest are delivered to the pulp chest before papermaking machine after preparation, and delivered through the thickening pulp pump, the external white water pool, washing pump, low-concentration desander, one-stage multi-section pressure screen to the pulp box for webbing, integrating, squeezing, drying, surface gluing, re-drying, smoothing, horizontal coiling and temporary storage, then cut and recoiled into the coiled paper with different specifications, finally packed on the coiled paper coiling line and delivered to the finished product warehouse with the lift and the forklift.

纸机各部分的湿损纸和干损纸分别在各自的损纸池和水力碎浆机中碎解后，泵送至制浆车间的损纸处理系统。

The wet and dry damaged paper from all sections of the papermaking machine are disintegrated in their respective damaged paper pools and hydraulic pulpers, and then pumped to the damaged paper processing system of the pulp production workshop.

造纸车间的主要技术参数见表 3.4-2。

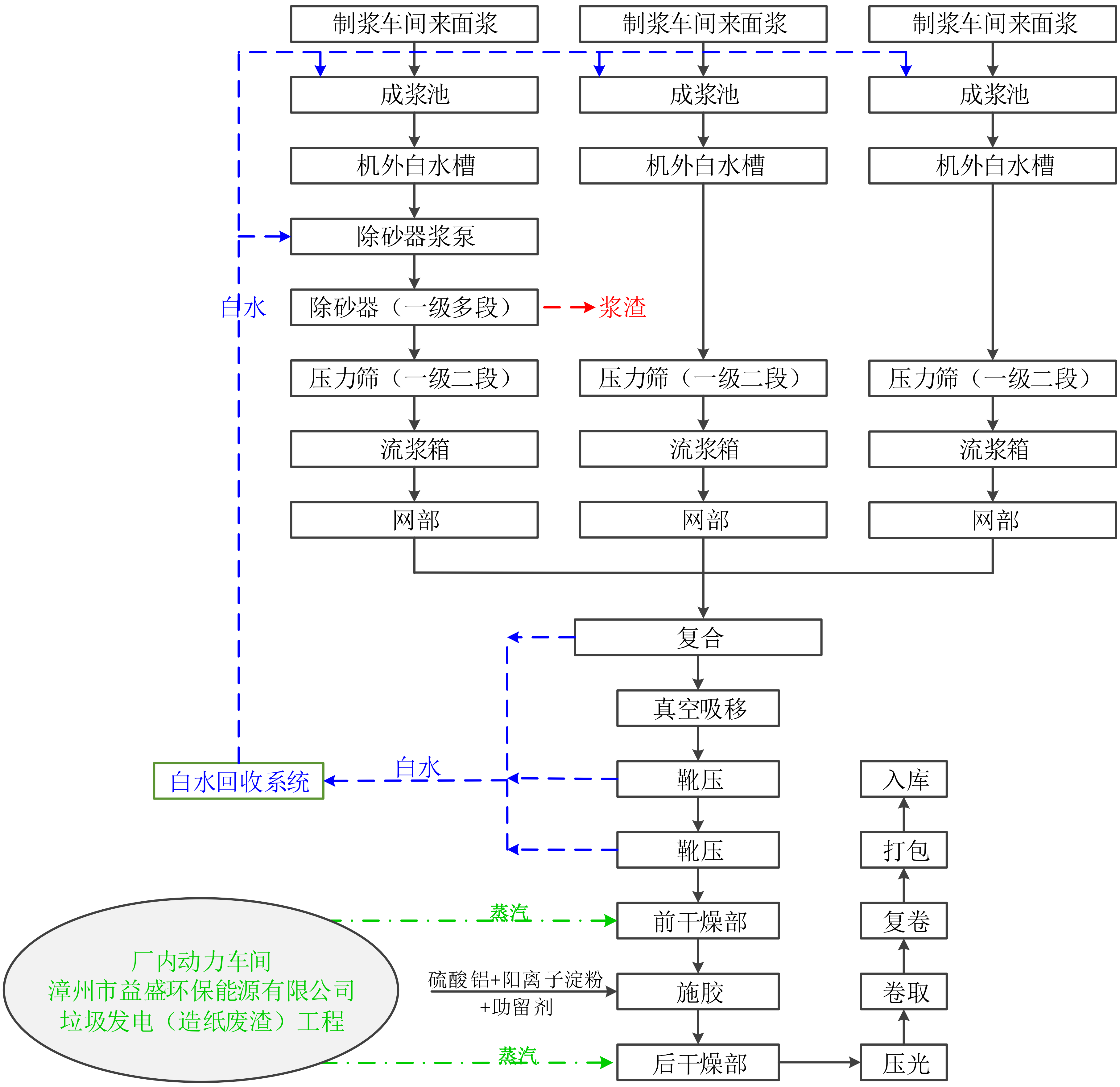
Major technical parameters of papermaking workshop are as shown in -.

表 3.4-2 造纸车间主要技术参数

Table 3.4-2 Major Technical Parameters of Papermaking Workshop

序号 Seq no.	名称 Designation	单位 Unit	数量 Qty.
1	产品名称 Name of the product	高档箱板纸 High-grade cardboard paper	

序号 Seq no.	名称 Designation	单位 Unit	数量 Qty.
2	产品规格 Product specification	卷筒 Coil	
3	年工作日 Annual working days	天 Day	330
4	日工作时 Daily working hours	时 Hr	24
5	定量范围 Quantitative range	g/m^2	130~230
6	浆料配比 Mixing ratio of pulp		
	OCC	%	80~90
	NUKP	%	20~10
7	成品结构 Structure of finished product		
	面层：NUKP+OCC中纤 Core layer: NUKP+OCC medium fiber	%	20+80
	芯层：OCC短纤维浆 Core layer: OCC short fiber pulp	%	100
	底层：OCC中纤维浆 Bottom layer: OCC medium fiber pulp	%	100
8	纸机抄宽 Papermaking machine width	mm	8760
9	成品宽 Finished product width	mm	8660
10	工作车速 Working speed	m/min	1100
11	设计车速 Design speed	m/min	1200
12	总成品率 Total finished product ratio	%	92
13	成品产量 Finished product yield	t/d	1818
14	成品水份 Finished product water content	%	8


制浆车间来面浆
制浆车间来面浆
制浆车间来面浆
成浆池
成浆池
成浆池
机外白水槽
机外白水槽
机外白水槽
除砂器浆泵
白水
除砂器（一级多段）
浆渣
压力筛（一级二段）
压力筛（一级二段）
压力筛（一级二段）
流浆箱
流浆箱
流浆箱
网部
网部
网部
复合
真空吸移
白水回收系统
白水
靴压
靴压
入库
打包
复卷
卷取
压光
蒸汽
前干燥部
厂内动力车间
漳州市益盛环保能源有限公司
垃圾发电（造纸废渣）工程
硫酸铝+阳离子淀粉
+助留剂
施胶
蒸汽
后干燥部

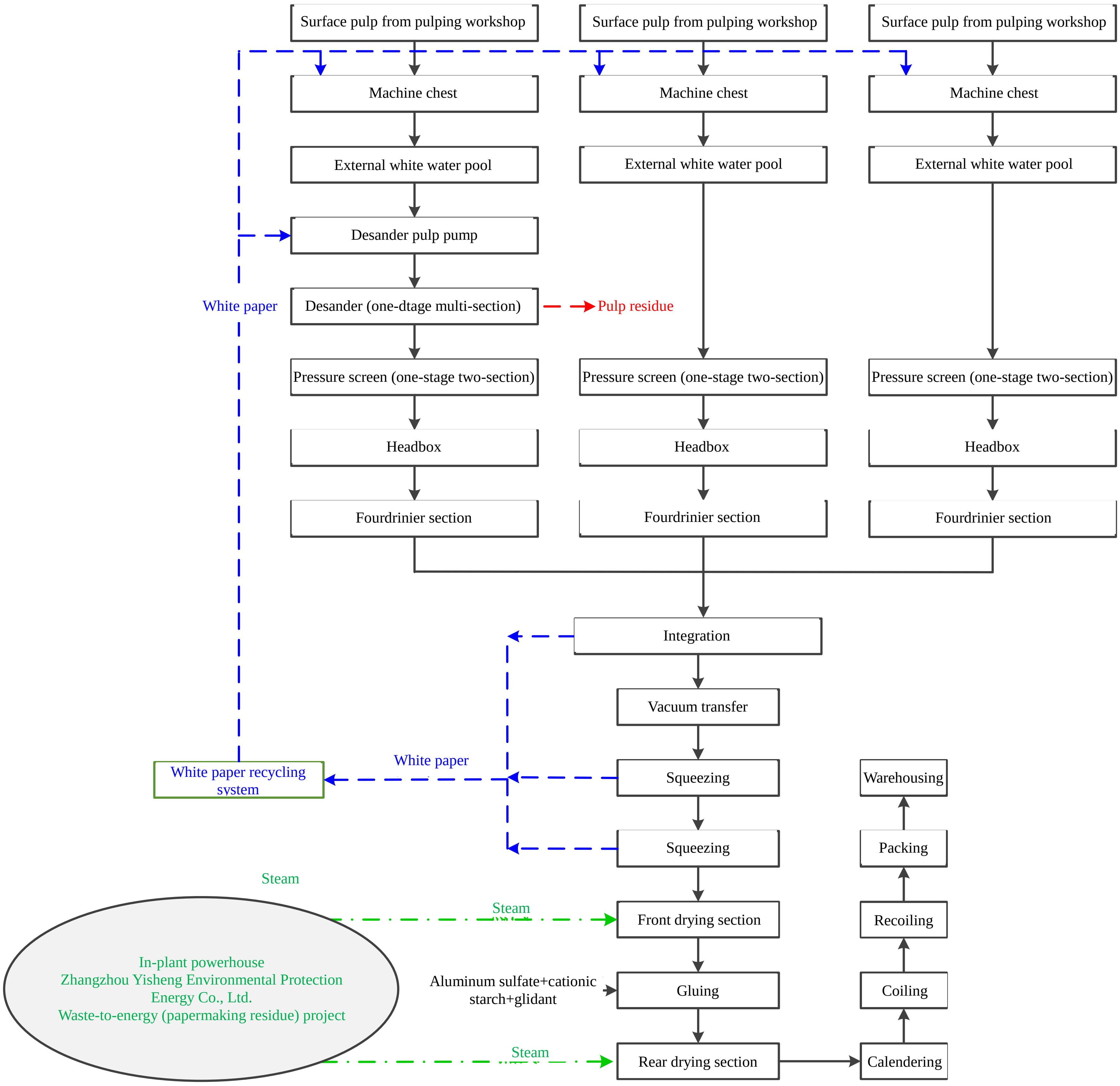


图 3.4-3　造纸车间生产工艺流程

Figure 3.4-3 Production Process Flow of Parpermaking Workshop

3.4.3 产污环节统计

3.4.3 Statistics of Pollution Chains

拟建项目产污环节详见下表 3.4-3。

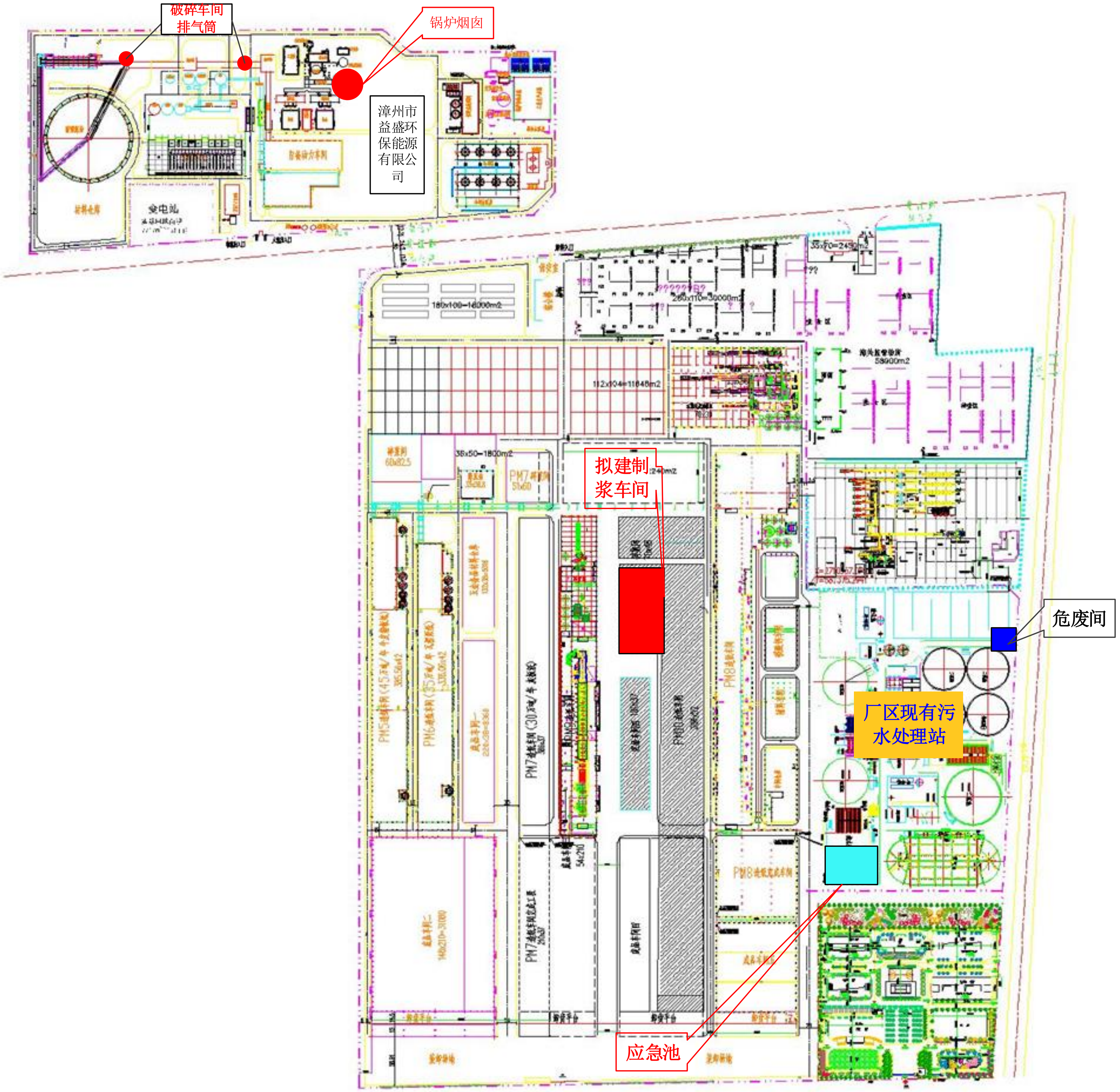
Pollution chains of proposed project are detailed in Table 3.4-3 below.

表 3.4-3 拟建项目产污环节一览表

Table 3.4-3 Schedule of Pollution Chains of Proposed Project

项目类别 Item classification	产污节点 Pollution nodes	污染因子 Pollution factors	对厂区现有工程的排污情况 Pollution discharge condition of existing project in plant area
废气 Waste gas	依托动力车间的燃煤锅炉 Based on coal-fired boiler of powerhouse	颗粒物、SO_2、NOx Particulate matter, SO2, NOx	不新增 No addition
	依托煤炭破碎工序 Based on coal crushing process	粉尘 Dust	不新增 No addition
	贮煤场 Coal yard	扬尘 Flying dust	不新增 No addition
	灰库 Ash silo	装卸粉尘 Dust from handling	不新增 No addition
	依托厂内污水处理站 Based on sewage treatment station in plant	H_2S、NH_3、臭气浓度 NH3, H2S and odor concentration	不新增 No addition
废水 Wastewater	造纸工段 Papermaking Section	SS、氨氮、COD、BOD_5、总氮、总磷 SS, ammonia nitrogen, COD, BOD_5, total nitrogen, total phosphorus	新增污染物源强 Addition of pollutant source intensity 新增污染源 Addition of pollutant source
	员工生活 Employee's life		
噪声 Noise	车间生产设备 Production equipment in workshop	噪声 Noise	新增污染物源强 Addition of pollutant source intensity 新增污染源 Addition of pollutant source

固体废物 Solid waste	制浆车间 Pulping workshop	铁丝、塑料、砂石、污泥等 Iron wire, plastic, sand, stone, sludge and so on	新增污染物源强 Addition of pollutant source intensity 新增污染源 Addition of pollutant source
	造纸车间 Papermaking workshop	浆渣（木片、纤维束等） Pulp residue (wood chip, fibre bundle and so on)	新增污染物源强 Addition of pollutant source intensity 新增污染源 Addition of pollutant source
	污水处理站 Sewage Treatment Station	污泥（含水率50%） Sludge (with water content of 50%)	新增污染物源强 Addition of pollutant source intensity 不新增污染源 No addition of pollutant source
	给水处理站 Water treatment plant	污泥（含水率80%） Sludge (with water content of 80%)	新增污染物源强 Addition of pollutant source intensity 不新增污染源 No addition of pollutant source
	办公生活区 Office and living quarter	生活垃圾 Domestic waste	新增污染物源强 Addition of pollutant source intensity 新增污染源 Addition of pollutant source
	生产车间 Production workshop	废润滑油 Waste lube oil （危废类别HW08） (classification of hazardous waste: HW08)	新增污染物源强 Addition of pollutant source intensity 新增污染源 Addition of pollutant source


破碎车间排气筒
锅炉烟囱
漳州市益盛环保能源有限公司
拟建制浆车间
危废间
厂区现有污水处理站
应急池

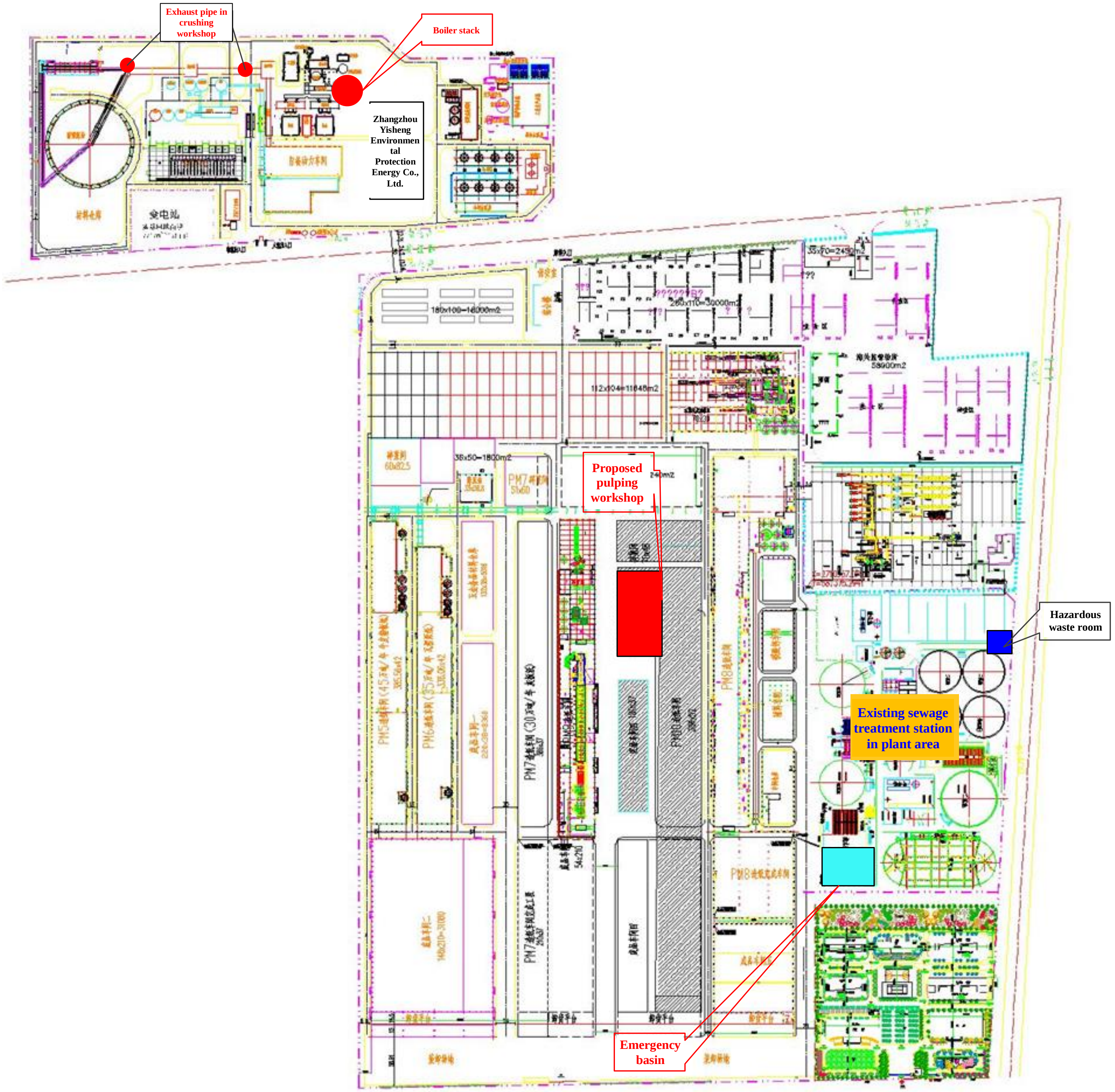

Exhaust pipe in crushing workshop
Boiler stack
Zhangzhou Yisheng Environmental Protection Energy Co., Ltd.
Proposed pulping workshop
Hazardous waste room
Existing sewage treatment station in plant area
Emergency basin

图 3.4-4　拟建项目污染源平面示意图

Figure 3.4-4 Schematic Plan of Pollution Source in Proposed Project

3.5 拟建项目各平衡关系

3.5 Various Balance Relationships of Proposed Project

3.5.1 水平衡

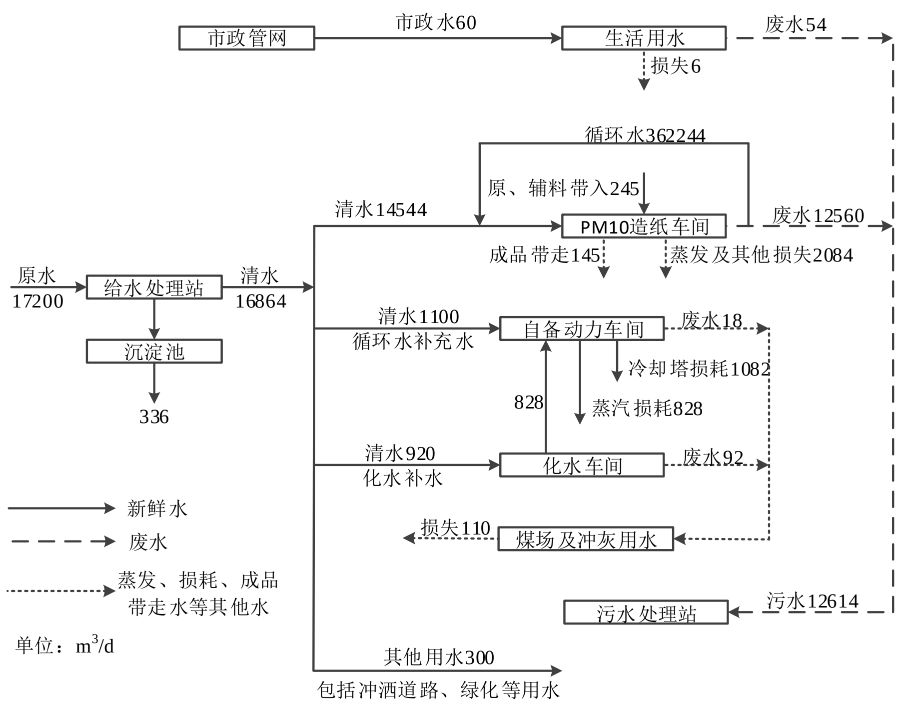
3.5.1 Water Balance

（1）拟建项目水平衡

(1) Water balance of proposed project

拟建项目水平衡见图 3.5-1。

Water balance of proposed project is as shown in –



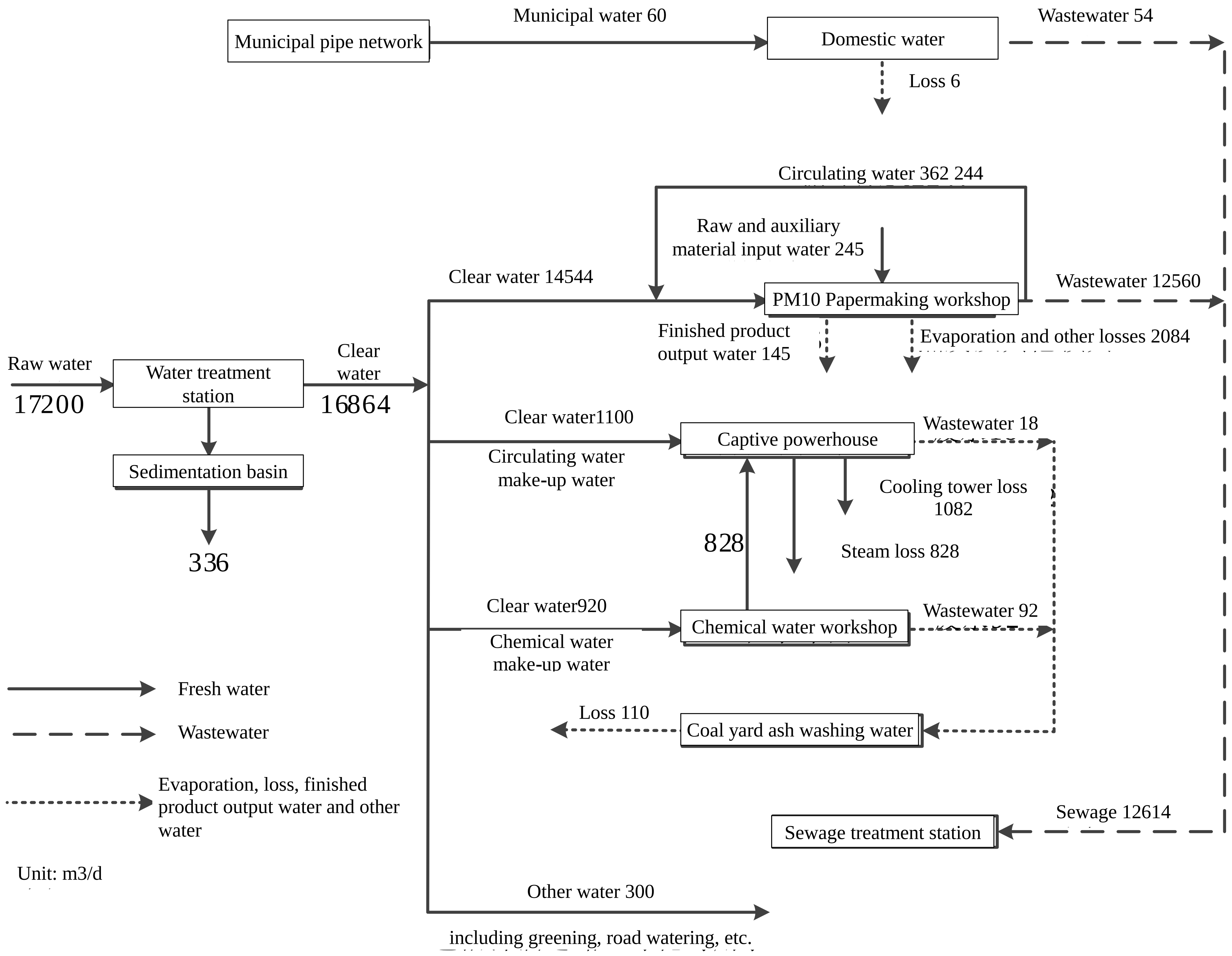


图 3.5-1　拟建项目水平衡图

Figure 3.5-1 Water Balance Diagram of Proposed Project

（2）拟建项目工业废水重复利用

(2) Reuse of industrial wastewater of proposed project

水重复利用率：指在确定的系统内，生产过程中排水，无需处理或经处理后被另一个系统利用的水量。拟建工程重复利用水量是指造纸车间白水用于制浆车间替代新鲜水的用量。

Water reuse rate: refers to water flow of the drainage during production in a defined system which is used by the other system without the need of treatment or upon treatment. Flow of water reused in the proposed project refers to the flow of white water used in the papermaking workshop to replace the fresh water in the pulping workshop.

$$\text{水重复利用率}=\frac{\text{重复利用水量}}{\text{用水量}}\times 100\%$$

$$\text{Reuse rate of water}=\frac{\text{Reused water consumption}}{\text{Water consumption}}\times 100\%$$

表 3.5-1　拟建工程工业废水重复利用率一览表

Table 3.5-1 Schedule of Reuse Rate of Industrial Wastewater in Proposed Project

生产线 Production line	清水（m^3/d） Clean water (m^3/d)	循环水（m^3/d） Circulating water (m^3/d)	合计（m^3/d） Total (m3/d)	工业用水重复利用率（%） Reuse rate of industrial water (%)
PM10	14544	362244	376788	96.14

（3）全厂水平衡

(3) Water balance of whole plant

拟建项目完成后，全厂项目水平衡情况见图 3.5-2。

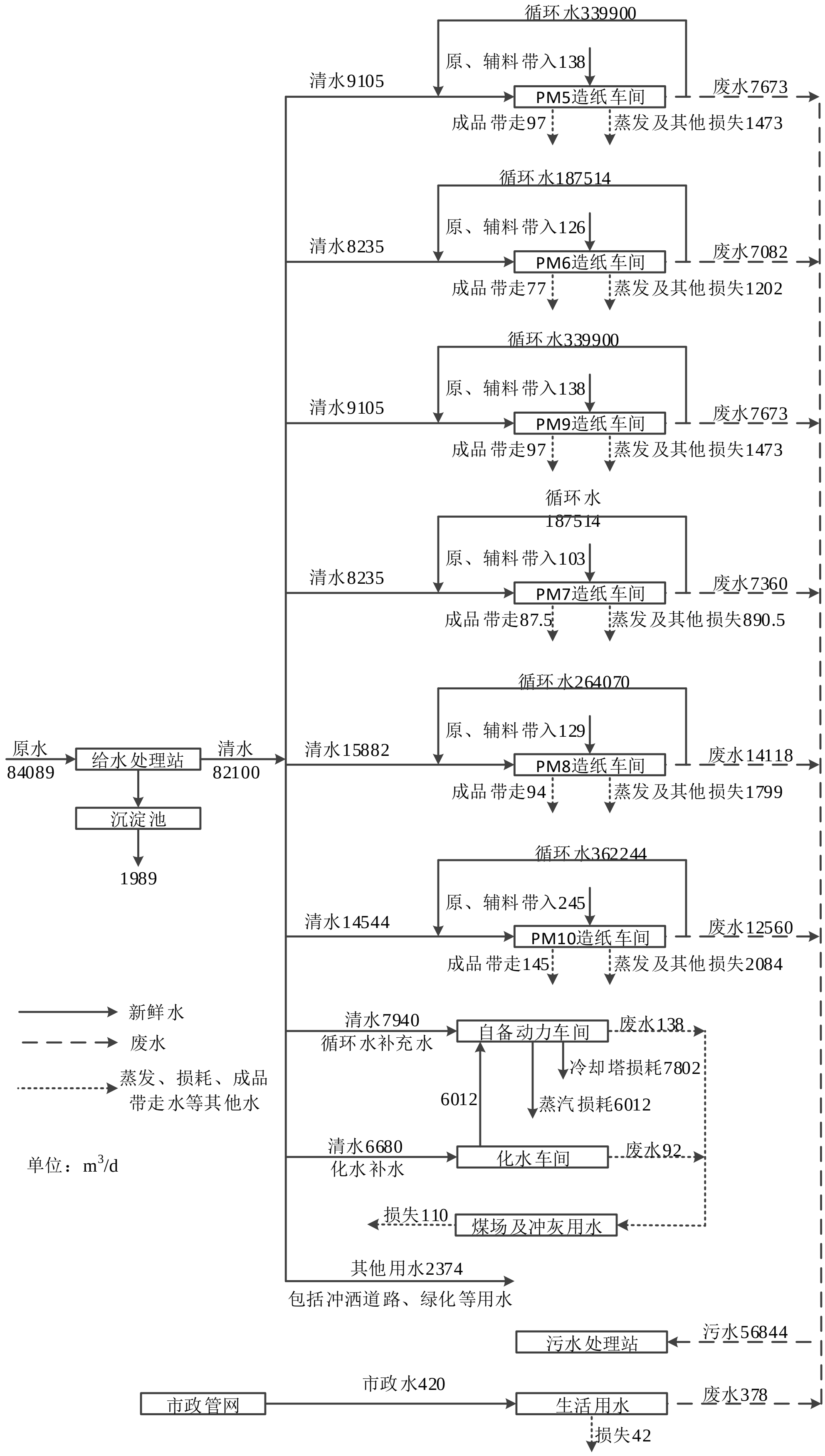
Water balance conditions of the projects throughout the plant upon completion of proposed project are as shown in Figure 3.5-2.

3.5.2 浆水平衡图

3.5.2 Pulp water Balance

拟建项目（PM10）浆水平衡见图 3.5-3。

Pulp water balance of proposed project (PM10) is as shown in Figure 3.5-3


循环水339900
原、辅料带入138
清水9105
PM5造纸车间
废水7673
成品带走97
蒸发及其他损失1473
循环水187514
原、辅料带入126
清水8235
PM6造纸车间
废水7082
成品带走77
蒸发及其他损失1202
循环水339900
原、辅料带入138
清水9105
PM9造纸车间
废水7673
成品带走97
蒸发及其他损失1473
循环水
187514
原、辅料带入103
清水8235
PM7造纸车间
废水7360
成品带走87.5
蒸发及其他损失890.5
循环水264070
原、辅料带入129
原水
84089
给水处理站
清水
82100
清水15882
PM8造纸车间
废水14118
沉淀池
成品带走94
蒸发及其他损失1799
1989
循环水362244
原、辅料带入245
清水14544
PM10造纸车间
废水12560
成品带走145
蒸发及其他损失2084
新鲜水
废水
蒸发、损耗、成品
带走水等其他水
单位：m3/d
清水7940
循环水补充水
自备动力车间
废水138
冷却塔损耗7802
6012
蒸汽损耗6012
清水6680
化水补水
化水车间
废水92
损失110
煤场及冲灰用水
其他用水2374
包括冲洒道路、绿化等用水
污水处理站
污水56844
市政管网
市政水420
生活用水
废水378
损失42

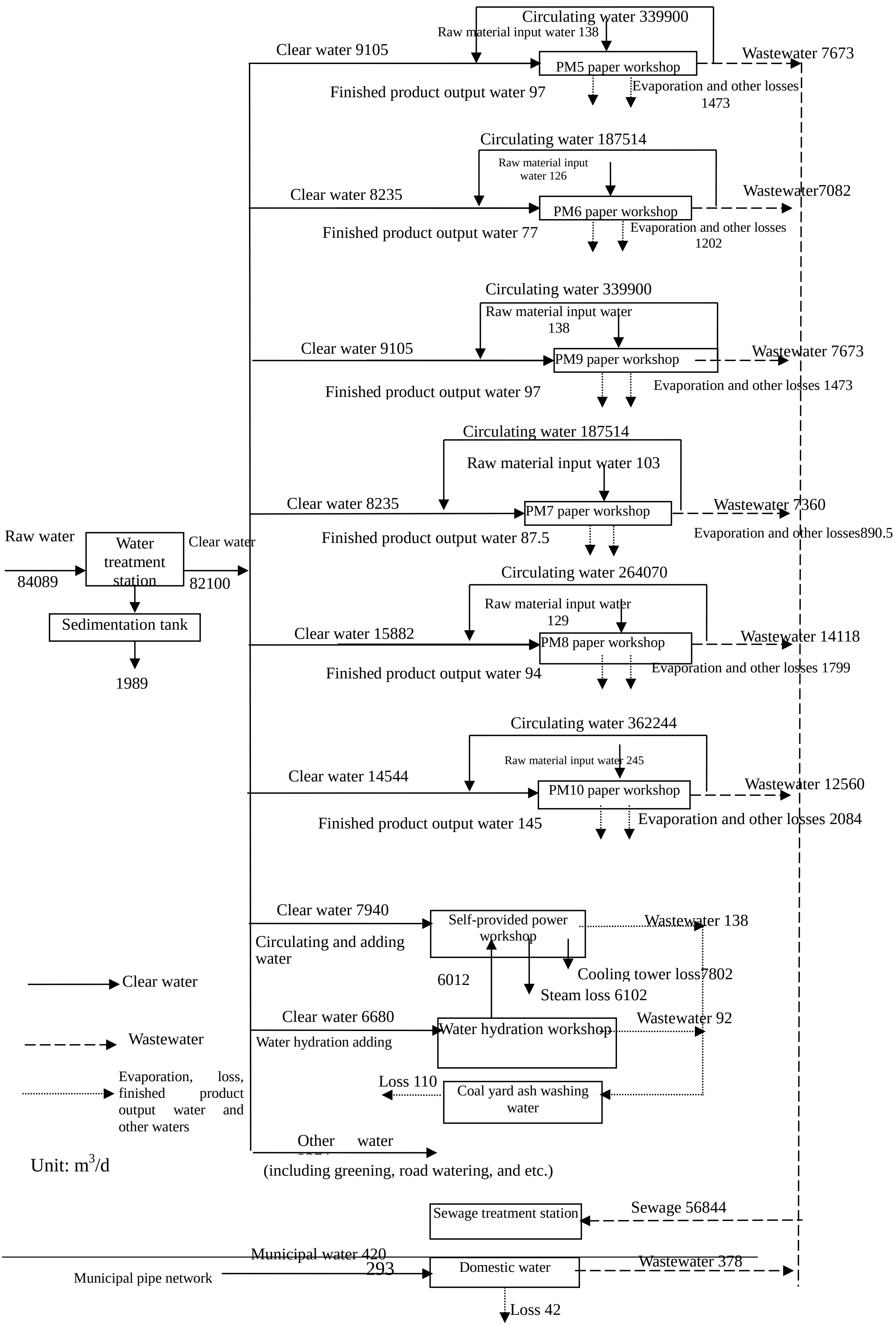
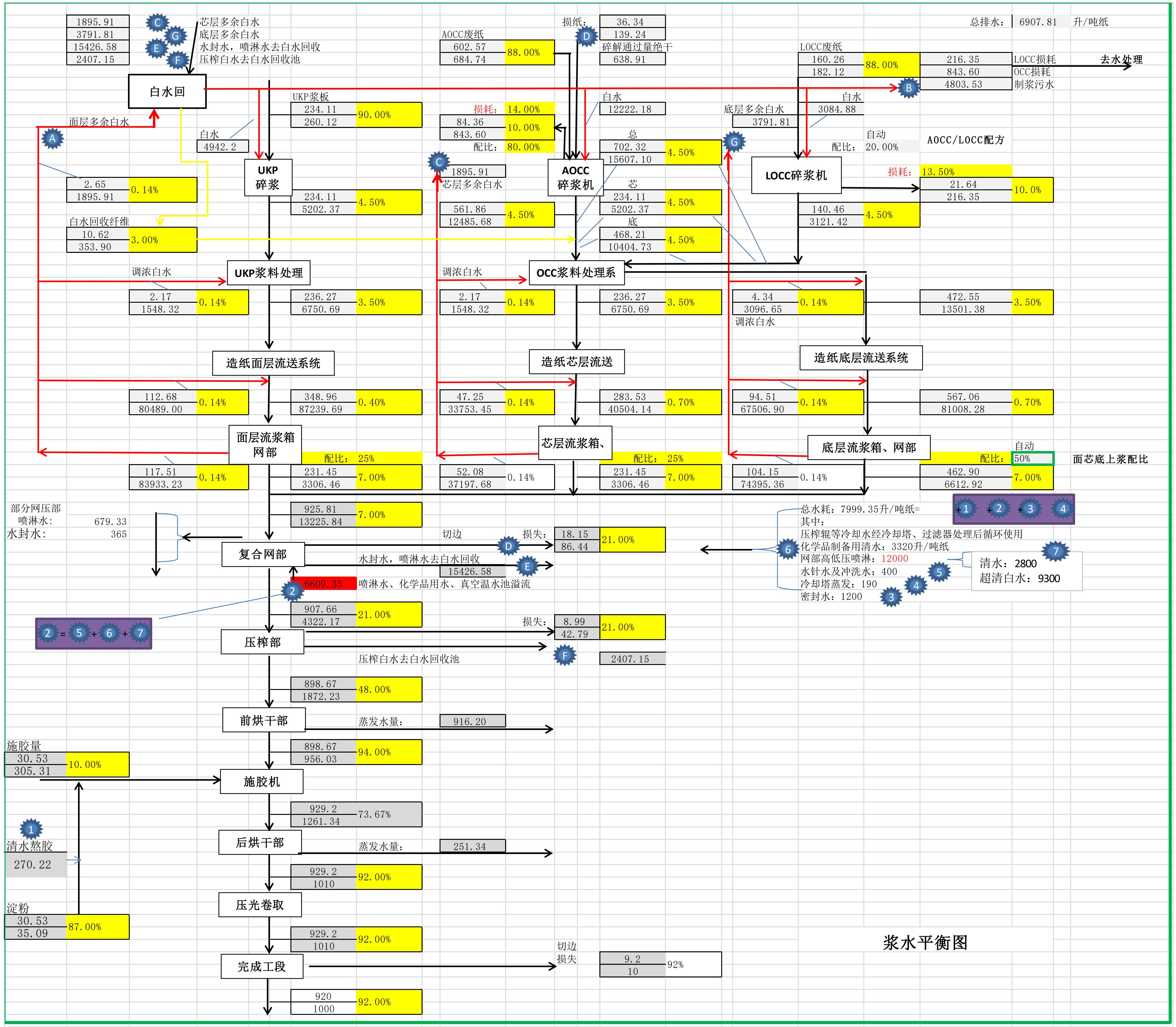

Circulating water 339900
Raw material input water 138
Clear water 9105
PM5 paper workshop
Wastewater 7673
Finished product output water 97
Evaporation and other losses 1473
Circulating water 187514
Raw material input water 126
Clear water 8235
PM6 paper workshop
Wastewater7082
Finished product output water 77
Evaporation and other losses 1202
Circulating water 339900
Raw material input water 138
Clear water 9105
PM9 paper workshop
Wastewater 7673
Finished product output water 97
Evaporation and other losses 1473
Circulating water 187514
Raw material input water 103
Clear water 8235
PM7 paper workshop
Wastewater 7360
Finished product output water 87.5
Evaporation and other losses890.5
Raw water
84089
Water treatment station
Clear water
82100
Sedimentation tank
1989
Circulating water 264070
Raw material input water 129
Clear water 15882
PM8 paper workshop
Wastewater 14118
Finished product output water 94
Evaporation and other losses 1799
Circulating water 362244
Raw material input water 245
Clear water 14544
PM10 paper workshop
Wastewater 12560
Finished product output water 145
Evaporation and other losses 2084
Clear water 7940
Self-provided power workshop
Wastewater 138
Circulating and adding water
6012
Cooling tower loss7802
Steam loss 6102
Clear water
Wastewater
Evaporation, loss, finished product output water and other waters
Clear water 6680
Water hydration adding
Water hydration workshop
Wastewater 92
Loss 110
Coal yard ash washing water
Other water
Unit: m^3/d
(including greening, road watering, and etc.)
Sewage treatment station
Sewage 56844
Municipal water 420
Municipal pipe network
Domestic water
Wastewater 378
Loss 42

图 3.5-2　全厂项目水平衡图

Figure 3.5-2 Steam Balance Diagram of Projects throughout the Plant


总排水： 6907.81 升/吨纸
芯层多余白水
底层多余白水
水封水，喷淋水去白水回收
压榨白水去白水回收池
白水回
面层多余白水
AOCC废纸
损耗
碎解通过量绝干
LOCC废纸
LOCC损耗
OCC损耗
制浆污水
去水处理
UKP浆板
白水
UKP 碎浆
AOCC 碎浆机
LOCC碎浆机
AOCC/LOCC配方
配比： 20.00%
白水回收纤维
调浓白水
UKP浆料处理
OCC浆料处理系
造纸面层流送系统
造纸芯层流送
造纸底层流送系统
面层流浆箱 网部
芯层流浆箱、
底层流浆箱、网部
面芯底上浆配比
部分网压部 喷淋水： 679.33
水封水： 365
复合网部
切边
总水耗：7999.35升/吨纸=
压榨辊等冷却水经冷却塔、过滤器处理后循环使用
化学品制备用清水：3320升/吨纸
网部高低压喷淋：12000
水针水及冲洗水：400
冷却塔蒸发：190
密封水：1200
清水：2800
超清白水：9300
喷淋水、化学品用水、真空温水池溢流
压榨部
压榨白水去白水回收池
前烘干部
蒸发水量： 916.20
施胶量
施胶机
后烘干部
蒸发水量： 251.34
清水熬胶 270.22
淀粉
压光卷取
完成工段
浆水平衡图

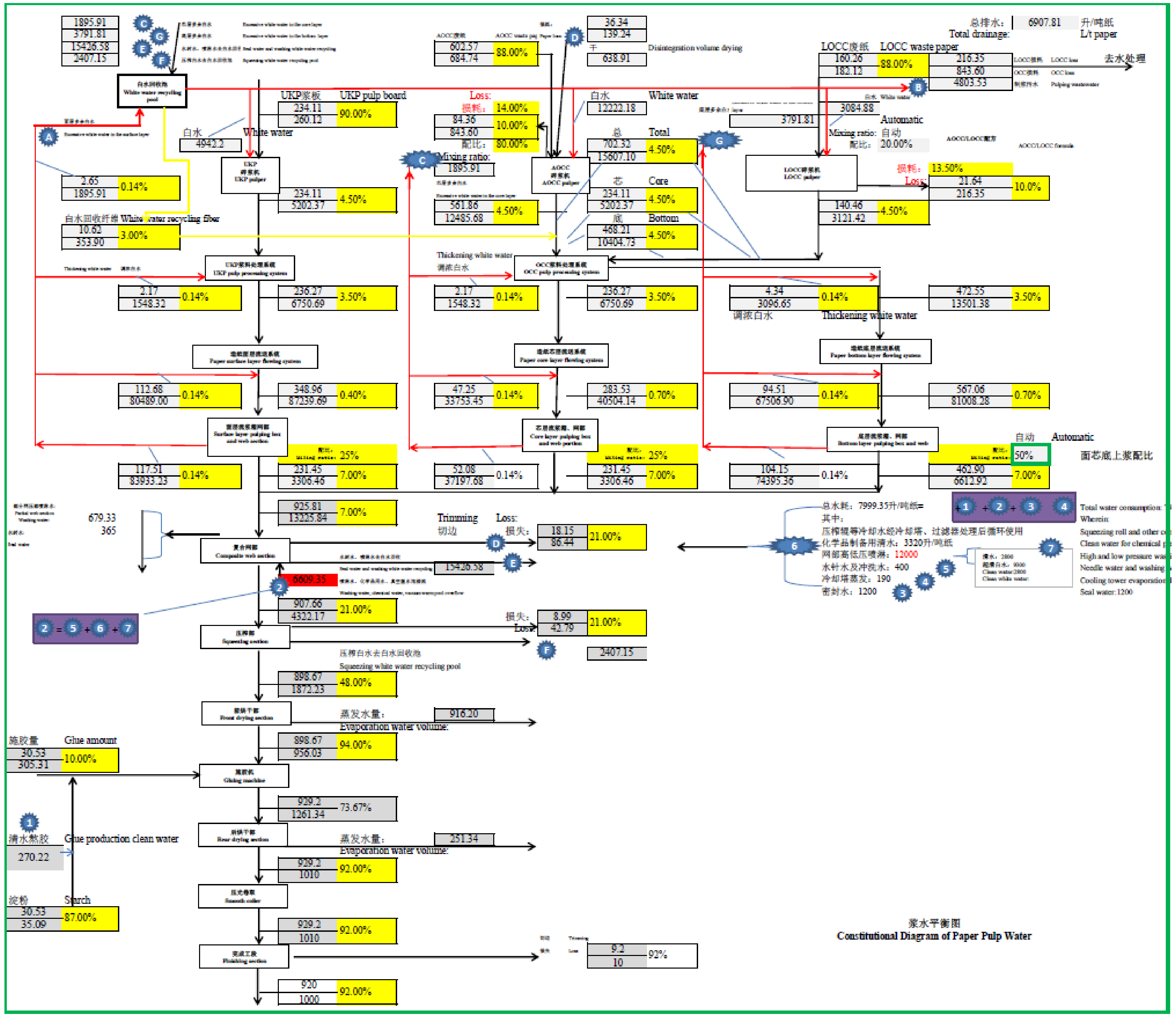


图 3.5-3 拟建项目浆水平衡图

Figure 3.5-3 Pulp Water Balance Diagram of Proposed Project

3.6 拟建工程污染排放情况分析

3.6 Analysis of Pollution Emission of Proposed Project

3.6.1 废水排放及控制措施

3.6.1 Wastewater Discharge and Control Measures

拟建项目产生的各类废水产生源及主要污染物如下：

Various sources of wastewater and major pollutants generated during production of the project are as follows:

（1）制浆造纸车间废水：主要是来自打浆、废纸处理和抄造等工段，湿纸幅压榨出的水分、辅料备制、浆料中添加的辅助化学品和助剂随着用于冲洗纸网上悬浮纤维的喷淋水流向网下，这些废水含有纤维碎屑、细小纤维、颜料、淀粉等，是低浓度有机废水，主要污染物是 COD、BOD_5、SS。

(1) Wastewater from pulping and papermaking workshop: mainly from the sections of beating, waste paper processing and papermaking, the moisture of the wet paper web, the preparation of auxiliary materials, and the auxiliary chemicals and additives added in the pulp. The spray water of suspended fiber on the fourdrinier flows to the fourdrinier. Such waste water contains fiber debris, fine fibers, pigments, starch, etc. It is a low-concentration organic wastewater. The main pollutants are COD, BOD5, SS.

（2）职工生活污水：主要含 COD、BOD_5、氨氮等。

(2) Domestic sewage of employees: mainly containing COD, BOD5, ammonia nitrogen, etc.

（3）给水处理站废水：制水过程中产生的废水主要来自沉淀池的排泥水和滤池的反冲洗水，主要的污染物是 SS。该股废水经沉淀处理后上清液直接入市政雨水管网。

(3) Wastewater of water treatment station: wastewater generated during water production is mainly sourced from sludge water of sedimentation basin and backwash water of filter basin with major pollutants being SS. After the sedimentation treatment of this wastewater, the supernatant liquid is directly discharged into the municipal

rainwater pipe network.

拟建工程的废水进入厂内污水处理厂进行处理，目前厂内已经建成污水处理站处理规模 80000m^3/d，采用“预处理+厌氧（IC）+好氧+深度处理”处理工艺，工艺流程图 3.6-1。现有全厂排入污水处理厂的废水量为 44230m^3/d，剩余余量为 35770m^3/d，完全可以满足处理拟建项目 12614m^3/d 的废水量，废水经过处理后满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 要求，目前污水处理站出水暂时排放至九龙江北港；待排海管道建设完成后，拟建项目产生废水及厂内现有工程产生的废水经过厂内污水处理厂处理达标后统一纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

The wastewater of the proposed project enters the in-plant sewage treatment plant for treatment. At present, the wastewater treatment station has been built within the plant with a treatment scale of 80,000 m3/d, adopting treatment process of “pretreatment + anaerobic (IC) + aerobic + deep treatment”.- The flow of wastewater discharged into the sewage treatment plant by the whole plant is 44,230m^3/d, and the remaining balance is 35,770m^3/d, which can fully meet the wastewater treatment capacity of 12,614m^3/d of the proposed project. Upon treatment, wastewater complies with requirements in Table 1 of DB35/1310-2013 *Emission Standards for Water Pollutants* in the Pulp and Paper Industry. Presently, the effluent from the sewage treatment station supporting the proposed project is temporarily discharged to North Port of Jiulong River. Once marine discharge pipes are completed, both wastewater generated by proposed project and by existing project in the plant will be incorporated into the tailwater marine discharge pipes of Jiaomei Sewage Treatment Plant (250,000 t/d) after being treated by the sewage treatment plant in the plant for uniform discharge to deep sea.

综合现有工程在线监测数据、验收监测情况以及类比《制浆造纸工程技术规范》（HJ2011-2012）等资料，拟建项目的废水排放情况见表 3.6-1。

Comprehensively considering on-line monitoring data, monitoring conditions in acceptance of existing project and comparing with *Technical Specifications for Pulp and Papermaking Projects* (HJ2011-2012) and other data, emission conditions of wastewater pollutants from proposed project are detailed in -.

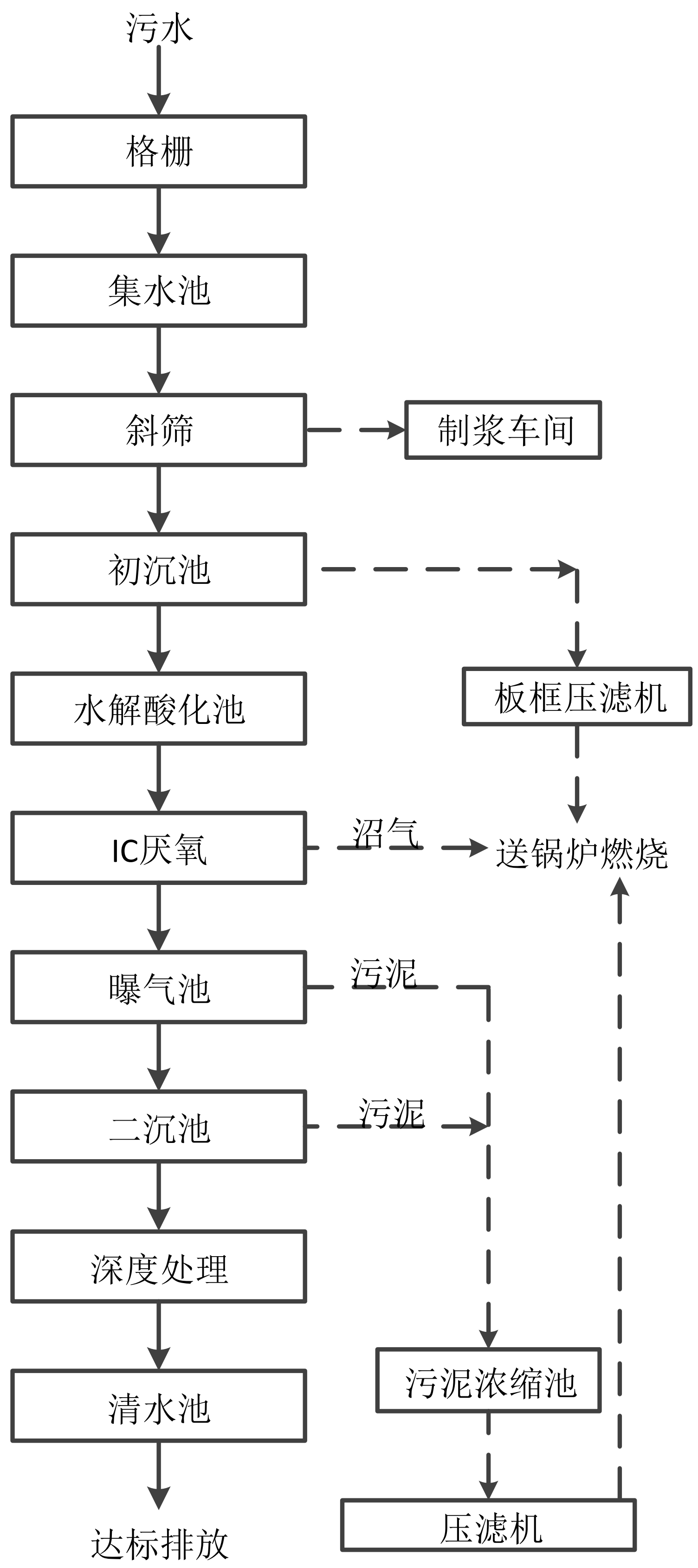
表 3.6-1 拟建项目正常工况下废水水质、水量情况一览表

Table 3.6-1 Schedule of Wastewater Quality and Flow under Normal Condition of Proposed Project

生产线 Production line	排水量 (m^3/d) Drainage flow (m^3/d)	COD		BOD_5		SS		氨氮 Ammonia nitrogen		总氮 Total nitrogen		总磷 Total phosphorus		pH	排放去向 Destination of discharge
		mg/l	t/d	mg/l	t/d	mg/l	t/d	mg/l	t/d	mg/l	t/d	mg/l	t/d		
拟建造纸车间（PM10） Proposed papermaking workshop (PM10)	12560	2900	36.42	1450	18.21	1400	17.58	15	0.19	--	--	--	--	9~10	厂内污水处理站 Sewage treatment station in plant
新增生活污水 Newly added domestic sewage	54	300	0.016	200	0.011	200	0.011	40	0.002	--	--	--	--	6-9	厂内污水处理站 Sewage treatment station in plant
现有工程废水 Wastewatre from existing project	44230	2900	128.27	1450	64.13	1400	61.92	15	0.66	--	--	--	--		厂内污水处理站 Sewage treatment station in plant
污水处理站进水 Influent to sewage treatment station	56844	2898	164.71	1498	90.88	1399	79.51	15	0.854	--	--	--	--		--

<table>
<tr><td rowspan="2">生产线
Production line</td><td rowspan="2">排水量
(m^3/d)
Drainage flow
(m^3/d)</td><td colspan="2">COD</td><td colspan="2">BOD_5</td><td colspan="2">SS</td><td colspan="2">氨氮
Ammonia nitrogen</td><td colspan="2">总氮
Total nitrogen</td><td colspan="2">总磷
Total phosphorus</td><td>pH</td><td rowspan="2">排放去向
Destination of discharge</td></tr>
<tr><td>mg/l</td><td>t/d</td><td>mg/l</td><td>t/d</td><td>mg/l</td><td>t/d</td><td>mg/l</td><td>t/d</td><td>mg/l</td><td>t/d</td><td>mg/l</td><td>t/d</td><td></td></tr>
<tr><td>污水处理站出水
Effluent from sewage treatment station</td><td>56844</td><td>78</td><td>4.43</td><td>20</td><td>1.14</td><td>20</td><td>1.14</td><td>2.0</td><td>0.11</td><td>10</td><td>0.57</td><td>0.4</td><td>0.022</td><td>6~9</td><td>并入园区污水管网经园区排污口排放
Incorporated into sewage pipe network of the park for discharge via drain outlet</td></tr>
<tr><td>控制标准
Control standard
DB35/1310-2013《制浆造纸工业水污染物排放标准》表1
Table 1 of DB35/1310-2013 Emission Standards for Water Pollutants</td><td>--</td><td>＜80</td><td>--</td><td>＜20</td><td>--</td><td>＜30</td><td>--</td><td>＜8</td><td>--</td><td>＜12</td><td>--</td><td>＜0.8</td><td>--</td><td>6-9</td><td>--</td></tr>
</table>

生产线 Production line	排水量 (m^3/d) Drainage flow (m^3/d)	COD		BOD_5		SS		氨氮 Ammonia nitrogen		总氮 Total nitrogen		总磷 Total phosphorus		pH	排放去向 Destination of discharge
		mg/l	t/d	mg/l	t/d	mg/l	t/d	mg/l	t/d	mg/l	t/d	mg/l	t/d		
达标情况 Up to standard Up to standard Yes/No	--	达标 Yes	--	达标 Yes	--	达标 Yes	--	达标 Yes	--	达标 Yes	--	达标 Yes	--	达标 Yes	--


污水
格栅
集水池
斜筛
制浆车间
初沉池
板框压滤机
水解酸化池
IC厌氧
沼气
送锅炉燃烧
曝气池
污泥
二沉池
污泥
深度处理
清水池
污泥浓缩池
压滤机
达标排放

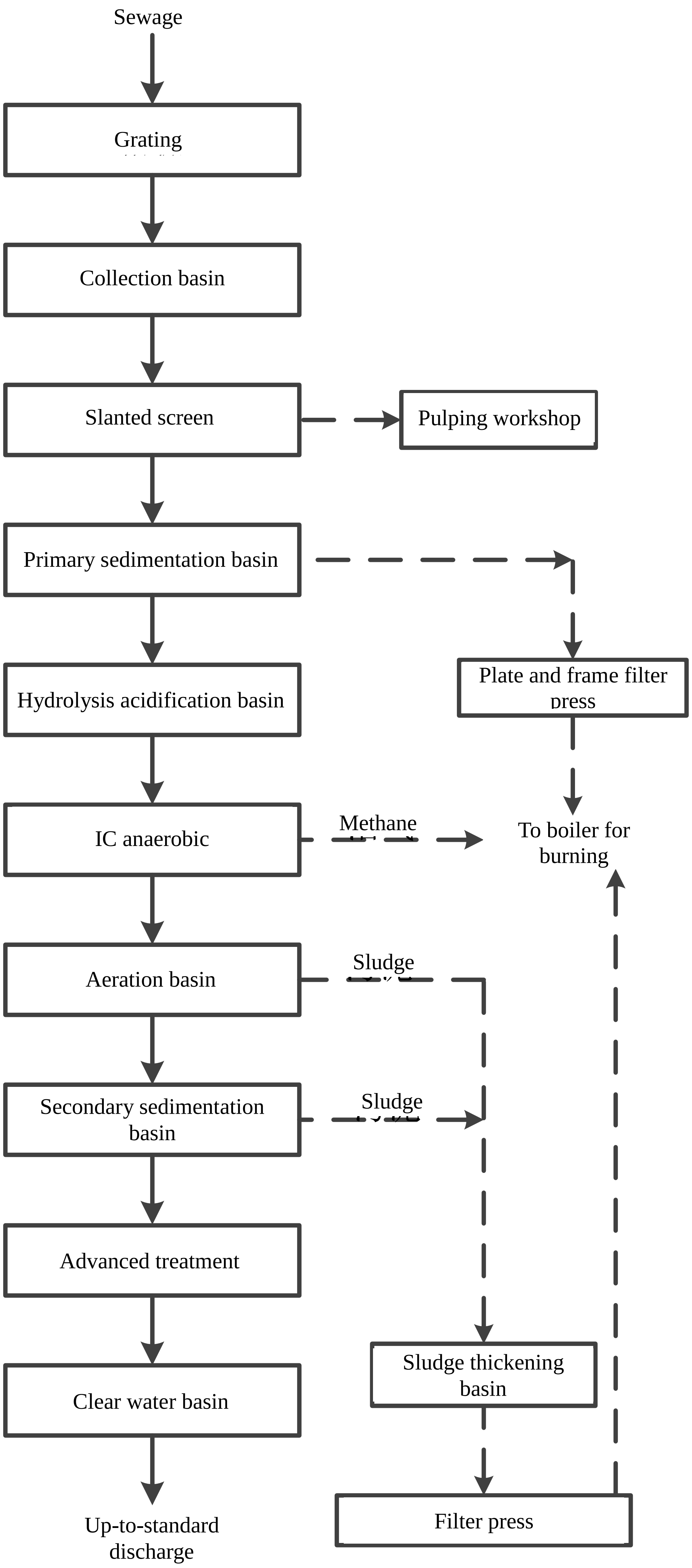


图 3.6-1　厂内配套污水处理工艺流程图

Figure 3.6-1 Process Flow Chart of Associated Sewage Treatment within Plant

3.6.2 废气排放及控制措施

3.6.2 Waste Gas Emission and Control Measures

根据工程分析，拟建工程生产用蒸汽依托厂内现有动力车间；污水处理依托厂内现有污水处理站。

According to engineering analysis, steam used for production of proposed project is sourced from existing powerhouse; sewage treatment is based on existing sewage treatment station within the plant.

因此，拟建工程无新增废气污染源。

As such, proposed project has no newly added source of waste gas pollution.

3.6.3 固体废物产生及控制措施

3.6.3 Solid Waste Generation and Control Measures

拟建项目产生的主要固体废物为造纸车间固废（包括浆渣、塑料、铁钉铁丝、砂石、污泥等）、给水处理站污泥、污水处理站污泥等。拟建工程固体废物产生及处理情况见表 3.6-2。

The solid waste generated in the existing projects consist of, among others, solid waste in the papermaking workshop (including, inter alia, pulp residue, plastic, iron nail & wire, sand & stone, and sludge), sludge of water treatment station, sludge of sewage treatment station and so on. Solid waste generation and treatment conditions of proposed project are as shown in Table 3.6-2.

表 3.6-2 拟建项目主要固体废物产生情况

Table 3.6-2 Major Solid Waste Generation Conditions of Proposed Project

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	拟建项目 Proposed project	
			产生量（t/a） Generation flow (t/a)	处置方式 Disposal method
制浆造纸车间 Pulping and papermaking workshop	浆渣（木片、纤维束等） Pulp residue (wood chip, fibre bundle and so on)	一般固废 General solid waste	34155	送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置 Delivered to

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	拟建项目 Proposed project	
			产生量（t/a）Generation flow (t/a)	处置方式 Disposal method
				Zhangzhou Yisheng Environmental Protection Energy Co., Ltd for disposal by incineration
	铁丝、塑料等 Iron wire, plastic and so on	一般固废 General solid waste	25075	铁丝和塑料经收集后进入联盛纸业的年处理 55 万吨造纸废渣厂区进行清洗、筛分后铁丝出售给物资回收部门（铁丝等金属出售给漳州皖润物资回收有限公司；塑料等出售给福建友峰塑胶有限公司） After collecting the wire and plastic, they enter the Liansheng Paper's annual processing of 550,000 tons of papermaking waste slag plant area for cleaning and screening. The wire is sold to the material recycling department (the metal such as wire is sold to Zhangzhou Yurun Material Recovery Co., Ltd.; plastics, etc. are sold to Fujian Youfeng Plastic Co., Ltd.)
	砂石、污泥等 Sand, stone, sludge and so on	一般固废 General solid waste	15570	环卫部门清运处理 Cleaning and transportation for

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	拟建项目 Proposed project	
			产生量（t/a） Generation flow (t/a)	处置方式 Disposal method
				disposal by sanitation authorities
污水处理站 Sewage Treatment Station	污泥（含水率 50%） Sludge (with water content of 50%)	一般固废 General solid waste	13586	送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置 Delivered to Zhangzhou Yisheng Environmental Protection Energy Co., Ltd for disposal by incineration
给水处理站 Water treatment plant	污泥（含水率 80%） Sludge (with water content of 80%)	一般固废 General solid waste	729.6	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
办公生活区 Office and living quarter	生活垃圾 Domestic waste	一般固废 General solid waste	165.24	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
生产车间 Production workshop	废润滑油 Waste lube oil （危废类别 HW08） (classification of hazardous waste: HW08)	危险废物 Hazardous waste	3	暂存于危废仓库，委托给漳州联办环保产业有限公司进行处置 Tentatively stored in hazardous waste warehouse to be commissioned to Zhangzhou Joint Office Environmental Protection Industry Co., Ltd for disposal
合计 Total			89283.84	

3.6.4 噪声产生及控制措施

3.6.4 Noise Generation and Control Measures

拟建项目噪声源主要为造纸生产机械设备如碎浆机、除砂器、双磨盘、浆泵、水泵、造纸机等工艺设备噪声，其中水力碎浆机及造纸机是重点控制的噪声源。

Noise source of proposed project is mainly production machinery equipment for papermaking, such as pulper, desander, double disc refiner, pulp pumps, water pumps and papermaking machines, with focus on control of such noise source as hydraulic pulpers and papermaking machine.

拟建项目产生噪声的主要设备及噪声级见表 3.6-3。

Major equipment generating noise and noise level of proposed project are as shown in Table 3.6-3.

表 3.6-3　产生噪声的主要设备及噪声级　单位：dB(A)

Table 3.6-3 Major Equipment Generating Noise and Noise Level in dB(A)

序号 Seq no.	设备名称 Designation	数量 Qty.（台/套）(Set)	所在车间 Respective workshop	噪声级dB（A）Noise level dB(A)	距厂界距离 Distance from battery limit				治理措施 Prevention & control measures	降噪效果 dB(A) Noise reduction effect dB(A)
					E	S	W	N		
1	碎浆机 Pulper	2	制浆车间 Pulping workshop	90	450	530	300	450	基础减振、厂房隔声 Foundation vibration reduction, sound insulation in powerhouse	20
2	高浓除砂器 High concentration desander	2		85	430	515	320	465		20
3	双盘磨 Double disc refiner	2		85	430	490	320	490		20
4	浆泵 Pulp pump	1		85	430	490	320	490		20
5	水泵 Water pump	16		85	420	520	330	460		20

6	造纸机 Papermaking machine	1	造纸车间 Papermaking workshop	90	400	410	350	570		20

3.7 拟建项目主要污染物汇总

3.7 Summary to major pollutants of proposed project

拟建项目主要污染物汇总详见表 3.7-1。

Summary to major pollutants of proposed project is detailed in -.

表 3.7-1　拟建项目主要污染物核算表

Table 3.7-1 Accounting Sheet of Major Pollutants of Proposed Project

内 容 Contents		产生量 Generation flow	削减量 Reduction flow	排放量 Emission flow
一、废水 I. Wastewater				
1	废水量（万t/a） Wastewater flow (ten thousand t/a)	416.262	0.00	416.262
2	COD（t/a）	12023.88	11699.2	324.68
3	BOD_5（t/a）	6012.93	5924.68	83.25
4	SS（t/a）	5805.03	5721.78	83.25
5	氨氮（t/a） Ammonia nitrogen (t/a)	/	/	8.33
6	总氮 Total nitrogen	/	/	42.89
7	总磷 Total phosphorus	/	/	1.72
二、固体废物 II. Solid Waste				
1	浆渣（木片、纤维束等） Pulp residue (wood chip, fibre bundle and so on)	34155	0	34155
2	铁丝、塑料等 Iron wire, plastic and so on	25075	0	25075
3	砂石、污泥等 Sand, stone, sludge and so on	15570	0	15570

内 容 Contents		产生量 Generation flow	削减量 Reduction flow	排放量 Emission flow
4	污泥（含水率50%） Sludge (with water content of 50%)	13586	0	13586
5	污泥（含水率80%） Sludge (with water content of 80%)	729.6	0	729.6
6	生活垃圾 Domestic waste	165.24	0	165.24
7	废润滑油 Waste lube oil （危废类别HW08） (classification of hazardous waste: HW08)	3	0	3

3.8 拟建工程完成前后“三本账”

3.8 “Three Accounting Books" prior to and upon completion of proposed project

拟建工程完成前后“三本账”情况汇总详见表 3.8-1。

Summary to conditions of “Three Accounting Books” prior to and upon completion of proposed project are detailed in -

表 3.8-1 拟建工程完成前后“三本账”汇总表

Table 3.8-1 Summary to Conditions of “Three Accounting Books” prior to and upon completion of Proposed Project

项目 Item	污染物名称 Name of pollutants	现有工程排放量 Emission of existing project	拟建工程排放量 Emission of proposed project	“以新带老”削减量 Reductions of replacement of existing project with new project	拟建项目建成后全厂排放量 Water consumption conditions of proposed project throughout the plant upon its completion	变化情况 Change conditions

废水 Wastewater	废水量（万t/a） Wastewater flow (ten thousand t/a)	1503.82	416.262	0	1920.082	+416.262
	COD（t/a） COD (t/a)	1172.98	324.68	0	1497.66	+324.68
	BOD_5（t/a） BOD_5 (t/a)	300.76	83.25	0	384.01	+83.25
	SS（t/a） SS (t/a)	300.76	83.25	0	384.01	+83.25
	氨氮（t/a） Ammonia nitrogen (t/a)	30.08	8.33	0	38.41	+8.33
	总氮 Total nitrogen	150.38	42.89	0	193.27	+42.89
	总磷 Total phosphorus	6.02	1.72	0	7.74	+1.72
废气 Waste gas	废气量（万 m^3/a） Waste gas emission (ten thousand m^3/a)	750720	0	0	750720	0
	烟尘（t/a） Flue gas (t/a)	187.68	0	0	187.68	0
	SO_2（t/a） SO_2 (t/a)	675.65	0	0	675.65	0
	NOx（t/a） NOx (t/a)	1126.08	0	0	1126.08	0
	破碎粉尘 Crushing dust	0.6	0	0	0.6	0
固体废物 Solid waste	生活垃圾 Domestic waste	550.8	165.24	0	716.04	+165.24
	一般工业固废 General industrial solid waste	815350	89115.6	0	904465.6	+89115.6
	危险废物 Hazardous waste	10.0	3	0	13.0	+3

3.9 清洁生产分析

3.9 Analysis of Clean Production

清洁生产是指将整体预防的环境战略持续应用于生产过程、产品和服务中，以增加生态效率和减少人类及环境的风险。绿色化学是指利用化学原理从根本上减少或消除有毒有害物质的使用和产生。本报告将根据清洁生产的原则，结合“绿色化学”的理念，从生产工艺与装备要求、资源能源利用指标、产品指标、污染物产生指标（末端处理前）、废物回收利用要求和环境管理要求六方面进行清洁生产和绿色化学分析。评价等级分为三级，一级为优，可达到国际上同行业清洁生产先进水平；二级良，达到国内同行业先进水平；三级中等，达到国内一般清洁生产水平，即基本要求。

Clean production refers to the continuous application of environmental strategies for overall prevention to production processes, products and services to increase eco-efficiency and reduce human and environmental risks. Green chemistry refers to the use of chemical principles to fundamentally reduce or eliminate the use and production of toxic and hazardous substances. This report will be based on the principle of cleaner production, combined with the concept of “green chemistry”, from production process and equipment requirements, resource and energy utilization indicators, product indicators, pollutant production indicators (prior to end treatment), waste recycling requirements and environmental management requirements. Assessment is classified into three grades. Grade 1 is excellent, which can reach the international advanced level of clean production in the same industry; Grade 2 is good, which can reach advanced peer level in the domestic industry; Grade 3 is inbetween, which can reach domestic general clean production level, namely, the basic requirements.

建设单位于 2016 年开展企业清洁生产审核，根据清洁生产核审的验收意见，项目清洁生产审核结论：公司建立健全的清洁生产审核领导小组和管理机构，制定了详细审核计划和考核目标，实施清洁生产无/低费方案，并认真、及时地组织实施清洁生产中/高费方案。方案实施后，企业清洁生产水平能够达到国内清

洁生产先进水平要求，取得了良好的环境、社会、经济效益，达到了预期效果。综合分析，**企业在审核后达到国内行业清洁生产先进水平（二级）**。

The construction company carried out the enterprise clean production audit in 2016. According to the inspection and acceptance opinions of the clean production audit, the project clean production audit conclusion: the company established a sound clean production audit leading group and management organization, formulated a detailed audit plan and assessment objectives, and implemented cleaning. Production no/low fee program, and organize the implementation of clean production medium/high fee plan in a serious and timely manner. Upon implementation of the plan, the company's clean production level can meet the requirements of the domestic advanced level of clean production, and achieved good environmental, social and economic benefits, and achieved the expected results. To sum up, **the company reached the advanced level of clean production in domestic industry after the audit (Grade 2)**

现有工程与拟建工程清洁生产指标对比详见表 3.9-1。

Comparison of clean production indexes between existing and proposed project is detailed in Table 3.9-1.

表 3.9-1 清洁生产指标对比表

Table 3.9-1 Comparison Sheet of Clean Production Indexes

序号 Seq no.	名称 Designation	单位 Unit	牛皮箱板纸（PM5/PM9）Kraft linerboard (PM5/PM9)	高强瓦楞原纸（PM6线）High-strength corrugating medium (PM6 line)	灰板纸（PM7线）Gray board (PM7 line)	灰底涂布白板纸（PM8线）Gray-coated whiteboard paper (PM8 line)	拟建项目（高档箱板纸 PM10）Proposed project (high-strength corrugating medium PM10)
1	单位产品取水量 Water draw rate	m^3/t	7	8	8	13.5	8

	per unit production						
2	单位产品综合能耗 Comprehensive energy consumption per unit product	kgce/t	273.89	258.26	257.82	375.96	221.9
3	水重复利用率 Reuse rate of water	%	97.39	95.79	95.79	94.33	96.14
4	单位产品废水产生量 Wastewater generations per unit product	m^3/t	5.8	6.9	7.1	12	6.9
5	单位产品COD_{Cr}产生量 COD_{Cr} generations per unit product	kg/t	6.15	6.15	6.15	6.15	6.15

由上表 3.9-1 可知，拟建项目与现有工程的清洁指标基本持平，因此针对拟建项目本环评进行清洁生产简要分析。

As shown in above Table 3.9-1, the clean index of the proposed project is basically the same as that of the existing project. Therefore, a brief analysis of the clean production of the proposed environmental impact assessment is carried out.

3.9.1 纸浆造纸清洁生产分析

3.9.1 Analysis of Clean Production in Pulp Papermaking

3.9.1.1 原辅材料

3.9.1.1 Raw and Auxiliary Materials

造纸原料品种多样，主要造纸原料除木材外，还有草类原料，如稻草、麦草、芦苇、芒秆、蔗渣和废纸等。我国是造纸大国，但是造纸资源极为短缺，特别是森林资源不足。原料结构中木浆比例低，大量的非木材纤维（如稻草、麦草、芦苇、芒秆、蔗渣等）制浆又在一定程度上增加了环境污染。加大废纸资源的开发利用，可以变废为宝，节约纤维原料。废纸的再生，国外称之为“城市里的森林工程”。比起用木材造纸，利用 1t 废纸，可生产约 0.8t 再生浆，可替代节约 3～4m^3 的木材，减少了森林资源的消耗，可节省约 1.2t 煤、600kW·h 电和 100t 水。同时还降低了环境污染。

There are various kinds of raw materials for papermaking. In addition to wood, the main raw materials for papermaking are grass raw materials such as straw, wheat straw, reed, stalk, bagasse and waste paper. China is a big paper country, but there is a shortage of paper resources, especially insufficient forest resources. The proportion of wood pulp in the raw material structure is low, and a large amount of non-wood fiber (such as straw, wheat straw, reed, stalk, bagasse, etc.) pulping increases environmental pollution to some extent. Increase of the development and utilization of waste paper resources may turn waste into treasure and save fiber raw materials. The recycling of waste paper is referred to as “forestation project in the city” abroad. Compared with wood papermaking, using 1t waste paper, it can produce about 0.8t recycled pulp, which can save 3-4m^3 of wood, reduce the consumption of forest resources, and save about 1.2t coal, 600kW·h electricity and 100t water, not to mention the reduction of environmental pollution.

采用木材制浆生产的纸产品质量比较好，但是由于我国森林资源比较匮乏，原料来源受到很大的限制。而且建厂投资大，污染较为严重，污染治理设施投资也相应较大。与化学制浆造纸比较，废纸制浆可减少 75%的空气污染、35%的水污染。

The quality of paper products produced by wood pulping is relatively good, but due to the scarcity of forest resources in China, the source of raw materials is greatly limited. Moreover, the investment in building a factory is large, the pollution is more serious, and the investment in pollution control facilities is correspondingly larger.

Compared with chemical pulping and papermaking, waste paper pulping can reduce air pollution by 75% and water pollution by 35%,

在原辅材料的选购上严格控制，选择高品质原材料。拟建项目使用原料主要为 NUPK 废纸、AOCC 进口废纸、OCC 国内废纸等，原料均通过现有采购途径进行采购，原料来源有保证；生产线设有配套的原辅材料仓储用房，防止雨水、灰尘、泥砂等混入原料中，保持原料清洁；并在生产过程中严格控制化学品的投量同时污染也较轻。

With purchase of raw and auxiliary materials being strictly controlled and high quality raw materials being selected, the raw materials used in the proposed project are mainly NUPK waste paper, AOCC imported waste paper, OCC domestic waste paper, etc. The raw materials are all purchased through the existing procurement channels, the source of raw materials is guaranteed; the production line is equipped with supporting raw and auxiliary materials storage rooms to prevent Rainwater, dust, muddy sand, etc. are mixed into the raw materials to keep the raw materials clean; and the chemical injection rate is strictly controlled in the production process, and the pollution is also light.

另外拟建项目生产过程中要添加和使用一些化学品，这些化学品毒性低，对环境和人体健康产生的不良影响都很小。

In addition, some chemicals should be added and used in the production process of the proposed project. These chemicals are low in toxicity and have little adverse effects on the environment and human health.

3.9.1.2 生产工艺技术及装备水平

3.9.1.2 Production Process & Technology and Equipment Level

拟建项目采用高得率、低污染制浆技术，制浆采用高效筛选、净化和纤维分级技术，造纸采用靴式压榨脱水技术，配套 DCS\QCS 等，均为国内外先进的制浆造纸设备。

The proposed project uses high-yield, low-pollution pulping technology, high-efficiency screening, purification and fiber grading technology for pulping, shoe-type press dewatering technology for papermaking, DCS\QCS, etc., all of which are advanced pulp and paper equipment at home and abroad.

废纸制浆生产工艺主要包括蒸煮制浆和机械制浆两种。原始的废纸再生工艺多采用蒸煮的方式，在加药、加温条件下离解废纸，工艺与操作比较简单；但能耗大，制浆得率低而且污染相对较重。由于节能和环保的要求，国际上逐步以水力碎浆机取代了蒸煮。尽管水力碎浆机的功能也日益改进，但有时仍不能满意地处理着色废纸。因此采用蒸煮工艺处理着色废纸仍在应用；机械制浆是废纸经破碎离解后，通过除渣器除去杂物即可送去造纸，用水量较少，水污染较轻。

Waste paper pulp production process mainly includes cooking pulping and mechanical pulping. Original waste paper recycling process mostly uses the cooking method to dissociate the waste paper under the condition of adding and heating, and the process and operation are relatively simple; but the energy consumption is large, the pulping yield is low and the pollution is relatively heavy. With the requirements of energy conservation and environmental protection, cooking is progressively replaced with hydropulper in international context. Hydropulper, though is increasingly improved with its function, occasionally is still not satisfactory to handle the colored waste paper. Therefore, the cooking method to treat the colored waste paper is still in use; the mechanical pulping is that after the waste paper is disintegrated by the slag, the waste material can be removed by the slag remover, the water consumption is less, and the water pollution is lighter.

拟建项目采用机械制浆法，在工艺上主要考虑以下环节来保证工艺技术的先进性：

The proposed project adopts the mechanical pulping method, and the following aspects are mainly considered in the process to ensure the advancement of the process technology:

（1）合理安排碎浆、粗筛、除砂、精筛等基本工序的顺序，形成最优化组合的制浆系统，是每个处理环节在各自的节点上都能充分发挥功效，达到最优化，保证整个制浆系统的效益。

(1) Reasonably arrange the sequence of basic processes such as pulping, coarse screening, sand removal, fine screening, etc., to form an optimal combination of

pulping system, which is capable of fully exerting effects on each node at each processing step to achieve optimization and to ensure the effectiveness of the entire pulping system.

（2）尽早、尽快的除去所有杂质，减少后续设备的负担和投资，保证系统运转良好。

(2) Remove all impurities as soon as possible and reduce the burden and investment of subsequent equipment to ensure that the system works well.

（3）选择合理有效的单体设备，保证各处理环节的效率。

(3) Select reasonable and effective single equipment to ensure the efficiency of each processing link.

（4）在保证良浆质量的同时，尽量减少排渣率，注意二段设备的配置，提高废纸制浆的浆得率。

(4) While ensuring the quality of good pulp, minimize the slagging rate, pay attention to the configuration of the second-stage equipment, and improve the pulp yield of waste paper pulping.

3.9.1.3 节能节水措施

3.9.1.3 Energy and Water Saving Measures

（1）节能措施

Energy saving measures

拟建项目采用废纸抄造高档箱板纸，采用湿法造纸方法，抄造时少量纤维原料会通过成型网进入白水中，本工程采用多盘回收机对网下白水进行回收，不仅对水回收再用，而且回收的纤维原料全部回用。

The proposed project uses waste paper to make high-grade cardboard paper, and adopts the wet papermaking method. When the paper is made, a small amount of fiber raw materials will enter the white water through the forming net. This project uses a multi-disc recycling machine to recover the white water under the net, not only for water recycling, but also the recycled fiber raw materials are reused.

碎浆车间选用高浓除渣等工艺，降低能耗；选用靴式压榨，提高纸页进烘干部的干度；烘干部采用密闭气罩和热回收装置，回收部分热能；纸机采用交流变

频传动，减少能源消耗。

The pulping workshop adopts high-concentration slag removal and other processes to reduce energy consumption; the shoe press is used to improve the dryness of the paper sheet into the drying section; the drying section uses a closed hood and a heat recovery device to recover part of the heat energy; AC variable frequency drive to reduce energy consumption

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工艺流程顺畅、短捷，生产车间采用联合厂房，减少管路长度和车间内部运输距离。准确进行负荷平衡、热平衡、水平衡和物料平衡方面的计算，使所选设备及其能力与生产规模一致。

The process flow is smooth and short, and the production workshop adopts a joint workshop to reduce the length of the pipeline and the transportation distance inside the workshop. Load balancing, heat balance, water balance, and material balance are accurately calculated to allow the selected equipment and capacity thereof to be consistent with production scale.

（2）节水措施

(2) Water saving measures

本项目通过水的分质、回收、循环使用等措施达到节水，采用的节水措施有：

The project achieves water conservation through measures such as water quality, recycling, recycling, etc. The water saving measures adopted are:

①造纸车间用的冷却水全部收集，经冷却塔、过滤器处理后循环使用。

①The cooling water used in the papermaking workshop is collected and recycled after being treated by a cooling tower and a filter.

②造纸车间热回收系统配置二级热回收设备回收尾气中的水汽。

②The heat recovery system of papermaking workshop is equipped with secondary heat recovery equipment to recover water and steam from the tail gas.

③拟建项目配置白水回收设备回收利用中段白水。造纸车间产生的多余白水经白水回收设备处理后分成 3 种不同的白水：超清白水、清白水、浊白水。超清白水经过滤后用于纸机网部高低压喷淋水，清白水用于浆料稀释调浓，浊白水一部分在白水回收设备循环回收，一部分送白水塔储存用于制浆工段作为工艺用水，确保制浆过程中除机械密封和设备冷却外不再使用清水。

③The proposed project is equipped with white water recycling equipment to recycle the middle white water. Excessive white water produced in the papermaking workshop is treated by white water recovery equipment and divided into three different white waters: ultra-clear white water, white water, and turbid white water. The ultra-clear white water is filtered and used for the high and low pressure spray water of the paper machine net part, and the white water is used for the dilution and concentration of the pulp. Part of the turbid white water is recycled in the white water recovery equipment, and a part of it is sent to the white water tower for storage in the pulping section as process water, ensuring that no water is used except the mechanical seal and equipment cooling during the pulping process.

④造纸车间冷凝水回收至自备动力车间循环使用，以减少软化水用量。

④The condensate from the paper mill is recycled to the self-contained power plant for recycling to reduce the amount of softened water.

通过以上措施，本工程造纸系统每吨成品的清水消耗达到 $8m^3/t$，符合国家造纸行业用水定额，在国内也是可行的，同时也是符合该厂实际情况的。

Through the above measures, the clean water consumption per ton of finished product of the papermaking system of this project reaches 8m3/t, which is in line with the national water industry quota, and is also feasible in China, and it is also in line with the actual situation of the plant.

3.9.1.4 污染物产生及控制措施分析

3.9.1.4 Analysis of Pollutant Generation and Control Measures

（1）废水

(1) Wastewater

拟建工程的废水进入厂内污水处理厂进行处理，目前厂内已经建成污水处理站处理规模 80000m^3/d，采用"预处理+厌氧（IC）+好氧+深度处理"处理工艺，现有及在建工程建成后，全厂废水排放量为 44230m^3/d，剩余余量为 35770m^3/d，完全可以满足处理拟建项目 12614m^3/d 的废水量，废水经过处理后满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 要求，目前污水处理站出水暂时排放至九龙江北港；待排海管道建设完成后，拟建项目产生废水及厂内现有工程产生的废水经过厂内污水处理厂处理达标后统一纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

The wastewater of the proposed project enters the in-plant sewage treatment plant for treatment. At present, the wastewater treatment station has been built within the plant with a treatment scale of 80,000 m3/d, adopting treatment process of "pretreatment + anaerobic (IC) + aerobic + deep treatment". Upon completion of projects under construction, the flow of wastewater discharged into the sewage treatment plant by the whole plant is 44,230m^3/d, and the remaining balance is 35,770m^3/d, which can fully meet the wastewater treatment capacity of 12,614m^3/d of the proposed project. Upon treatment, wastewater complies with requirements in Table 1 of DB35/1310-2013 *Emission Standards for Water Pollutants* in the Pulp and Paper Industry. Presently, the effluent from the sewage treatment station supporting the proposed project is temporarily discharged to North Port of Jiulong River. Once marine discharge pipes are completed, both wastewater generated by proposed project and by existing project in the plant will be incorporated into the tailwater marine discharge pipes of Jiaomei Sewage Treatment Plant (250,000 t/d) after being treated by the sewage treatment plant in the plant for uniform discharge to deep sea.

（2）废气

(2) Waste gas

拟建项目依托工程产生的污染物主要有锅炉烟气中的烟尘、SO_2、NOx，煤

炭破碎工段产生的粉尘，拟建项目新增的污染物主要为制浆车间产生的 H_2S。对于锅炉有组织排放废气通过采取除尘、脱硫及低氮燃烧的措施，主要污染物均能够满足《火电厂大气污染物排放标准》（GB13223-2011）标准限值要求；煤炭粗碎工段、细碎工段各配备 1 套静电除尘设施，粉尘排放能够满足《大气污染物综合排放标准》（GB16297-1996）表 2 二级标准限值要求；对于制浆间的无组织排放废气，主要污染物为 H_2S，通过加强管理。

The pollutants generated by the proposed project depend on the smoke, SO2, NOx in the boiler flue gas and the dust generated in the coal crushing section. The newly added pollutants in the proposed project are mainly H_2S produced by the pulping workshop. For the boilers with organized exhaust emissions through the measures of dust removal, desulfurization and low-nitrogen combustion, the main pollutants can meet the standard limit requirements of the *Emission Standards for Air Pollutants in Thermal Power Plants* (GB13223-2011); coal coarse crushing section, fine crushing section Each set is equipped with 1 set of electrostatic dust removal facilities, and the dust emission can meet the requirements of Grade II standard in Table 2 of *Integrated Emission Standards for Air Pollutant* (GB16297-1996); for the unorganized exhaust gas in the pulping room, the main pollutant is H_2S.

（3）噪声

(3) Noise

在厂区的布局规划过程中，对厂区平面及车间内部进行优化布局；选用符合噪声限值要求的低噪声设备，根据实际情况安装隔音、消声、减震设施，并对工作人员进行噪声防护隔离。

In the layout planning process of the plant, optimize the layout of the plant floor and the interior of the workshop; select low-noise equipment that meets the noise limit requirements, install sound insulation, noise reduction and shock absorption facilities according to the actual situation, and isolate the noise protection of the workers.

（4）固体废物

(4) Solid waste

造纸车间产生的塑料、铁钉铁丝等回收利用，浆渣、污水处理站污泥等送锅炉焚烧处置，砂石等、给水处理站污泥由环卫部门清运处理、废润滑油委托有资质的单位清运处置，固体废物分类处理后，等均得到了妥善的处置。

Recycling of plastics, iron nails, etc. produced in the papermaking workshop, sludge and sewage treatment station sludge, etc. are sent to the boiler for incineration disposal, sand and gravel, etc., and the sewage treatment station sludge is cleared and transported by the sanitation department, and the waste lubricating oil is entrusted to be qualified. Unit disposal, solid waste sorting, etc., have been properly disposed of

3.9.2 造纸生产线清洁生产评价

3.9.2 Assessment of Clean Production of Papermaking Production Line

拟建项目建设一条年产 60 万吨高档箱板纸生产线，本次主要对造纸生产线的清洁生产指标进行评价。

Proposed project will be constructed with a high-grade cardboard paper production (PM10) line with annual production of 0.6 mtpa. Production indicators of clean production for papermaking production line are mainly evaluated in this assessment.

本次评价根据《制浆造纸行业清洁生产评价指标体系》（国家发展和改革委员会 环境保护部 工业和信息化部公告 2015 年第 9 号，2015 年 4 月 15 日）对拟建项目的清洁生产水平进行定量评价。

This assessment is based on the *Clean Production Assessment Index System of the Pulp and Papermaking Industry* (Announcement No. 9 of 2015 of the National Development and Reform Commission and Ministry of Environmental Protection Industry and Information Technology, April 15, 2015) to carry out quantitative assessment of the clean production of the proposed project.

根据《制浆造纸行业清洁生产评价指标体系》，拟建生产线清洁生产水平分析详见表 3.9-2、表 3.9-3。

In accordance with Clean Production Assessment Index System of the Pulp and Papermaking Industry, analysis for clean production level of the proposed production line is detailed in Table 3.9-2, 3.9-3.

表 3.9-2　高档箱板纸生产线（PM10）清洁生产评价

Table 3.9-2 Assessment of Clean Production of High-grade Cardboard Paper Production Line (PM10)

序号 Seq no.	一级指标 Grade I index	一级指标权重 Weight of Grade I index	二级指标 Grade II index		单位 Unit	二级指标权重 Weight of Grade II index	I级基准值 Reference value of Grade I	II 级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
1	资源和能源消耗指标 Resource and energy consumption indexes	0.2	*单位产品取水量 *Water draw rate per unit product	箱纸板 Cardboard paper	m^3/ t	0.5	8	13	22	8
2			*单位产品综合能耗a *Comprehensive energy consumption per unit product a		kgce/ t	0.5	240	280	320	221.9
3	资源综合利用指标 Resource comprehensive utilization index	0.1	水重复利用率 Reuse rate of water		%	1	90	85	80	96.14
4	污染物产生指标 Pollutants production index	0.3	*单位产品废水产生量 *Wastewater generations per unit product		m^3/ t	0.5	7	11	18	6.9
5			*单位产品COD_{Cr}产生量		kg/ t	0.5	11	15	22	6.15

			*COD_{Cr} generations per unit product						
6	纸产品定性评价指标 Quantitative assessment index of paper products	0.4	参见表13[b] See Table 13[b]						
注1：带*的指标为限定性指标。 Note 1: The indexes indicated with “*” are definite indexes									
a 综合能耗包括纸机抄造和涂布过程。 a Comprehensive energy consumption consists of papermaking and coating process of paper machine. b 表13计算结果为本表的一部分，计算方法与本表其他指标相同。 b Calculation results in Table 13 are a part herein and calculation method thereof are the same as other indexes herein.									

表 3.9-3 纸制品企业清洁生产管理指标项目基准值

Table 3.9-3 Reference Values of Clean Production Management Index Items for Paper Product Enterprises

序号 Seq no.	一级指标 Grade I index	二级指标 Grade II index	指标分值 Score of index	I级基准值 Reference value of Grade I	II级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
1	生产工艺及装备指标 Production	真空系统 Vacuum system	0.2	循环使用水 Recycled use of water			I级 Grade I
2		冷凝水回收系统 Condensate recycling system	0.2	采用冷凝水回收系统 Condensate recycling system adopted			I级 Grade I

序号 Seq no.	一级指标 Grade I index	二级指标 Grade II index	指标分值 Score of index	I级基准值 Reference value of Grade I	II 级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
3	process and equipment index	废水再利用系统 Wastewater reuse system	0.2	拥有白水回收利用系统 Available with white water recycling system			I级 Grade I
4		填料回收系统 Filler recycling system	0.13	拥有填料回收系统（涂布纸有涂料回收系统） Available with filler recycling system (coated paper available with coatings recycling system)			I级 Grade I
5		汽罩排风余热回收系统 Steam hood exhaust heat recovery system	0.13	采用闭式汽罩及热回收 Enclosed steam hood and heat recovery adopted			I级 Grade I
6		能源利用 Energy utilization	0.14	拥有热电联产设施 Available with cogeneration facilities			I级 Grade I
7	产品特征指标 Product characteristic index	涂布纸 Coated paper	0.4	不使用附录2中所列染料，不使用含甲醛的涂料 No use of the dyes listed in Appendix 2, no use of formaldehyde-containing paints			I级 Grade I
8		再生纸制品 Recycled paper products	0.4	符合HJ/T410相关要求 In compliance with relevant requirements in HJ/T410			I级 Grade I
9	清洁生产管理指标	*环境法律法规标准执行情况 * Compliance with of	0.155	符合国家和地方有关环境法律、法规，废水、废气、噪声等污染物排放符合国家和地方排放标准；污染物排放应达到国家和地方污染物排放总量控制指标和排污许可证管理要求			I级 Grade I

序号 Seq no.	一级指标 Grade I index	二级指标 Grade II index	指标分值 Score of index	I级基准值 Reference value of Grade I	II 级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
	Clean production management index	environmental laws a nd regulations		In compliance with national and local environmental laws and regulations, pollutants such as waste water, waste gas and noise comply with national and local emission standards; pollutant discharges shall meet national and local pollutant discharge total control indicators and discharge permit management requirements.			
10		*产业政策执行情况 * Implementation conditions of industrial policies	0.065	生产规模符合国家和地方相关产业政策，不使用国家和地方明令淘汰的落后工艺和装备 The scale of production shall conformsto relevant national and local industrial policies, and obsolete technologies and equipment whose retirement are expressly specified by local and national governments shall not be used			I级 Grade I
11		*固体废物处理处置 *Solid waste treatment and disposal	0.065	采用符合国家规定的废物处置方法处置废物；一般固体废物按照GB 18599相关规定执行；危险废物按照GB 18597相关规定执行 Wastes shall be disposed of in accordance with the waste disposal measures as set forth national regulations; general solid wastes shall be in compliance with relevant provisions of GB 18599; hazardous wastes shall be in compliance with relevant provisions of GB 18597			I级 Grade I
12		清洁生产审核情况 Clean production audit condition	0.065	按照国家和地方要求，开展清洁生产审核 Clean production is audited in accordance with local and national requirements			I级 Grade I
13		环境管理体系制度 Environmental	0.065	按照GB/T 24001建立并运行环境管理体系，环境管理程序文件及作业文件齐备		拥有健全的环境管理体系和完备的管理文件	I级 Grade I

序号 Seq no.	一级指标 Grade I index	二级指标 Grade II index	指标分值 Score of index	I级基准值 Reference value of Grade I	II级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
		management system		An environmental management system shall be established and operated in accordance with GB/T 24001, complete with environmental management program files and work-related documents		Available with a sound environmental management system and complete management documents	
14		废水处理设施运行管理 Operation management of wastewater treatment facilities	0.065	建有废水处理设施运行中控系统，建立治污设施运行台账 Constructed with central control system for wastewater treatment facilities with standing book regarding operation of sewage control facilities established	建立治污设施运行台账 Standing book regarding operation of sewage control facilities established		I级 Grade I
15		污染物排放监测 Monitoring of pollutants emission	0.065	按照《污染源自动监控管理办法》的规定，安装污染物排放自动监控设备，并与环境保护主管部门的监控设备联网，并保证设备正常运行 Automatic monitoring equipment for pollutant emission shall be installed in accordance with the		对污染物排放实行定期监测 Emission of pollutants shall be monitored on a regular basis.	I级 Grade I

序号 Seq no.	一级指标 Grade I index	二级指标 Grade II index	指标分值 Score of index	I级基准值 Reference value of Grade I	II 级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
				provisions of the "Measures for Automatic Monitoring of Pollution Sources" and be networked with the monitoring equipment of competent authorities for environmental protection to ensure normal operation of the equipment.			
16		能源计量器具配备情况 Furnishment of Energy Metering Devices	0.065	能源计量器具配备率符合GB/T17167、GB24789三级计量要求 Furnishment rate of energy metering device shall meet the Level 3 metering requirements of GB/T17167 and GB24789.	能源计量器具配备率符合GB/T17167、GB24789二级计量要求 Furnishment rate of energy metering device shall meet Level 2 metering requirements of GB/T17167 and GB24789.		I级 Grade I
17		环境管理制度和机构 Environmental management system and organizations	0.065	具有完善的环境管理制度；设置专门环境管理机构和专职管理人员 Available with a sound environmental management system with special environmental management organizations and full-time management personnel set up			I级 Grade I
18		污水排放口管理 Sewage drain outlet	0.065	排污口符合《排污口规范化整治技术要求（试行）》相关要求 Sewage drain outlet shall comply with relevant requirements of *Technical*			I级 Grade I

序号 Seq no.	一级指标 Grade I index	二级指标 Grade II index	指标分值 Score of index	I级基准值 Reference value of Grade I	II 级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
		management		*Requirements for Standardized Remediation of Sewage Discharge Ports (for Trial Implementation)*			
19		危险化学品管理 Management of hazardous chemicals	0.065	符合《危险化学品安全管理条例》相关要求 In compliance with relevant requirements in *Hazardous Chemicals Safety Management Regulations*			I级 Grade I
20		环境应急 Environmental emergency response	0.065	编制系统的环境应急预案并开展环境应急演练 Systematic environmental contingency plans shall be prepared and environmental emergency drills be conducted	编制系统的环境应急预案 Systematic environmental contingency plans shall be prepared		I级 Grade I
21		环境信息公开 Publicity of environmental information	0.065	按照《环境信息公开办法（试行）》第十九条要求公开环境信息 Environmental information shall be publicized in accordance with Article 19 of *Measures for Environmental Information Disclosure (for Trial Implementation)*		按照《环境信息公开办法（试行）》第二十条要求公开环境信息 Environmental information shall be publicized in accordance with Article 20 of *Measures for*	I级 Grade I

序号 Seq no.	一级指标 Grade I index	二级指标 Grade II index	指标分值 Score of index	I级基准值 Reference value of Grade I	II 级基准值 Reference value of Grade II	III级基准值 Reference value of Grade III	拟建项目 Proposed project
						Environmental Information Disclosure (for Trial Implementation)	
22			0.065	按照HJ 617编写企业环境报告书 A corporate environmental report shall be prepared in accordance with HJ 617			I级 Grade I

注：1、带*的指标为限定性指标。

Notes: 1. The indexes indicated with “*” are definite indexes

2、拟建项目建成后，将根据《制浆造纸行业清洁生产评价指标体系》及项目环评的要求建立和完善环境管理体系、贯彻执行环境保护法规的各项要求，并进行清洁生产审核。

2. Upon completion of proposed project, it will establish and improve the environmental management system will be established and improved, various requirements of environmental protection regulations will be complied with and clean production audit will be conducted in accordance with *Clean Production Evaluation Index System of the Pulp and Paper Industry* and EIA requirements of the project.

根据《制浆造纸行业清洁生产评价指标体系》制浆造纸行业不同等级清洁生产企业综合评价指数评定条件，对于Ⅰ级（国际清洁生产领先水平），需同时满足综合评价指数 Y_{I}'≥85，且限定性指标全部满足Ⅰ级基准值要求；对于Ⅱ级（国内清洁生产先进水平），需同时满足综合评价指数 Y_{II}'≥85，且限定性指标全部满足Ⅱ级基准值要求。

According to the assessment conditions for the comprehensive assessment index of different grades for clean production enterprises in the pulping and papermaking industry in *Clean Production Assessment Index System for Pulping and Papermaking Industry*, the level of comprehensive evaluation index YI'≥85, the qualification indicators shall all meet the Class I benchmark value requirements; for Class II (the domestic advanced level of cleaner production), the comprehensive evaluation index YII' ≥ 85 must be met at the same time, and the qualification indicators all meet the Class II benchmark value requirements.

根据《制浆造纸行业清洁生产评价指标体系》综合评价指数计算，对照拟建项目各指标，综合评价指数 Y_{I}'=100，且限定性指标全部满足Ⅰ级基准值要求。

According to the comprehensive assessment index of the *Clean Production Assessment Index System for Pulping and Papermaking Industry*, the comprehensive evaluation index YI'=100 is compared with the indicators of the proposed project, and the qualification indicators shall all meet the Class I benchmark value requirements.

因此，拟建工程造纸车间清洁生产水平为Ⅱ级，达到国内清洁生产先进水平。

Therefore, the clean production level of the papermaking workshop of the proposed project is Grade II, reaching the advanced level of domestic clean production.

3.9.3 清洁生产管理措施

3.9.3 Clean production management measures

拟建项目将按照《制浆造纸行业清洁生产评价指标体系》制浆企业清洁生产管理要求和相关法律法规建立清洁生产管理体系，清洁生产管理体系详见表 3.9-4。

The proposed project will establish a clean production management system in accordance with the clean production management requirements of *Clean Production Assessment Index System for Pulping and Papermaking Industry* and related laws and regulations. The clean production management system is detailed in Table 3.9-4.

表 3.9-4 清洁生产管理体系

Table 3.9-4 Clean Production Management System

序号 Seq no.	管理体系 Management system	主要内容 Main contents
1	员工培训教育 Staff training and education	（1）通过不断教育，逐步增强全体员工的安全、健康、环保、质量、成本、清洁生产等相关意识； (1) Through continuous education, gradually enhance the safety, health, environmental protection, quality, cost, clean production and other related awareness of all employees; （2）通过各种形式的岗位培训，不断提高全体员工的职业技能（包括：基本技能、操作水平、职业等级、改革创新技能等）； (2) Continuously improve the professional skills of all employees through various forms of job training (including: basic skills, operational level, occupational level, reform and innovation skills, etc.); （3）通过企业奖罚、激励机制及相关规章制度，鼓励全体员工的高度责任心及敬业精神。 (3) Encourage the high sense of responsibility and professionalism of all employees through corporate rewards and punishments, incentive mechanisms and related rules and regulations.

序号 Seq no.	管理体系 Management system	主要内容 Main contents
2	企业管理 Enterprise management	（1）加强基础管理，从考核车间到考核班组（或设备，如有可能，甚至可能具体到个人），对电、煤、蒸汽、新鲜水等所有物料都进行计量，对消耗进行统计，对成本进行定额控制并逐级降低，实行节奖超罚制度；逐步减少原辅材料及能源的消耗，降低成本，提高企业管理水平； (1) Strengthen basic management, from the assessment workshop to the assessment team (or equipment, if possible, even to individuals), measure all materials such as electricity, coal, steam, fresh water, etc. Costs are subject to quota control and reduced step by step, implementing a system of over-the-counter penalty; gradually reducing the consumption of raw and auxiliary materials and energy, reducing costs, and improving corporate management; （2）加强企业环境管理，逐步实现对各个废物流（废水、废气、固体废物等）进行例行监控（单位时间内的废水、废气的总量，以及其中的污染物及其排放量，单位时间内固体废物总量；单位产品的废水、废气以及其中污染物的发生负荷及排放量，单位产品固体废物产生量）； Strengthen the environmental management of enterprises and gradually realize the routine monitoring of various waste streams (waste water, waste gas, solid waste, etc.) (the total amount of waste water and waste gas per unit time, as well as the pollutants and their emissions, total amount of solids per unit time; waste water and waste gas per unit product and the load and discharge of pollutants in it, the amount of solid waste produced per unit of product) （3）加强车间的现场管理，逐步杜绝跑、冒、滴、漏。 (3) Strengthen the on-site management of the workshop and gradually eliminate run, run, drip, and leak.
3	原辅材料及能源 Raw and auxiliary materials and energy	（1）所有原辅材料/能源（如煤）在采购、进厂、贮存、输送和搬运、使用前实行严格的检验/计量/品质控制措施； (1) Take strict inspection/metering/quality control measures for all raw and auxiliary materials/energy (such as coal) prior to procurement, storage, storage, transportation and handling, and use; （2）对供方提供的原材料进行检验比较，提出有关控制指标，选择高品质原材料。 (2) Examine and compare the raw materials provided by the supplier, propose relevant control indicators, and select high-quality raw materials.

序号 Seq no.	管理体系 Management system	主要内容 Main contents
4	过程控制 Process control	（1）对制浆工艺各参数进行调整和优化（如压力、温度、化学品加入量、液比等）； (1) Adjust and optimize various parameters of the pulping process (such as pressure, temperature, chemical addition amount, liquid ratio, etc.); （2）防止制浆/洗浆等工艺过度或不足； (2) Prevent excessive or insufficient processes such as pulping/washing; （3）对工厂主要设备设施系统采取预防性/计划性维修维护措施； (3) Take preventive/planned maintenance and repair measures for the main equipment and facilities of the factory;
5	现场管理 Construction site management	（1）管道/阀门/法兰等处的水、汽泄漏及时维修； (1) Repair water and steam leakage at pipes/valves/flanges on a timely basis; （2）严格控制化学品和添加剂等物料处理和制备过程中的跑、冒、滴、漏； (2) Strictly control the running, running, dripping and leaking during the processing and preparation of materials such as chemicals and additives; （3）严格湿边或湿损纸混入白水槽； (3) Strictly prohibit wet edge or wet damaged paper mixed into white water tank; （4）采用适宜的盖子覆盖所有的振筛和化学品计量槽； (4) Cover all vibrating screens and chemical metering tanks with a suitable cover; （5）安装适当的料槽，收集筛渣。 (5) Install an appropriate tank and collect the rejects.

3.9.4 小结

3.9.4 Summary

综上所述，根据《制浆造纸行业清洁生产评价指标体系》，拟建项目清洁生产水平为II级，达到了国内清洁生产先进水平。

To sum up, in accordance with *Clean Production Assessment Index System for Pulping and Papermaking Industry*, the clean production level of the proposed project is Grade II, reaching the advanced level of domestic clean production.

4 环境现状调查与评价

4 Investigation and Evaluation on Environmental Status

4.1 自然环境现状调查

4.1 Investigation on Natural Environment Status

4.1.1 地理位置

4.1.1 Geological position

漳州台商投资区地处九龙江出海口，与厦门市接壤。境内交通便捷，距厦门高崎国际机场 26km，距厦门东渡和海沧国际货柜码头分别为 19km 和 13km。国道 324、319 线，沈海、厦成高速公路，鹰厦铁路、厦深高铁横贯区内，交通十分便捷。

Zhangzhou Taiwan Investment Zone is located at estuary of Jiulong River, and bordering on Xiamen. The traffic there is convenient, 26km from Xiamen Gaoqi International Airport, and 19km and 13km respectively from Dongdu and Haicang International Container Ports of Xiamen. National Road 324, 319, Shenyang-Haikou Expressway, Xiamen- Chengdu Expressway, Yingtan- Xiamen Railway, Xiamen-Shenzhen High-speed Railway are passing through the zone, and traffic is very convenient.

联盛纸业（龙海）有限公司位于漳州台商投资区凤山工业园，中心坐标为东经 117°51′39.14″、北纬 24°29′54.26″。本项目位于联盛纸业（龙海）有限公司现有工程厂址内。

Liansheng Paper Industry (Longhai) Co., Ltd. is located in Fengshan Industrial Park of Zhangzhou Taiwan Investment Zone, with central coordinate of 117°51′39.14″E, 24°29′54.26″N. This project is located at the existing plant address of Liansheng Paper Industry (Longhai) Co., Ltd.

4.1.2 地形、地貌

4.1.2 Topography and landform

漳州台商投资区区域山峦起伏，河谷、水系、盆地穿插其间。全境地势北高南低，北部多为丘陵区，东部制高点文圃山海拔 422.2m，南部为河口冲积平原、沿江一带海拔标高约为 2.8～3.6m 左右。地貌形态为丘陵、台地和河口平原类型。河流堆积阶地主要分布于角美一带，河口平原分布于沿江一带及角美。

The area where Zhangzhou Taiwan Investment Zone locates has rolling hills, river valleys, water system and basins scattered. The landform in the entire zone is high in the North while low in the South, and the North is hilly area. The highest point in the East,Wenpu Mountain is 422.2m above sea level; the estuary alluvial plain is in the South, and average altitude along the river is about 2.8~3.6m. The topographic forms are mainly hills, terrace and estuary plain. The river built terrace is mainly distributed to Jiaomei, while estuary plain is distributed along the river and in Jiaomei.

该区域第四系全新机海积层为主的沉积地带，西北部丘陵由花岗闪光岩组成。东部文圃山及北部石鸡山由火山岩组成。平原覆盖层由第四纪洪冲积层及海积层组成，厚度一般在 10m 以内，岩性有积土、砂土、淤泥等，基岩为花岗岩类。

This area is the sedimentary zone mainly with the Quaternary new marine deposit, and the hills in the Northwest are mainly comprised of granodiorite. The Wenpu Mountain in the East and Shiji Mountain in the North are comprised of volcanic rock. The coverage of plain is comprised of the Quaternary diluvial sediments and marine deposit with thickness within 10cm. The rock contains soil, sand and silt; the base rock is granite.

4.1.3 地震

4.1.3 Earthquake

根据《中国地震动参数区域图》（GB18306-2001）福建省区划表，拟建场地属Ⅶ度地震烈度区，地震分组为第一组，设计基本地震加速度为 0.15g。

In accordance with *Seismic Ground Motion Parameters Zonation Map of China* (GB18306-2001), the designed seismic fortification intensity in the planned site is Grade VII, and designed basic seismic acceleration is 0.15g.

4.1.4 气象气候

4.1.4 Meteorology and climate

（1）地面风场

(1) Surface wind field

该地区年平均风速 2.8m/s。常年主导风向为 E 风，频率为 15.3%，其平均风速为 3.8m/s；次主导风向为 ESE，频率为 12.8%，其平均风速为 3.2m/s。

The annual average wind speed in this area is 2.8m/s. The perennial predominant wind direction is E wind with frequency of 15.3% and average wind speed of 3.8m/s; secondary predominant wind direction is ESE with frequency of 12.8% and average wind speed of 3.2m/s.

（2）气温

(2) Temperature

本地区年平均气温 21℃，月平均最高气温在七月，平均为 33.1℃，极端最高气温在 8 月，为 38.3℃，月平均最低气温在一月，平均为 9.0℃，极端最低气温也在一月，为-0.2℃。

The annual average temperature in this area is 21 ℃; the highest monthly average temperature is in July with average temperature of 33.1 ℃, and the extremely highest temperature is 38.3 ℃ in August; the minimum monthly average temperature is in January with average temperature of 9.0 ℃, and the extremely minimum temperature is -0.2 ℃ in January.

（3）湿度

(3) Humidity

本地区湿度变化幅度不大，在 77.0～85.0%之间，其中 6 月最大，为 85.0%，11～12 月最小为 77.0%。全年平均为 80.0%。

The range of humidity change in this area is small, about 77.0~85.0%; the largest is 85.0% in June while the minimum is 77.0% in November and December. The annual average humidity is 80.0%.

（4）降水

(4) Precipitation

本地区年平均降水量为 1371.3mm，最多降水月份为 5～6 月，即梅雨季节，年均降水日数为 133d。大于 50mm 降水日数 5.2d。

The annual average precipitation in this area is 1371.3mm. Months with the most precipitation are May and June, i.e. the Meiyu season; annual average precipitation days shall be 133d. Number of with precipitation larger than 50mm is 5.2d.

（5）稳定度

(5) Stability

全年以 D 类稳定度频率最高，占 65.35%，不稳定(A-C)占 17.5%，稳定(E-F)占 17.71%，全年各季稳定度分布见表 4.1-1。

The stability frequency of type D in the entire year is the highest, accounting for 65.35%; instability (A-C) is 17.5% while stability (E-F) is 17.71%. The stability distribution in each quarter of the year can be seen in Table 4.1-1.

表 4.1-1 各季稳定度分布（单位：%）

Table4.1-1 Stability distribution in each quarter (Unit: %)

稳定度 Stability / 季度 Quarter	A~C	D	E~F
一月 January	14.61	67.93	17.53
四月 April	17.10	65.88	17.13
七月 July	19.61	58.36	22.12
十月 October	16.68	69.18	14.19
全年 Whole year	17.05	65.35	17.71

（6）风向风频

(6) Wind direction and frequency

龙海地区累年各风向风频变化情况表见表 4.1-2，气象资料统计的累年风频玫瑰图见图 4.1-1；风向－风速－稳定度联合分布见表 4.1-3。

The table of wind direction and frequency in Longhai in cumulative years can be seen in Table 4.1-2; cumulative wind frequency rose diagram in meteorological data can be seen in Fig.4.1-1; the joint distribution of wind direction- wind speed- stability can be seen in Table 4.1-3.

表 4.1-2 累年各风向频率分布（单位：%）

Table 4.1-2 Wind direction and frequency distribution in cumulative years (Unit: %)

月 Month	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	C
一 January	1.0	1.0	3.0	13.0	18.0	14.0	7.0	1.0	0.0	0.0	0.0	1.0	4.0	11.0	5.0	2.0	17.0
四 April	1.0	1.0	2.0	10.0	20.0	16.0	9.0	4.0	4.0	2.0	1.0	1.0	3.0	7.0	3.0	1.0	14.0
七 July	1.0	1.0	2.0	6.0	6.0	7.0	11.0	12.0	14.0	7.0	3.0	2.0	3.0	8.0	4.0	1.0	9.0
十 October	1.0	2.0	4.0	15.0	17.0	12.0	7.0	3.0	1.0	0.0	1.0	0.0	3.0	15.0	5.0	1.0	12.0
全年 Whole year	1.0	1.2	2.4	11.1	15.3	12.8	8.7	5.0	3.9	1.8	1.3	1.2	3.3	10.6	4.8	1.3	13.0

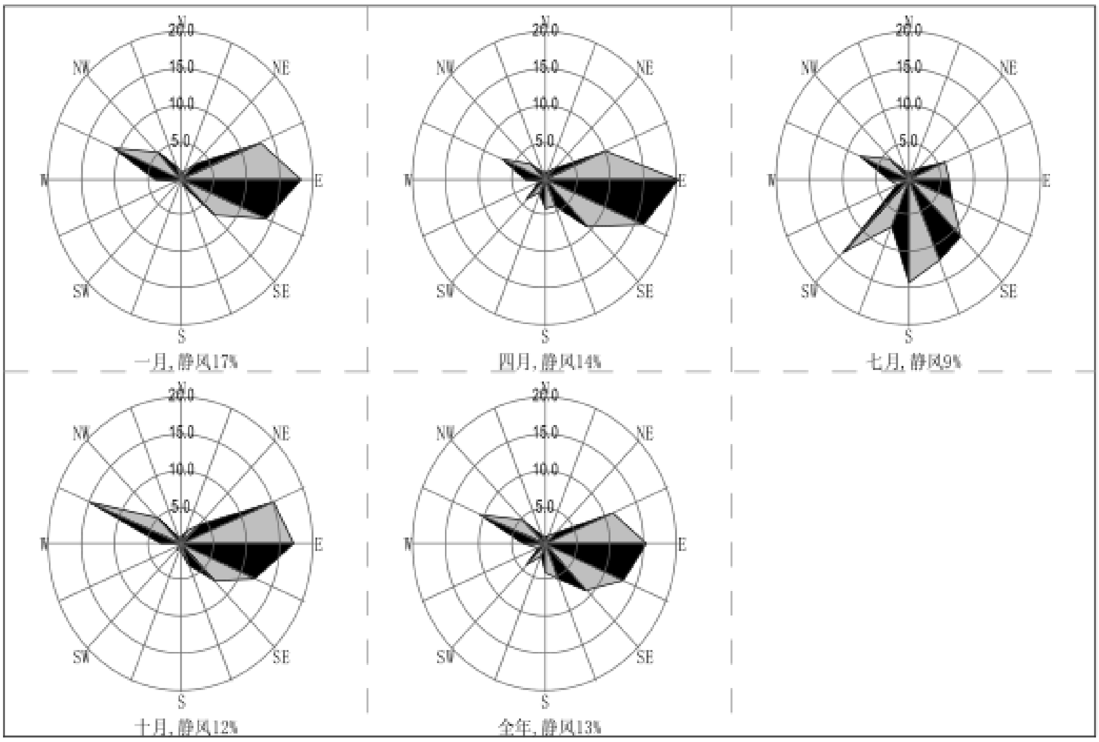


图 4.1-1　累年风频玫瑰图

Fig.4.1-1 Cumulative wind frequency rose diagram

表 4.1-3 风向—风速—稳定度联合频率分布表（单位：%）

Table 4.1-3 Joint frequency distribution table of wind direction- wind speed- stability (Unit: %)

风速 Wind speed	稳定度 Stability	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	C
＜1.0	A~C	0.21	0.1		0.1	0.32			0.1			0.21	0.94	0.63	0.1	0.1	0.32	1.15
	D	0.63	0.1	0.52	0.21	0.63	0.32		0.63	0.21		0.52	0.1	0.83	0.42	0.1	0.63	3.65
	E~F	0.32		0.1	0.1	0.1	0.1		0.1	0.42	0.1	0.1	0.1	0.52	0.1		0.1	1.67
1.1~2.0	A~C		0.52	0.32	0.32	0.21			0.94	0.32		0.83	0.32	0.63	0.1	0.1	0.21	
	D	0.83	0.42	0.42	1.04	2.52	1.04	0.42	0.83			1.25	0.63	1.46	0.52		1.04	
	E~F	0.21	0.52	0.1	0.83	0.42	0.94	0.21	0.42	0.42		0.73	0.21	0.42	0.32		0.21	
2.1~3.0	A~C								0.1									
	D			0.1	0.32	0.63	0.1			0.1	0.21	0.42	0.1		0.32			
	E~F			0.1		0.1			1.56	0.21		0.1						
3.1~4.0	A~C	0.83	0.83	0.21	0.73	1.25	0.94	0.21	2.5	0.52			0.1	0.21			0.21	
	D	0.83	0.73	1.98	3.23	4.79	2.6	0.63	0.21	0.52	0.1	0.73	0.21	0.63			0.1	
	E~F	0.4	0.63	0.94	0.94	1.46	0.21	0.1		0.83	0.1	0.63	0.32	0.21	0.1		0.21	
4.1~6.0	A~C	0.1				0.21												
	D	0.42	1.56	1.98	3.85	5.73	1.35	0.63	1.15	0.63		0.21						
	E~F																	
＞6.0	D	0.42	0.42	0.52	1.04	0.63	0.21		0.21	0.1		0.1			0.1		0.21	

4.1.5 地表水系

4.1.5 Surface drainage pattern

4.1.5.1 陆域水文

4.1.5.1 Hydrology in land area

台商投资区区域内地表水系发达，地表水资源丰富，境内主要河流为福建省第二大河九龙江，其支流西溪及北溪在龙海福河汇合，流经沙洲分为北、中、南港向东汇入厦门港。

The surface drainage pattern in Taiwan Investment Zone is developed, and surface water resource is abundant; main river in the zone is Jiulong River, the second largest river in Fujian Province, and the branches West Stream and North Stream are converged in Fuhe, Longhai City, passing through sandbank, and flowing into Xiamen Port eastwards via North, Middle and South Ports.

九龙江北溪全长 274km，流域面积 9640km^2，年平均流量 258m^3/s，汇合前流经角美镇西部，九龙江北溪建有北溪引水工程，该工程是目前福建省最大的拦河引水工程，属于以农业灌溉为主，兼有工业、城乡生活、改善水质环境和航运等综合利用的水利工程，主要向漳州、龙海及厦门经济特区的工农业生产和城市生活供水。拦河闸枢纽工程位于江东桥下游 3km 的郭洲头，占地 34 亩，引水总流量 40m^3/s，干渠总长 80.8km，可灌溉 41.4 万亩。主体工程由南、北港两座桥闸及左、中、右三大干渠组成，角美属于左干渠供水范围，干渠长 50.8km、流量 22m^3/s，其中龙海段长 15.2km，厦门段长 35.6km；高干渠以 16m^3/s 流进厦门，低干渠以 6m^3/s 流进海沧。

The North Stream of Jiulong River is fully 274km long with catchment area of 9640km^2 and annual average flow of 258m^3/s. Before conversion, the stream flows through the west area of Jiaomei Town. The North Stream Diversion Project is built, which is the largest cross-river diversion project in Fujian Province currently, and is a comprehensive hydraulic engineering for agricultural irrigation, industrial, urban-rural life, water quality and environment improvement, and shipping. It mainly provides water for industrial and agricultural production and urban domestic water in

Zhangzhou, Longhai and Xiamen Special Economic Zone. The sluice hinge project is located at Guozhoutou, 3km downstream Jiangdong Bridge, covering an area of 34mu. The total diversion flow is 40m^3/s, main canal is 80.8km long, and may irrigate 414,000mu land. The main project is comprised of two bridge sluices in South and North Port, as well as three main canals in the left, middle and right. Jiaomei is within the water supply scope of the left main canal with length of 50.8km and flow of 22m^3/s; Longhai section is 15.2km long and Xiamen section is 35.6km long; the high canal flows into Xiamen at the flow of 16m^3/s and low canal flows into Haicang at the flow of 6m^3/s.

九龙江北溪是开发区主要给水来源。向厦门供水的北引工程左干渠经角美开发区北侧流过。开发区东面有一全长为 4.7km 的排涝港，该排涝港接纳附近工业、生活污水及雨水，功能为农灌排涝渠道，水量受北引左干渠调节，排涝港汇入九龙江河口北港，在排入口处，设有排涝水闸，由人工控制排涝，当九龙江河口北港涨潮时关闸，退潮时则开闸排水。

The North Stream of Jiulong River is the main water source of the Development Zone. The left main canal of North Diversion Project supplying water to Xiamen passes through the north side of Jiaomei Development Zone. A 4.7km long flood drainage port is on the east of the development zone, which absorbs industrial and domestic sewage and rainwater, and plays the role as a canal for agricultural irrigation and flood drainage. The water volume is adjusted by the left main canal of the North Diversion Project. The flood drainage port converts to the North Port of Jiulong River estuary. Drainage sluice is set at the inlet, and flood drainage will be operated manually. The sluice is closed when Jiulong River estuary North Port floods, and opened to drain when tide falls.

4.1.5.2 海域水文

4.1.5.2 Hydrology in sea area

（1）九龙江北港

(1) North Port of Jiulong River

九龙江北港沿角美镇南部边缘汇入厦门港，为感潮河口，属正规半日潮，每

天两次涨退潮，涨潮时潮水沿江上溯可达江东桥一带，平均最高潮水位 7.23m，平均最低潮水位 2.44m，平均潮差 2.44m。涨潮平均流速约 0.55m/s，流向为西北向，大体沿岸线方向。退潮为东南方向，大体沿岸线方向，流速为 0.56m/s。

The North Port of Jiulong River flows into Xiamen Port along the south edge of Jiaomei Town, which is a tidal estuary with semidiurnal tide. Tide rises and falls twice every day. When the tide rises, the water may reach Jiangdong Bridge along the river, with the highest average tide level of 7.23m, the minimum average tide level of 2.44m. The mean tide range is 2.44m. Mean flow rate of the tide rise is about 0.55m/s, and the flow direction is toward the northwest along the coastal line. The tide fall is toward southeast along the coastal line in general. The flow rate is 0.56m/s.

（2）九龙江河口

(2) Estuary of Jiulong River

九龙江河口湾包括厦门嵩屿半岛的象鼻嘴与南岸龙海市港尾打石坑连线以西，龙海市紫泥乡浒茂洲、乌礁洲和玉枕州以东的海域。该河口湾为腹大口小的倒罐状溺谷河口湾，湾顶是九龙江北、中、南港和南溪入海口，湾内海域宽 8km 余，口门窄处约 3500m，东西长 13~16km，面积近 70km^2。

Jiulong River Estuary Bay contains the sea area to the west of the line connecting Xiangbizui in Xiamen Songyu Peninsula and Gangwei Dashikeng, Longhai City on the south coast, and to the east of Humaozhou, Wujiaozhou and Yuzhenzhou in Sini Town, Longhai City. The estuary bay is a drowned valley estuary bay in the shape of reversed pot with large body and small inlet. The top of the bay is the estuary of North, Middle, South Port and South Stream of Jiulong River. The sea area in the bay is about 8km wide, and the narrow part on the estuary is about 3500m. The length from the east to the west is 13~16km, with area of nearly 70km^2.

九龙江河口上段分为北港、中港、南港。据历年来的水文资料统计，丰水期水量占 65%，约为 76 亿 m^3；平水期水量占 20%，约为 23.4 亿 m^3；枯水期水量占 15%，约为 17.6 亿 m^3。九龙江河口区域石码镇以上是淡水区，中段是海水和淡水交汇区域，海水盐度受入海径流强烈影响，随着降水量的大小和潮汐的涨退而改变。下段是咸水区域，盐度相对比较高，且较稳定。

The upper section of Jiulong River Estuary is divided into North Port, Middle Port and South Port. According to historical statistical data regarding hydrology, the water volume in high flow period is 65%, about 7.6 billion m^3; the water volume in normal season is 20%, about 2.34 billion m^3; water volume in low water season is 15%, about 1.76 billion m^3. Upstream from Shima Town in Jiulong River estuary area is the fresh water zone, the middle section is the conversed area with sea water and fresh water, where salt degree of sea water is affected strongly by entering running water, and changed with volume of precipitation and rise/fall of tide. The lower section is a salt water area with relatively high and stable salt degree.

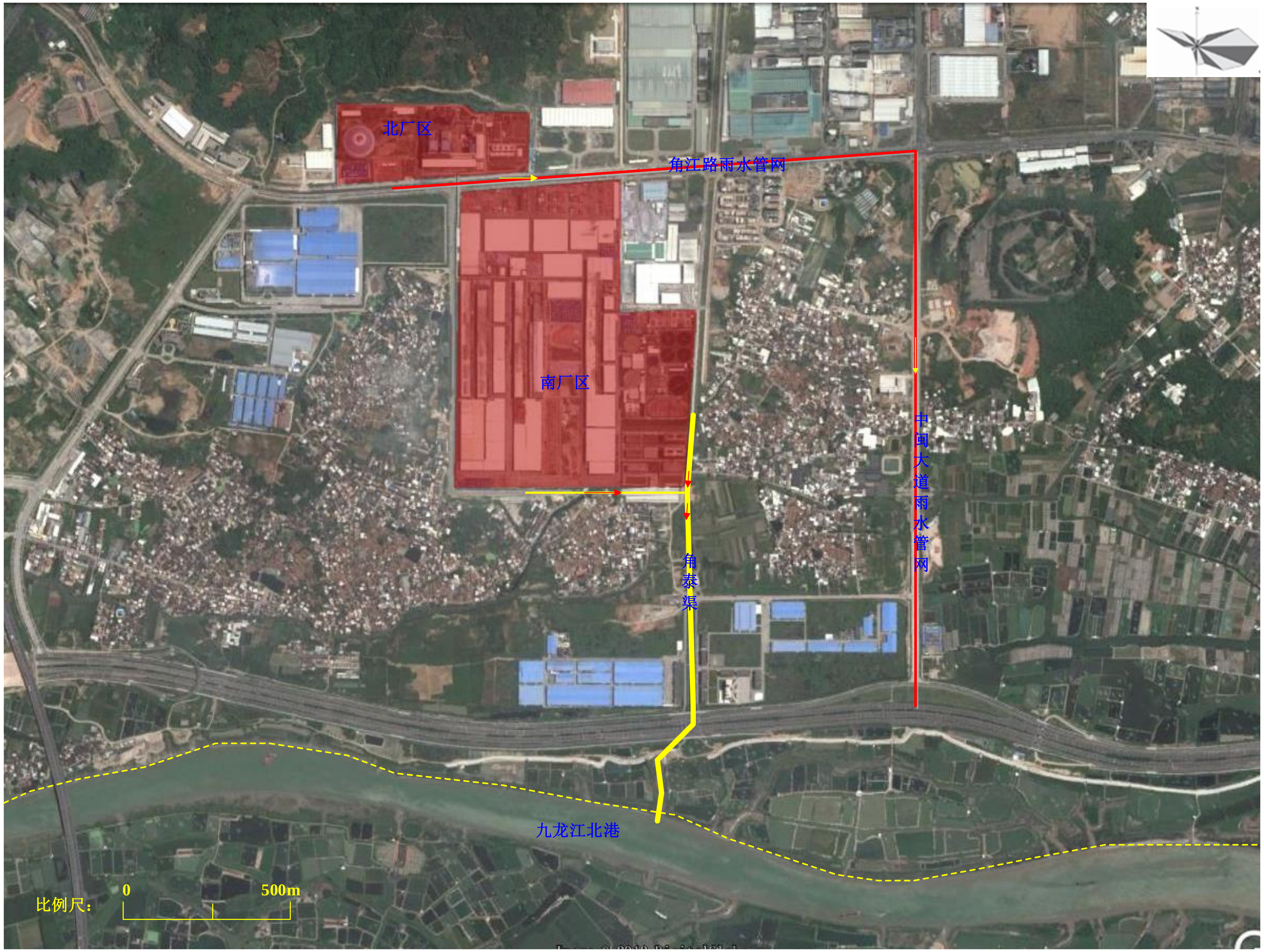
区域地表水系图见图 4.1-1。

The surface drainage pattern diagram in the area can be seen in Fig. 4.1-1.


长泰县
水流方向
厦门海沧
水磨水库
东孚镇
马銮湾
西山水库
金鸡山
大坑水库
狮岩水库
鬼仔垅水库
龙佳生态休闲山庄
角美镇
联盛纸业
厦门海沧
龙文区
吴宅工业区
文圃工业区
岩内水库
丁厝山
凤山工业区
龙池开发区
紫泥镇
海沧镇
厦门海沧
图1-2

图 4.1-2　区域地表水系图

Fig. 4.1-2 Regional surface drainage pattern diagram


北厂区
角江路雨水管网
南厂区
中闽大道雨水管网
角泰渠
九龙江北港
比例尺：
0
500m

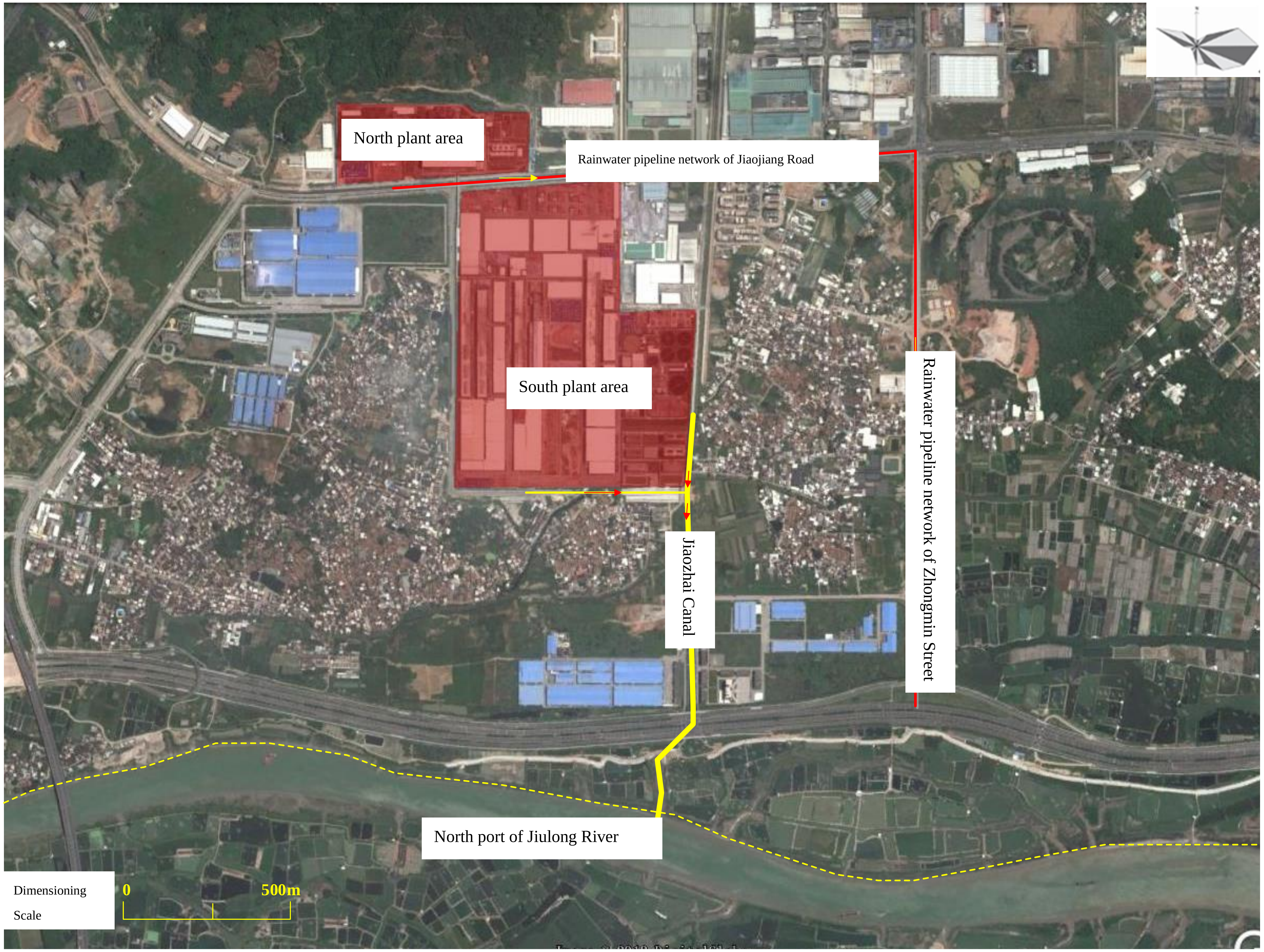


图 4.1-3　区域雨水排放系统及地表水系图

Fig. 4.1-3 Regional rainwater drainage system and surface drainage pattern diagram

4.1.6 水文地质

4.1.6 Hydrogeology

4.1.6.1 区域地质与水文地质条件

4.1.6.1 Regional geological and hydro-geological conditions

（1）区域地形地貌

(1) Regional landform

漳州盆地位于福建省第二大河流—九龙江下游，面积 566.2km^2，由红土台地、河流阶地、冲海积平原组成，盆地内零星分布海拔百米左右的低丘，最高的员山海拔 501.0m，盆地周围为中低山丘陵。在丘陵山地的山前地带，广泛分布中更新世、晚更新世和全新世冲洪积扇。

Zhangzhou Basin is located downstream Jiulong River, the second largest river of Fujian Province. With area of 566.2km^2, the basin is comprised of red clay platform, river terrace and alluvial marine depositional plain. Low hills with altitude of 100m are scattered in the basin. The highest hill is 501.0m above the sea level, and middle-low hills are around the basin. The middle pleistocene, late pleistocene and Holocene alluvial-proluvial fan are distributed extensively in the piedmont of hilly and mountainous area.

1）构造侵蚀中山：海拔 800m 以上，主要有盆地西北部的天宝大山（919.8m，海拔，下同）和盆地西南部的后倒山（836.1m）,由侏罗纪晚期火山熔岩组成，山体高大，山坡陡峻，山坡上风化壳较薄，切割深度大于 500m。

1) Tectonic erosional middle mountain: The altitude is above 800m, mainly Tianbao Mountain in the northwest of Basin (altitude 919.8m, similarly hereinafter) and Houdao Mountain (836.1m) in southwest of Basin; the mountains are comprised of volcanic lava in late Jurassic. The mountains are high, slopes are steep, slope weathered crust is thin, and cutting depth is larger than 500m.

2）构造侵蚀低山：海拔 500--800m，主要有盆地西北部的五峰山（775.0m）、盆地东南部的鱼嘴山（577.8m）、东山尖（562.8m）、太湖山（555.0m）、草尖尾（540.7m）和兀立于盆地之中的员山（501.0m）。由侏罗纪晚期火山熔岩组成，

山体较为高大，山坡较为陡峻，山坡上风化壳发育，切割深度 200--300m。

2) Tectonic erosional low mountain: The altitude is 500--800m, mainly Wufeng Mountain (775.0m) in the northwest of the basin, Yuzui Mountain (577.8m), Dongshanjian (562.8m), Taihu Mountain (555.0m), Caojianwei (540.7m) in the southeast of the basin, and Yuanshan Mountain (501.0m) in the basin. The mountains are comprised of volcanic lava in late Jurassic. The mountains are high, slopes are steep, slope weathered crust is developed, and cutting depth is 200-300m.

3）构造侵蚀高丘：海拔 200--500m，主要有盆地南部的观音山（413.1m）、白云山（399.6m）、小田山（325.3m）。由燕山期花岗岩或侏罗纪晚期火山岩组成，切割深度 150--200m。

3) Tectonic erosional high hill: The altitude is 200-500m, mainly Guanyin Mountain (413.1m), Baiyun Mountain (399.6m) and Xiaotian Mountain (325.3m) in the south of the basin. The mountains are comprised of Yanshanian granite or volcanic lava in late Jurassic with cutting depth of 150-200m.

4）低丘：海拔 50--250m，广泛分布于盆地周围或盆地当中。如盆地东部的云洞岩（224.9m）、观音山（165.7m）、盆地北部的向西山（128.3m）和盆地之中的员山西北的 188.6m 无名高地。这些低丘由燕山期花岗岩或侏罗纪晚期火山岩组成，山顶呈浑圆状，山坡和缓，风化壳较厚，切割深度 30--120m。

4) Low hills: The altitude is 50-250m, and mountains are extensively distributed around or in the basin, including Yudongyan (224.9m) and Guanyin Mountain (165.7m) in the east of the basin, Xiangxi Mountain (128.3m) in the North of the basin, and 188.6m nameless high land in the northwest of Yuanshan Mountain in the basin. The low hills are comprised of Yanshanian granite or volcanic lava in late Jurassic. The top is rounded, slope is gentle, weathered crust is thick, and cutting depth is 30-120m.

5）中更新世冲洪积扇：主要分布于天宝大山东南坡的山前地带，在天宝林场北，它的组成物质棕红色砂土砾石层的热释光年龄 39.34±3.3 万年。

5) Middle-pleistocene alluvial-proluvial fan: It is mainly distributed in piedmont on the southeast slope of Tianbao Large Mountain, in the north of Tianbao forest farm.

The thermoluminescence age of brown sand soil gravel layer, its composition material, is 393,400±33,000 years.

6）晚更新世冲洪积扇：主要分布于天宝大山东南坡、白云山西北坡员山的山前地带和靖城镇西北丘陵山地的山前地带，由晚更新世冲洪积地层组成，规模巨大。

6) Late-pleistocene alluvial-proluvial fan: It is mainly distributed on the piedmont area of southeast slope of Tianbao Large Mountain, northwest slope of Baiyun Mountain, and piedmont area of northwest hills in Jingcheng Town, and comprised of late-pleistocene alluvial-proluvial stratum with huge scale.

7）全新世冲洪积扇：主要分布在天宝大山东南坡、白云山西北坡员山的山前地带和靖城镇西北山前地带，规模较大。

7) Holocene alluvial-proluvial fan: It is mainly distributed on the piedmont area of southeast slope of Tianbao Large Mountain, northwest slope of Baiyun Mountain, and northwest piedmont area in Jingcheng Town with large scale.

8）红土台地：由中更新世残积层组成，广泛分布于盆地当中，海拔大多为15—50m，一般可分为三级，即 T_1^B=15—25m、T_2^B=30—35m、T_3^B=40—50m。这些红土台地呈微波状起伏，红土台地之间是宽而浅的坳谷，如上高坑，坳谷最宽 600m，两旁的红土台地海拔 25—36.6m，高出坳谷中的平原面 10m。

8) Red clay platform: It is comprised of middle-pleistocene eluvial deposit, and extensively distributed in basins with altitude of 15-50m; it is in general divided into three levels, i.e. T_1^B=15-25m, T_2^B=30-35m and T_3^B=40-50m. The red clay platform is wavy slightly, and wide and shallow valleys are between the platforms. In Shanggaokeng, the valleys are at widest 600m, and red clay platforms on both sides are 25-36.6m high, 10m higher than the plain level in valleys.

9）三级河流阶地（T3A）：分布零星，面积较小，主要分布在天宝镇茶铺、过塘镇西北约 3Km 公路旁、靖城红听、九龙江支流西溪南岸的靖城镇山头、寨仔、穴口、下魏、古湖和九龙江支流北西东岸的华安丰山等地，由中更新世冲积层组成，在过塘西北约 3Km 处组成该阶地的棕红色砂土砾石层的热释光年龄为23.3±3.5 万年。

9) Third-order river terrace (T3A): The terraces are scattered with small area, and mainly distributed in Chapu, Tianbao Town, beside the highway 3km in the northwest of Guotang Town, Hongting, Jingcheng, Shantou, Zhaizai, Xuekou, Xiawei, Guhu of Jingcheng Town on the south bank of West Stream, branch of Jiulong River, as well as Hua'an Fengshan on the east bank in the northwest of Jiulong River branch. The terrace is comprised of middle pleistocene alluvial stratum. The thermoluminescence age of brown sand soil gravel layer, its composition material, is 233,000±35,000 years about 3.5km in the northwest of Guotang.

10）二级河流阶地（T2A）：分布面积较小，主要出露在天宝镇后坑、五里沙、上高坑、龙奎等地。该阶地由晚更新世冲积相地层组成。在后坑西北，组成该阶地的浅黄色砂质粘土，其热释光年龄为 5.27±0.4 万年。

10) Second-order river terrace (T2A): The distribution area is small, and the terrace is exposed in Houkeng, Wulisha, Shanggaokeng, Longkui of Tianbao Town. The terrace is comprised of Late-pleistocene alluvial phase stratum. The thermoluminescence age of light yellow sand clay in the northwest of Houkeng, its composition material, is 52,700±4,000 years.

11）一级河流阶地（T1A）：主要分布在红土台地之间宽浅坳谷的上游，由全新世早期冲积相地层组成。在华安丰山，组成该阶地的灰黄色细粉砂粘土的热释光年龄为 8250±680 年。

11) First-order river terrace (T1A): The terrace is mainly distributed upstream of wide shallow valleys between the red clay terrace, and comprised of early helocene alluvial phase stratum. The thermoluminescence age of gray yellow fine sand clay in Hua'an Fengshan, the composition material of the terrace, is 8,250±680 years.

12）冲积、冲海积平原（T0A）：广泛分布在天宝--靖城和盆地东部及东北部，全新世晚期冲积、冲海积相地层组成。在盆地东部的龙文区步文镇梧西坑，组成该平原的青灰—灰黄色粘土的碳十四测年为 4580±110 年。

12) Alluvial and alluvial marine depositional plain (T0A): It is extensively distributed in the east and northeast of Tianbao-Jingcheng and Basin, and comprised of late Holocene alluvial and alluvial marine phase stratum. The carbon 14-year

measure technology of balsam green - grey yellow clay comprising the plain in Wuxikeng, Buwen Town, Longwen District, in the east of the Basin shows 4580±110 years.

（2）区域地质条件

(2) Regional geological conditions

区域西北侧为基岩丘陵区，项目区域周边为残积层，含角砾粘质砂土、砂质粘土，局部夹粘土。下部保留原岩结构，为燕山早期侵入岩（γ_5^2），以花岗岩、二长花岗岩、花岗闪长岩、石英闪长岩、闪长岩及同期次火山岩等为主。

The northwest side of the area is basement rock hilly area, and eluvial deposit is around the project, including anular gravel clay sand and sandy clay with clay between locally. The protolith structure is reserved in the lower part, which is early Yanshanian intrusive rock (γ_5^2), mainly granite, monzonitic granite, granodiorite, quartz diorite, diorite and sub-volcanic rock in the same period.

区域下游为海积层，是以海湾型沉淀为主，岩性为厚层状淤泥夹淤泥质砂，底部为薄层沙砾石。在港道地带则常有较厚沙层。

The marine deposit is downstream the region, mainly gulf sediment; the lithological character is thick-bedded silt with silt sand between. The bottom is thin gravel layer. The thick sand layer is frequent in port way zone.

（3）区域水文地质条件

(3) Regional hydro-geological conditions

区域含水层为孔隙裂隙水，除一些基岩构造附近，受其裂隙水补给而水量较大外，一般水量微弱，q=0.01-0.20 升/秒 米，Q_{max} 一般小于 0.4 升/秒，泉流量一般小于 0.1 升/秒。矿化度一般小于 0.3 克/升。

The water-bearing bed in the area contains pore-fissure water. Except the area near some bedrock structures where the water volume is large due to supply of fissure water, the water volume is tiny, q=0.01-0.20 L/s per m, Q_{max} is usually smaller than 0.4L/s, and spring flow rate is usually smaller than 0.1 L/s. The salinity is usually smaller than 0.3g/L.

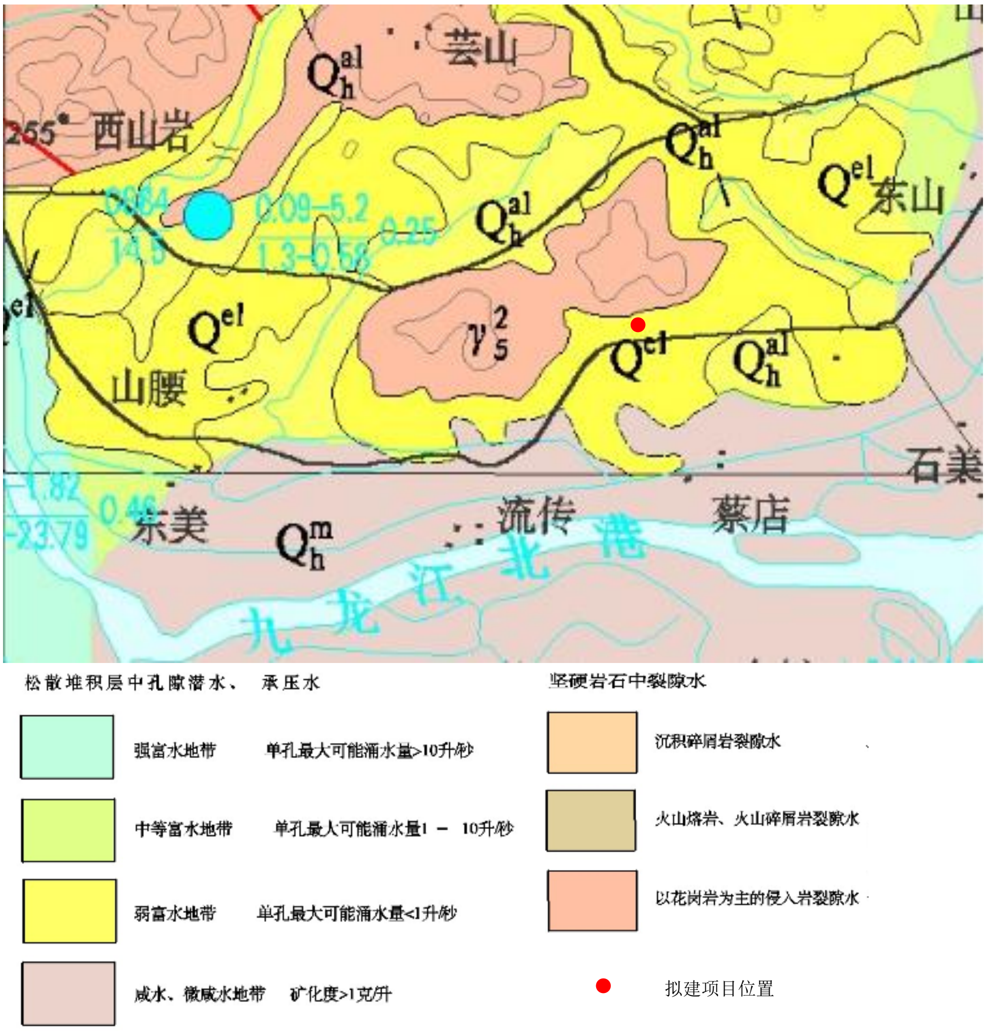
项目区下游为孔隙潜水，含水层为中细砂，厚度一般在 5.8-14.00 米，在迎

风海边。常和上覆风积沙层相连为一个含水层。属于咸水、微咸水地带，矿化度＞1 克/升。

The pore-phreatic water is downstream the project zone; the water-bearing stratum contains medium-fine sand with thickness of 5.8-14.00m on the windward seashore. It usually connects with the aeolian deposit stratum covered above and form to a water-bearing stratum. It belongs to salt water and micro salt water zone, with salinity >1g/L.

项目区域水文地质图详见图 4.1-4（节选自水文地质图（漳州幅 1：20 万 G-50-XXXⅣ））

The hydro-geological map of the project zone can be seen in Fig.4.1-4 (excerpt from hydro-geological map (Zhangzhou Map 1:200,000 G-50-XXXIV))



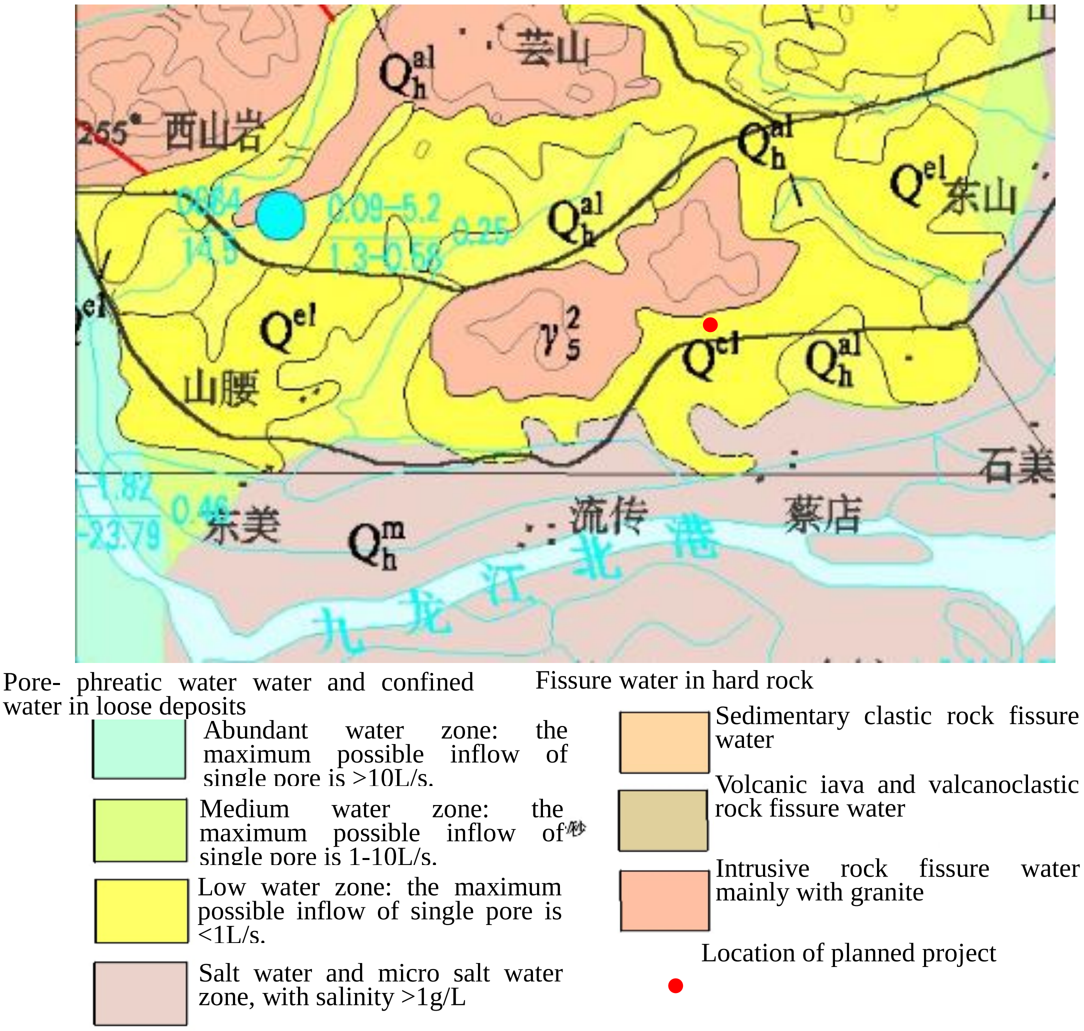


图 4.1-4　区域水文地质图

Fig.4.1-4 Regional hydro-geological map

4.1.6.2　区域地质构造概况

4.1.6.2　Overview of regional tectonics

漳州地处华南褶皱系东部，中生代以前为隆起区。自中生代燕山运动以来，发生强烈的断裂活动和岩浆活动，至燕山晚期，已基本形成现今的构造轮廓；尔后又经历多次强烈活动，至今仍在继续活动。境内出露的地层较全，多期次侵入岩、火山岩、变质岩广泛发育，构造复杂，但其分布具有明显的方向性——北东向条带分布，由西向东，地层分布、火山岩带、侵入岩带和变质岩带由老逐渐到新，明显受构造控制，形成重要的地质特征。

Zhangzhou is located in the east of South China fold system, which is upwelling area prior to the Mesozoic. Since the Yanshan movement in the Mesozoic Era, fierce fracture actions and magmatic actions had been incurred; by the late Yanshanian period, current structural configuration has come into being basically; later, the area suffered multiple fierce actions and is active now. The stratum exposed in the area is complete, and multi-time intrusive rock, volcanic rock and metamorphic rock are developed extensively. The structure is complex, and distributed toward obvious directions- north-east strip distribution, from the west to the east, the stratum distribution, volcanic rock belt, intrusive rock belt and metamorphic rock belt is from old to new gradually, and obviously controlled by tectonics, forming important geological characteristics.

漳州盆地地处长乐—诏安断裂带中段西侧与北西向九龙江断裂带交汇处，该盆地的边界由北东向和北西向两组断裂构造相互切割而成，是一个以北西向断裂起主导作用的地堑型的断陷盆地，因而盆地的平面展布亦呈北西向。第四纪早期，漳州盆地范围较大，东北大致以郭坑--江东桥北西向断裂为界，西南以金峰--大帽山北西向断裂为界，西北以天宝大山北东向断裂为界，东南以白云山山前北东向断裂为界。盆地内尚有北西向岱山岩—珩坑断裂、珠坑断裂、覆船山--康山断裂（即九龙江西溪北西向断裂带）；北东向断裂尚有古塘—大梅溪、郭坑—书都—九湖隐伏断裂以及北西西向员山—洋西断裂。这些断裂控制了盆地的几何形态及发育过程。

Zhangzhou Basin is at the cross between Changle-Zhao’an fault zone (west side in the middle section) and North-West Jiulong River Fault Zone. The boundary of the basin is formed by mutual cutting of North-East and North-West faulted structures, and is a down-faulted basin dominated by North-West fault. Therefore, the plan distribution of the basic is toward North-West direction. In early Quaternary period, the scope of Zhangzhou Basin is large. The northeast boundary is Guokeng-Jiangdong Bridge NW fault, the southwest boundary is Jinfeng-Damao Mountain NW fault, the northwest boundary is Tianbao Large Mountain NE fault, and the southeast boundary is NE fault in the front of Baiyun Mountain. The NW Daishanyan - Hangkeng Fault, Zhukeng Fault, Fuchuan Mountain-Kang Mountain Fault (i.e. Jiulong River West Stream NW fault zone); NE faults are Gutang-Damei Stream, Guo Keng-Shudu-Jiuhu buried fault as well as NWW Yuan Mountain-Yangxi fault. Those faults control the geometric shape and development process of the basin.

拟建项目厂址位于漳州市，大地构造位置处于欧亚大陆东南部的陆缘地带，区域不但花岗岩分布广泛，而且侵入岩十分发育，其上覆盖第四纪沉积物。构造体系主要为新华夏系构造、东西向构造和南北向构造，因受新华夏系构造的影响。由于峰谷交错，山河相间，形成了许多向南开口的马蹄形优良小环境，地貌依次可划分为中低山、丘陵、台地和河谷平原等 4 个类型区。拟建场地内未见对工程安全有明显影响的活动性断裂、区域地质构造通过。

The site of the planned project is located at Zhangzhou City. The geotectonic position is on the continental margin in the southeast of Eurasia Continent where the granite is distributed extensively and intrusive rock is developed. The Quaternary sediments are covered on the granite and intrusive rock. The tectonic system is mainly neocathaysian tectonic system, EW structure and SN structure under impact of neocathaysian structure. Many southward U-shaped good small environments are formed due to staggered peaks and valleys, mountains and rivers. The landform may be divided into four types of medium and low mountains, hills, platform and valley plains. There is no active fault and regional tectonics passing through which may affect safety of the project obviously.

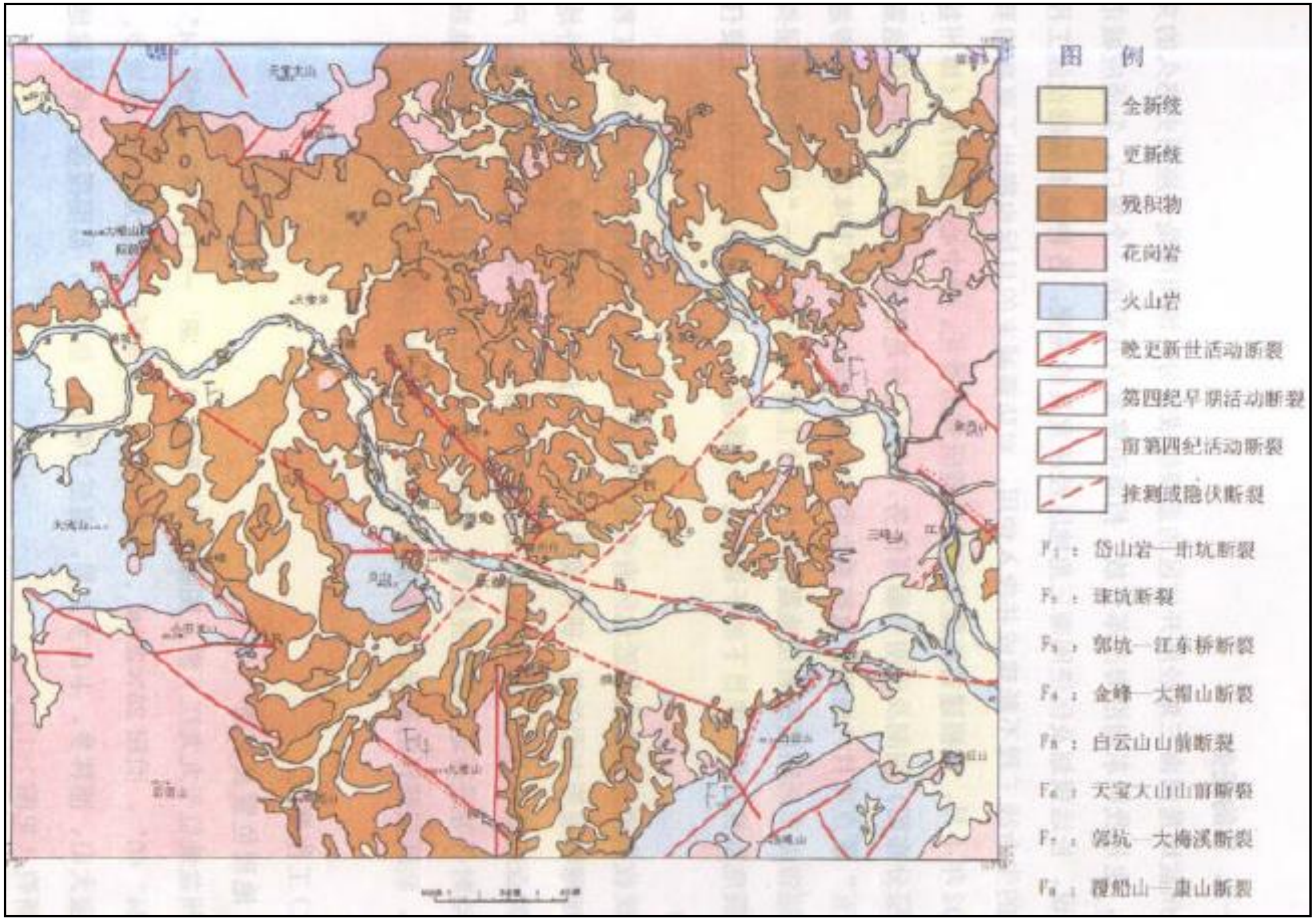


图 4.1-5　区域地质构造图

Fig.4.1-5 Regional tectonic map

4.1.6.3 评价区水文地质条件

4.1.6.3 Hydro-geological conditions in the evaluation zone

评价区位于九龙江北港北侧，地下水类型主要为第四系上层滞水和风化岩网状孔隙裂隙水两种。

The evaluation zone is located on the north side of Jiulong River North Port, and underground water type is mainly Quaternary system perched water and meshed pore-fissure water of decomposed rock.

第四系上层滞水主要赋存于现代河床相砂、淤泥质砂层中，密实度不均匀，孔隙连通性差，水位随季节变化，富水性贫乏；风化岩网状孔隙裂隙水主要为赋存于各风化岩土层中，富水性贫乏～一般，矿化度较高。

The Quaternary system perched water is mainly hosted in modern bed phase sand and muddy sand stratum with uneven density and worse pore connectivity. The water level is changed with seasons, and water yield property is worse; the meshed pore-fissure water of decomposed rock is mainly hosted in each decomposed rock and soil layer. The water yield property is worse-common, and salinity is high.

4.1.6.4 评价区地质条件

4.1.6.4 Geological conditions in the evaluation zone

根据本项目工程地质勘察，拟建场地内岩土层构成自上而下见有：

According to engineering geological survey on this project, the rock and soil structures on the planned site from up down are:

①素填土（Qml）：人工堆填而成，表层局部地段相变为薄层的杂填土，局部见 0.50～1.00m 的块（抛）石回填。成份以粘性土回填为主，含个别粒径 5～15cm 的中风化花岗岩碎石和块石；为人工堆填物，未经系统压实处理，堆填时间自上而下约 3～5 年不等，密实度很差。本层在拟建场地内均有分布，揭露厚度为 0.50～2.50m。

①Plain fill (Qml): It is filled manually, and phase change in local section of surface is thin foreign fill, with 0.50~1.00m block (rip-rap) stone backfill locally. The component is mainly clayed soil backfill, with individual moderately weathered granite stones and rubbles with particle size of 5~15cm; the plain fill is filled manually without systematic compaction processing. The filling time is about 3~5 years from up to down, and density is worse. The stratum is distributed on the planned site, with exposure thickness of 0.50~2.50m.

②残积砂质粘性土（Ｑel）：残积成因，母岩为花岗岩类。粘性较强，矿物成份以石英、长石及云母为主，长石、云母已风化成粘土状。本层在拟建循环水冷却塔场地内钻孔有揭露，揭露层厚为1.20～3.80m、平均2.09m，层顶埋深0.90～2.10m，层顶标高11.57～13.40m。

② Eluvial sandy clay (Qel): cause of eluvial deposit, and parent rock is granite. The viscosity is strong, and mineral compositions are mainly quartz, feldspar and mica; feldspar and mica have been weathered to clay. This stratum is exposed in drilled holes on the planned site of circulating water cooling tower. The thickness of the disclosed stratum is 1.20~3.80m, averagely 2.09m; the top burial depth is 0.90~2.10m and top elevation is 11.57~13.40m.

③全风化花岗岩（γ_5^2）：花岗岩风化形成。风化完全，原岩组织结构已基本破坏，有残余结构强度，岩芯呈土状，岩石坚硬程度为极软岩。本层在拟建场地内所有钻孔均有揭露，揭露层厚为1.20～5.10m、平均3.26m，层顶埋深0.50～4.70m，层顶标高9.57～15.99m。

③ Completely weathered granite (γ_5^2): it is formed by granite through weathering. The weather is complete, the structure of protolith has been largely damaged; the residual structural strength is reserved; the core of rock is earthy; the hardness of rock is ultimate soft. This stratum is exposed in all drilled holes on the planned site. The thickness of the exposed stratum is 1.20~5.10m, averagely 3.26m; the top burial depth is 0.50~4.70m and top elevation is 9.57~15.99m.

④砂土状强风化花岗岩（γ_5^2）：花岗岩风化形成。岩芯呈砂土状，原岩组织结构已大部破坏，风化裂隙很发育，岩体完整性程度为极破碎，岩石坚硬程度为极软岩。本层在拟建场地内所有钻孔均有揭露，揭露层厚为1.60～4.40m、平均3.30m，层顶埋深3.40～6.20m，层顶标高7.83～12.56m。

④ Sand-soil strong weathered granite (γ_5^2): it is formed by granite through weathering. The rock core is sandy, and the structure of protolith has been damaged mostly; the weathered fissure is developed, and completion degree of rock is extremely breaking; the hardness of rock is ultimate soft. This stratum is exposed in all drilled holes on the planned site. The thickness of the exposed stratum is 1.60~4.40m, averagely 3.30m; the top burial depth is 3.40~6.20m and top elevation is 7.83~12.56m.

⑤碎块状强风化花岗岩（γ_5^2）：花岗岩风化形成。风化强烈，节理、裂隙很发育，原岩结构已大部分风化破坏，主要由石英、角闪石、长石及云母等矿物组成。本层在拟建场地内所有钻孔均有揭露，揭露层厚为 0.90～5.70m、平均 3.83m，层顶埋深 6.10～9.70m，层顶标高 4.17～10.46m。

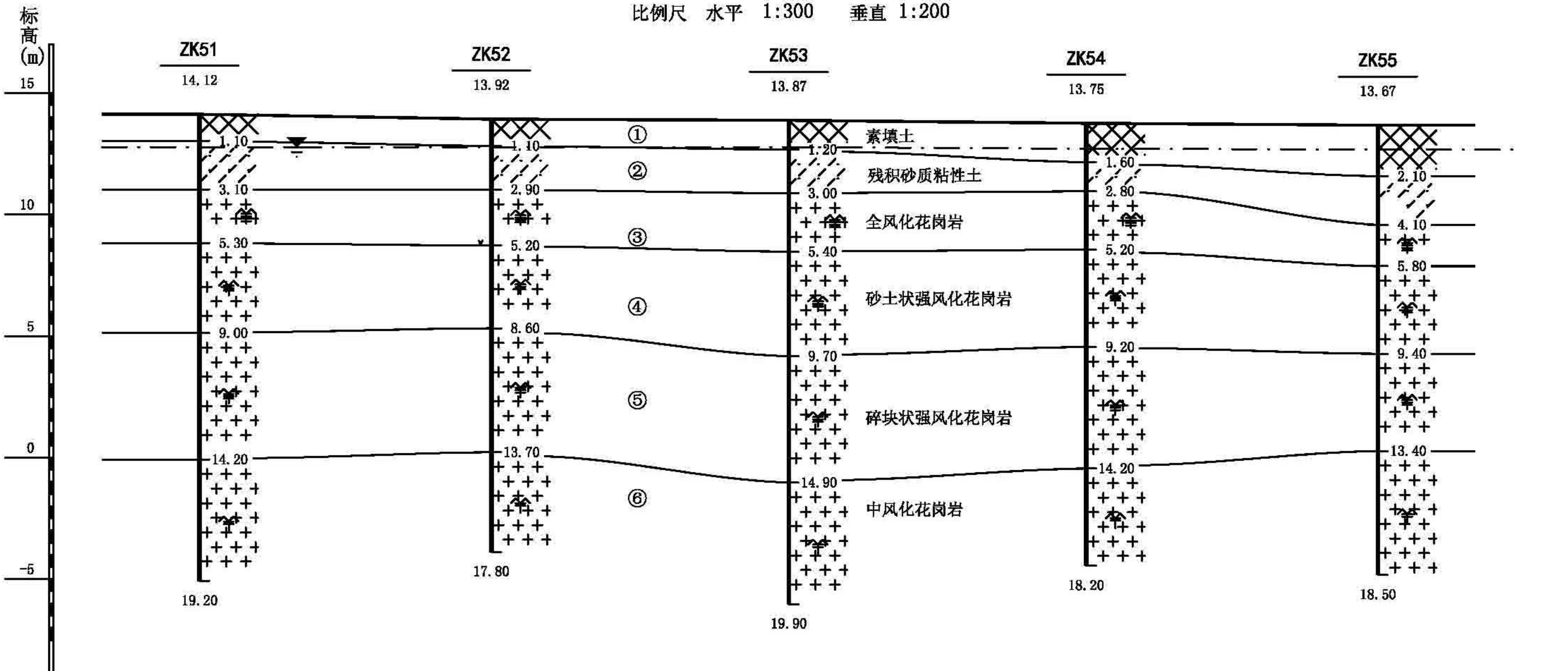
⑤ Chunky strong weathered granite (γ_5^2): it is formed by granite through weathering. The weathering is fierce, joints and fissures are developed, and the protolith structure has been weathered and damaged mostly. It mainly contains minerals such as quartz, amphiboles, feldspar and mica. This stratum is exposed in all drilled holes on the planned site. The thickness of the exposed stratum is 0.90~5.70m, averagely 3.83m; the top burial depth is 6.10~9.70m and top elevation is 4.17~10.46m.

⑥中风化花岗岩（γ_5^2）：花岗岩类风化形成，局部相变为微风化花岗岩。风化裂隙发育，矿物成分以石英、角闪石、长石和黑云母、角闪石等矿物为主。本层在拟建场地内所有钻孔均有揭露，均未揭穿，揭露厚度为 3.10～8.00m，层顶埋深 9.20～14.90m，层顶标高为-1.03～7.81m。

⑥ Intermediary weathered granite (γ_5^2): it is formed by granite after weathering, with locally phase is changed to weakly weathered granite. The weathering fissure is developed, and minerals are mainly quartz, amphiboles, feldspar, black mica and amphiboles. This stratum is exposed in all drilled holes on the planned site, but not penetrated. The thickness of exposure is 3.10~8.00m; the top burial depth is 9.20~14.90m and top elevation is -1.03~7.81m.

11-11'工程地质剖面图

比例尺 水平 1:300 垂直 1:200



水平间距(m)		18.00	18.35	18.35	18.00
水位 深度(m) / 标高(m)	1.35 / 12.77	1.15 / 12.77	1.10 / 12.77	1.05 / 12.70	1.00 / 12.67

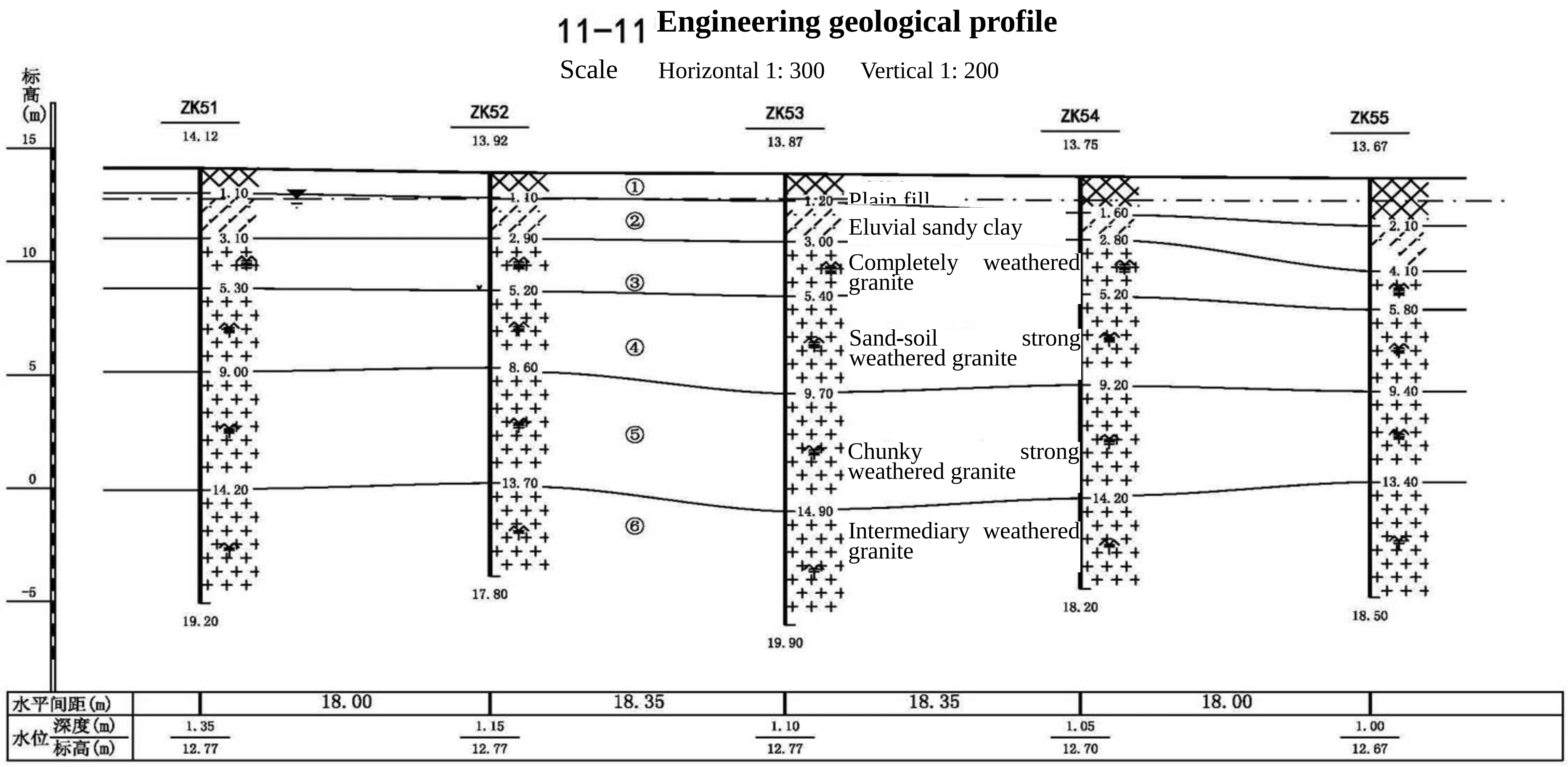


图 4.1-6 项目区典型地质剖面

Fig.4.1-6 Typical geological section in the project zone

4.1.6.5 评价区水文地质条件

4.1.6.5 Hydro-geological conditions in the evaluation zone

场地内地下水类型主要为上层滞水和风化岩网状孔隙裂隙水两种。

The underground water type inside the site is mainly perched water and meshed pore-fissure water of decomposed rock.

上层滞水主要赋存于①素填土层中，密实度不均匀，孔隙连通性差，水位随季节变化，富水性贫乏，属弱透水层；风化岩网状孔隙裂隙水主要为赋存于各风化岩土层中，为弱透水～中等透水层，富水性贫乏～一般。

The perched water is mainly hosted in ① plain soil stratum with uneven density and worse pore connectivity, which belongs to weak permeability stratum. The water level is changed with seasons, and water yield property is worse; the meshed pore-fissure water of decomposed rock is mainly hosted in each decomposed rock and soil layer and is weak-medium permeability stratum. The water yield property is worse-common.

勘察期间测得场地各钻孔中地下水初见水位埋深 0.80～3.35m，混合稳定水位埋深 0.60～3.15m（标高 12.67～14.02m）。因上层滞水和风化岩网状孔隙裂隙水含水层之间未见明显的隔水层，两者之间存在明显的水力联系，因此未进行分层测水位。

During the survey, the initial underground water level burial depth in each drilled hole is 0.80~3.35m through measurement, the mixed stable water level burial depth is 0.60~3.15m (elevation is 12.67~14.02m). Since there is no obvious aquiclude between perched water and meshed pore-fissure water of decomposed rock, and they have obvious hydraulic connection. Thus, the layered water level measurement is not carried out.

根据区域水文地质资料，地下水位年变化幅度 1m，场地地下水近 3～5 年最高水位标高约 15.00m，建议抗浮水位按拟建物四周设计地坪标高考虑。场地地下水主要补给方式为大气降水的渗透补给和同一含水层的渗透补给，主要通过沿含水层向地势低洼处排泄。

According to regional hydro-geological data, the annual change range of underground water level is 1m, and the highest water level elevation of underground water on the site in recent 3~5 years is about 15.00m. It is suggested that the anti-floating water level is considered as per designed grade level elevation around the building. The main supplementing way to underground water of the site is permeation of atmospheric precipitation and the same water-bearing layer. The water is mainly drained through water-bearing layer toward lower area.

4.1.7 自然资源

4.1.7 Natural resources

（1）森林资源

(1) Forest resources

区域植被系闽粤沿海丘陵、平原亚热带雨林区和闽南博平岭东南湿热带雨林区，主要植被有温、暖性针叶林、常绿阔叶林、次生雨林、红树林、暖性针阔叶混交林、暖性竹林、常绿阔叶灌丛，落叶阔叶灌丛、灌草丛以及经济林果和农作物等。共有野生和栽培植被 3 门 187 种、692 属，1182 种。林业资源主要树种有 56 科 90 属 125 种，珍贵树种有苏铁、银杏、油杉、水松、天竺桂、楠木等 20 多种。

The regional vegetation is the subtropical rain forest in coastal hills and plain in Guangdong and Fujian and Boping Ling Southeast wet tropical rain forest in Minnan Area of Fujian Province. Main vegetations are temperate and warm coniferous forest, evergreen broad-leaf forest, secondary rain forest, mangrove forest, warm mixed coniferous broad leaved forest, warm bamboo forest, evergreen broad-leaved brushes, deciduous broad leaved brushes, brush grass as well as economical forest fruits and field crops. There are totally 187 kinds in 3 phylums, 1182 kinds in 692 categories wild and cultural vegetations. Main trees in forest resources are 125 kinds in 90 categories, 56 families, in which there are over 20 precious trees including cycas revoluta, ginkgo, keteleeria fortunei, Chinese cypress, cinnamomum japonicum and nanmu.

（2）水产资源

(2) Aquatic resources

生存于境内水域的鱼类有软骨钢 16 科 22 种，硬骨鱼钢 103 科 413 种，还有各种虾类、蟹类、贝类、头足类、棘皮类、腔肠类等水生动物近百种，种类繁多。

Fishes in the water area are 22 kinds in 16 families of Chondrichthyes, 413 kinds in 103 families of Osteichthyes, as well as nearly a hundred of aquatic animals including shrimps, crabs, shellfish, cephalopoda, echinodermata and coelenteron.

（3）矿产资源

(3) Mineral resources

矿产资源主要以非金属矿产为主，尤其以砂、石、土最为丰富。矿种主要有以下种类：钾钠长石、水晶、石英、花岗岩、砖瓦粘土、耐火粘土、建筑用砂、泥煤、高岭土、铝土矿、玄武岩、陶土、地热水、矿泉水、磁铁矿、赤铁矿、钼、铍等。

The mineral resources are mainly nonmetallic minerals, especially sand, stones and soil. The mine types are mainly: kalialbite, crystal, quartz, granite, brick clay, fire clay, building sand, peat, Kaolin, bauxite, basalt, argil, geothermal water, mineral water, magnetite, hematite, molybdenum and beryllium, etc.

4.2 环境保护目标调查

4.2 Investigation on Environmental Protection Objective

4.2.1 环境功能区划

4.2.1 Environmental function zoning

（1）环境空气功能区划

(1) Ambient air function zoning

项目位于漳州台商投资区内，项目区属于《环境空气质量标准》（GB3095-2012）二类环境空气功能区。

The project is located in Taiwan Investment Zone of Zhangzhou, and the project zone belongs to the Class II ambient air function zone in accordance with *Ambient Air Quality Standard* (GB3095-2012);

（2）声环境功能区划

(2) Acoustic environment function zoning

项目位于漳州台商投资区内，项目所在区域属于《声环境质量标准》（GB3096-2008）3 类声环境功能区。

The project is located in Taiwan Investment Zone of Zhangzhou, and the project zone belongs to the Class III acoustic air function zone in accordance with *Environmental quality standard for noise* (GB3096-2008);

（3）地表水环境功能区划

(3) Surface water environment function zoning

根据《福建省近岸海域环境功能区划（修编）》（2011～2020 年，图 1.8-1），现有工程排污口位于九龙江北港出海口（厦漳跨海大桥连线以内的九龙江河口区域），主导功能为红树林保护、养殖，水质执行《海水水质标准》（GB3097-1997）中的二类标准，拟建项目生产废水在厂区东南侧通过尾水排放专用管道连接角美工业综合开发区污水处理厂的尾水排放管道，并入开发区规划的污水排放口，排污口位于九龙江口角美港口，规划为四类区，主导水质为港口、一般工业用水区、纳污，海水水质执行《海水水质标准》（GB3097-1997）三类标准。

In accordance with *Offshore Area Environment Function Zoning of Fujian Province* (2011~2020), the drain outlet of current project is located at the estuary of Jiulong River North Port (Jiulong River estury area within the connecting line of Xiamen-Zhangzhou Bridge). The leading function is to protect and cultivate mangrove. The water quality shall follow the Class II standard in *Sea water quality standard* (GB3097-1997). The production wastewater is drained to tail water discharge pipeline of Jiaomei Industrial Comprehensive Development Zone sewage treatment plant through special pipeline for tail water discharge, and connected to sewage drainage outlet planned in the development zone. The sewage drain exit is located at Jiaomei Port, Jiulong River Estuary, which is a Class IV area. The leading quality water is port and common industrial water and pollution receiving zone. The sea water quality implements Class III standard in *Sea water quality standard* (GB3097-1997).

4.2.2 环境敏感区

4.2.2 Environmental sensitivity area

根据现场调查，本项目主要环境保护目标为项目周边村庄及东南侧 6.5km 处的九龙江口湿地、红树林保护区，本项目主要环境保护目标见表 1.8-1。

In accordance with field investigation, the main environment protection objectives are villages around the project and Jiulong River Estuary wetland, mangrove protection zone about 6.5km in the southeast side of the project. The main environmental protection objectives can be seen in Fig. 1.8-1.

4.3 环境质量现状监测与评价

4.3 Environmental Quality Status Monitoring and Evaluation

4.3.1 海域水环境质量现状调查与评价

4.3.1 Investigation and evaluation on seawater environment

4.3.1.1 九龙江河口水质现状调查

4.3.1.1 Investment on water quality status in estuary of Jiulong River

（1）调查点位

(1) Investigation point location

规划角美城市污水处理厂排污口附近海域设置 3 个调查站位，为了解九龙江河口历史水环境质量，评价引用《龙海市北区城市污水处理厂及配套管网一期工程环境影响报告书》2010 年 5 月 18 日监测数据和《漳州台商投资区凤山埔尾片区产业发展规划环境影响报告书》2018 年 3 月 14 日监测数据。

Three investigation stations are set near sea area of sewage drain exit of Jiaomei Urban Sewage Treatment Plant. In order to know historical water environment quality of Jiulong River Estuary, the monitoring data of *Environmental Impact Report of Phase I Project of Longhai North District Urban Sewage Treatment Plant and Supporting Pipeline Network* on May 18, 2010 and monitoring data of *Environmental Impact Report on Industrial Development Planning of Fengshanpu District in Zhangzhou Taiwan Investment Zone* on March 14, 2018.

表 4.3-1 九龙江北港水质评价结果单位：mg/L，pH 除外

Table 4.3-1 Water quality evaluation results in North Port of Jiulong River, unit: mg/L, pH is excluded

站号 Station No.	经度 Longitude	纬度 Latitude	备注 Remarks
Z01	117° 56′ 27.52″ E	24° 27′ 20.70″ N	白礁排污预留区内 Inside Baijiao sewage disposal reserve zone
Z02	117° 54′ 41.11″ E	24° 28′ 3.36″ N	白礁排污预留区外 Outside Baijiao sewage disposal reserve zone
Z03	117° 57′ 59.98″ E	24° 26′ 41.75″ N	白礁排污预留区外 Outside Baijiao sewage disposal reserve zone

（2）调查结果

(2) Investigation results

2010 年、2018 年监测期间，监测结果详见表 4.3-2。

During monitoring periods in 2010 and 2018, the monitoring results can be seen in Table 4.3-2.

由监测结果可知，九龙江河口 3 各站位监测 pH、DO、COD_{Mn}、BOD_5、油类、重金属（Zn、Cu、Cd、Cr）指标均能满足《海水水质标准》（GB3097-1997）第二、三类海水水质标准。高平潮、低平潮 DO、COD_{Mn}、重金属平均浓度变化不大，九龙江河口水质总体较为稳定。

The monitoring results show the indexes pH, DO, COD_{Mn}, BOD_5, oil, heavy metals (Zn, Cu, Cd, Cr) in three stations on Jiulong River Estuary all meet Class II and III seawater quality standards in *Seawater quality standards* (GB3097-1997). Flood slack, ebb slack DO, COD_{Mn}, and heavy metal mean concentration do not change largely, and water quality in Jiulong River estuary is stable.

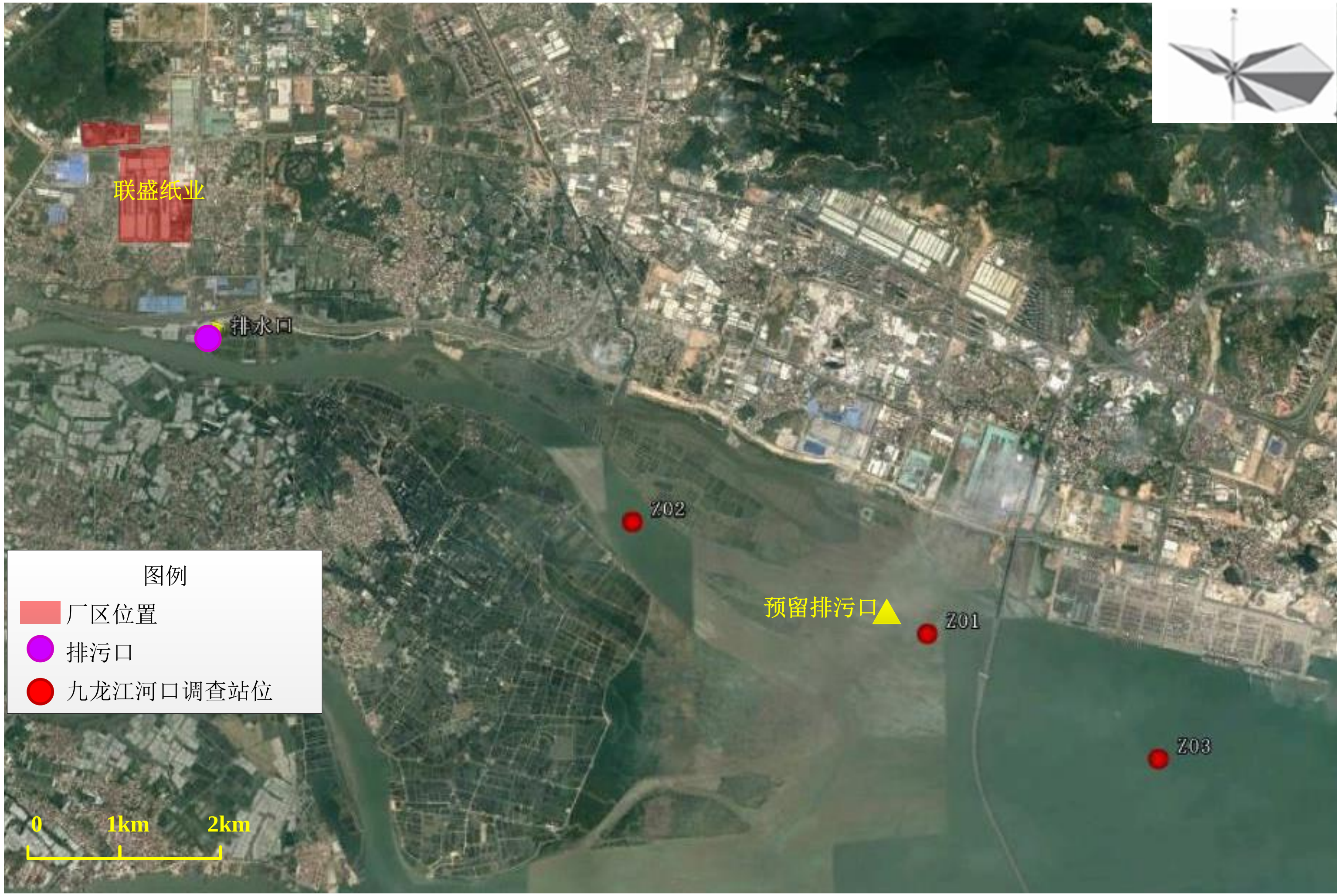
表 4.3-2 九龙江河口水质调查结果

Table 4.3-2 Investment results of water quality in estuary of Jiulong River

时间 Time	站位 Station	潮时 Time of tide	水温（℃）Water temperature (℃)	pH	盐度（%）Salinity (%)	DO（mg/L）DO (mg/L)	悬浮物（mg/L）Suspended solids (mg/L)	COD_M（mg/L）COD_M (mg/L)	BOD_5（mg/L）BOD_5 (mg/L)	油类（μg/L）Oil (μg/L)	Zn（μg/L）Zn (μg/L)	Cu（μg/L）Cu (μg/L)	Cd（μg/L）Cd (μg/L)	Cr（μg/L）Cr (μg/L)
2010年5月18日 May 18, 2010	Z01	高平潮 Flood slack	22.3	8.05	18	5.5	28	2.5	/	＜0.01	0.012	＜0.0011	＜0.0003	0.011
		低平潮 Ebb slack	24.0	7.65	14	5.7	32	3.4	/	＜0.01	0.025	＜0.0011	＜0.0003	0.014
		标准值 Standard value	/	6.8~8.8	/	＞4	/	≤4	≤4	≤0.3	≤100	≤50	≤10	≤200
	Z02	高平潮 Flood slack	25.2	7.69	10	5.8	38	3.0	/	＜0.01	0.005	＜0.0011	＜0.0003	0.011
		低平潮 Ebb slack	24.2	7.60	10	5.2	45	3.4	/	＜0.01	0.011	＜0.0011	＜0.0003	0.013
		标准值 Standa	/	7.8~8.5	/	＞5	/	≤3	≤3	≤0.05	≤50	≤10	≤5	≤100

		rd value												
	Z03	高平潮 Flood slack	23.9	8.04	19	5.7	11	2.3	/	＜0.01	＜0.0031	0.005	＜0.0003	0.008
		低平潮 Ebb slack	24.1	7.50	14	6.0	14	2.4	/	＜0.01	＜0.0031	0.010	＜0.0003	0.009
		标准值 Standard value	/	7.8~8.5	/	＞5	/	≤3	≤3	≤0.05	≤50	≤10	≤5	≤100
2018年3月14日 March 14, 2018	Z01	高平潮 Flood slack	20.3	7.9	12.2	5.50	33	2.45	1.2	4.2	7.8	＜1.1	0.02	6.5
		低平潮 Ebb slack	22.0	7.6	11.0	5.72	42	2.87	1.4	7.5	4.4	＜1.1	0.03	7.4
		标准值 Standard value	/	6.8~8.8	/	＞4	/	≤4	≤4	≤0.3	≤100	≤50	≤10	≤200
	Z02	高平潮 Flood slack	23.2	7.7	9.5	5.89	34	2.55	1.3	5.8	8.2	＜1.1	0.02	8.4
		低平潮	22.2	7.6	8.9	5.32	40	2.88	1.4	6.2	5.5	＜1.1	0.02	9.3

		Ebb slack												
		标准值 Standard value	/	7.8~8.5	/	＞5	/	≤3	≤3	≤0.05	≤50	≤10	≤5	≤100
	Z03	高平潮 Flood slack	21.9	7.9	13.4	5.90	15	2.04	1.0	4.8	＜3.1	＜1.1	0.02	7.0
		低平潮 Ebb slack	22.1	7.6	11.8	5.78	24	2.45	1.2	5.2	＜3.1	＜1.1	0.02	4.5
		标准值 Standard value	/	7.8~8.5	/	＞5	/	≤3	≤3	≤0.05	≤50	≤10	≤5	≤100
备注 Remarks			Z01站位执行《海水水质标准》（GB3097-1997）第三类海水水质标准。Z02、Z03 站位执行第二类海水水质标准 Z01 station implements the Class III seawater quality standard in *Seawater quality standard* (GB3097-1997). Z02 and Z03 stations implement the Class II seawater quality standard.											


联盛纸业
排水口
Z02
预留排污口
Z01
Z03
图例
厂区位置
排污口
九龙江河口调查站位
0
1km
2km

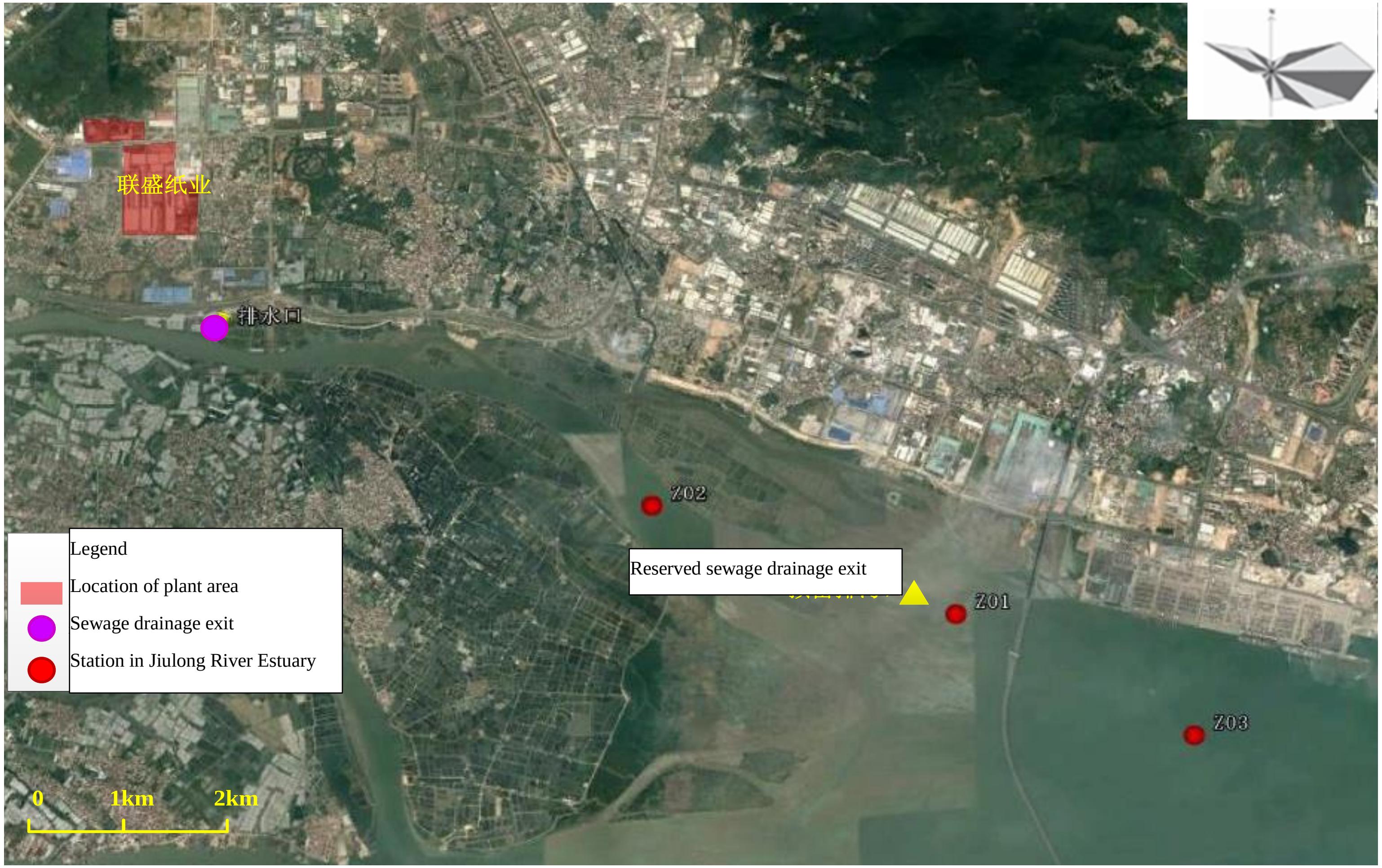


图 4.3-1 地表水环境质量监测断面示意图

Fig. 4.3-1 Surface water environment quality monitoring section

4.3.1.2 海域水环境质量现状监测与评价

4.3.1.2 Seawater environmental quality status monitoring and evaluation

1、海域水质资料回顾

1. Review of seawater quality data

依据本项目实际情况，本次相关海域水质现状的评估调查，采用收集历史资料与实测相结合的方法。

According to actual situations of this project, the evaluation and investigation of water quality in corresponding sea area adopts the method combining historical data collection and actual measurement.

首先，海域水质历史资料收集、分析如下：

Firstly, the historical data about water quality in the sea area is collected, and analyzed as follows:

根据本项目的厂址所在位置和周围海域环境特征，以及相关数据的时效性，本次评价报告可引用的数据及结论来源主要包括：

According to plant location of this project and ambient characteristics of nearby sea area, as well as timeliness of relevant data, the data and conclusion quoted by this evaluation report contains:

1、《2015 年~2017 年 福建省海洋环境状况公报》（福建省海洋与渔业厅）；

1. 2015~2017 *Bulletin of Fujian Province for Marine Environment Status* (Fujian Provincial Department of Ocean and Fishery);

2、《2015 年~2016 年 厦门市海洋环境状况公报》（厦门市海洋与渔业局）；《2017 年厦门市海洋生态环境状况公报》（厦门市海洋与渔业局）；

2. 2015~2016 *Bulletin of Xiamen for Marine Environment Status* (Xiamen Bureau of Ocean and Fishery); 2017 *Bulletin of Xiamen for Marine Environment Status* (Xiamen Bureau of Ocean and Fishery);

3、《2015 年~2017 年 漳州市海洋环境状况公报》（漳州市海洋与渔业局）。

3. 2015~2017 Bulletin of Zhangzhou City for Marine Environment Status (Zhangzhou Bureau of Ocean and Fishery);

根据《2017 年福建省海洋环境状况公报》，九龙江口水质为劣四类海水水

质。影响水质的主要因素为无机氮和活性磷酸盐。近岸海域水质情况见图 4.3-2。

In accordance with *2017 Bulletin of Fujian Province for Marine Environment Status*, the water quality in Jiulong River Estury is Inferior Class IV seawater quality. Main factors affecting water quality are inorganic nitrogen and active phosphate. The offshore sea water quality can be seen in Fig. 4.3-2.

		
2017年近岸海域水质状况 The offshore sea water quality status in 2017	2017年近岸海域海水中无机氮状况 Inorganic nitrogen status in offshore sea water in 2017	2017年近岸海域海水中活性磷酸盐状况 Active phosphaten status in offshore sea water in 2017

图 4.3-2　2017 年近岸海域水质状况

Fig.4.3-2 The offshore sea water quality status in 2017

近岸海域富营养化状态季节变化明显，秋冬季高于春、夏季。海湾、河口水体富营养化较为严重。相比 2016 年，重度富营养化面积有所减少。

The coastal eutrophication status changes obviously in each season, and that in Autumn and Winter is higher than Spring and Summer. The eutrophication of water in Bay and Estuary is serious. Compared to that in 2016, the area with heavy eutrophication is reduced.

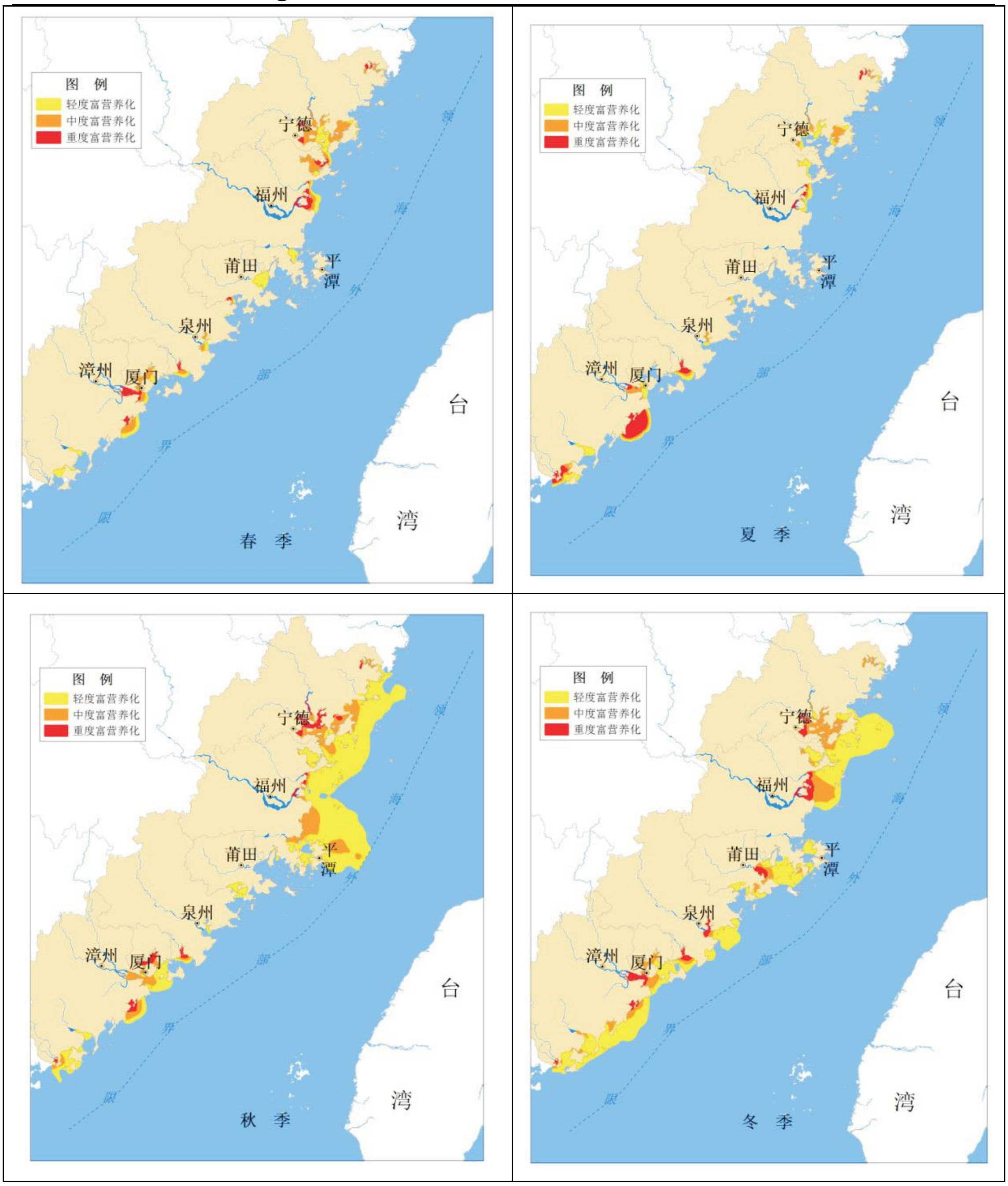


图 4.3-3　2017 年近岸海域富营养化状况

Fig.4.3-3 The offshore sea water eutrophication status in 2017

依据《2017 年厦门市海洋生态环境状况公报》，2017 年厦门湾局部海域水质与 2016 年相比有所改善，符合第一、第二类海水水质标准的海域面积达 890 平方公里，占该海域总面积的 69.1%，海水中主要超标污染要素仍为无机氮和活性磷酸盐。

In accordance with 2017 *Bulletin of Xiamen for Marine Environment Status*, the water quality of part of sea area in Xiamen Bay in 2017 is improved compared with that in 2016. Sea area complying with Class I and Class II sea water quality is 890km^2, accounting for 69.1% of total sea area. Main out-of-limit pollutants in seawater are still inorganic nitrogen and active phosphate.

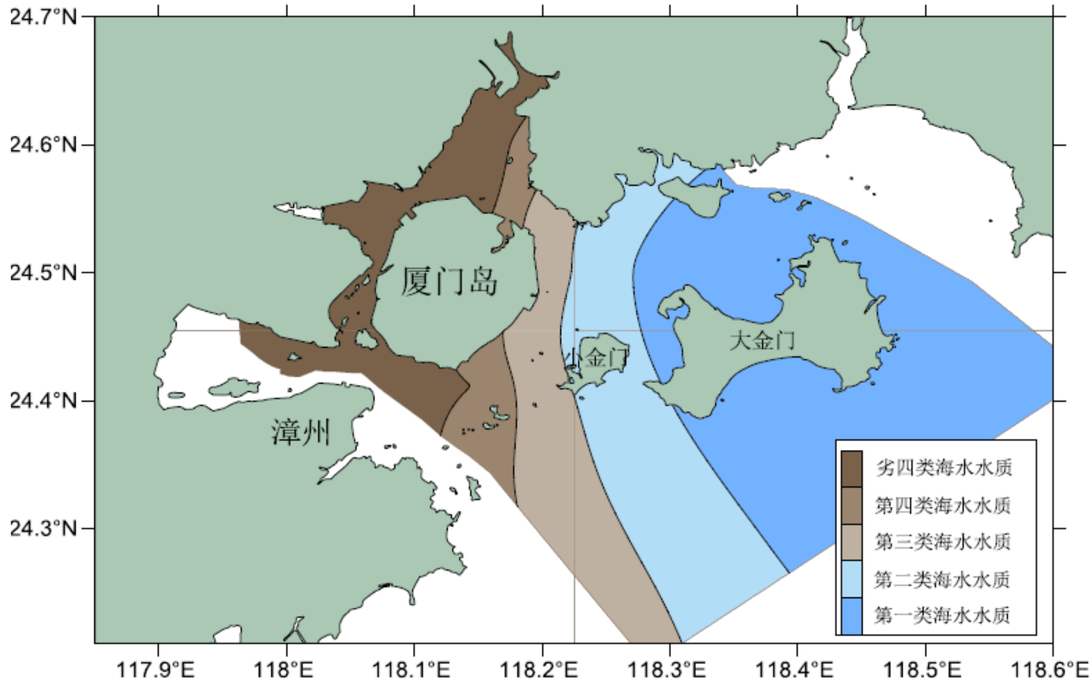


图 4.3-4　2017 年厦门湾局部海域水质评价结果示意图

Fig. 4.3-4 Diagram of local sea water quality evaluation results of Xiamen Bay in 2017

水体富营养化主要发生在厦门岛周边海域，其中其中西海域达中度至重度富营养化等级，同安湾、九龙江河口区和南部海域呈中度富营养化。

The water eutrophication mainly occurs in sea area around Xiamen Island, the eutrophication grade is from medium to heavy in the west sea area, and is medium in Tong’an Bay, Jiulong River Estuary and South Sea Area.

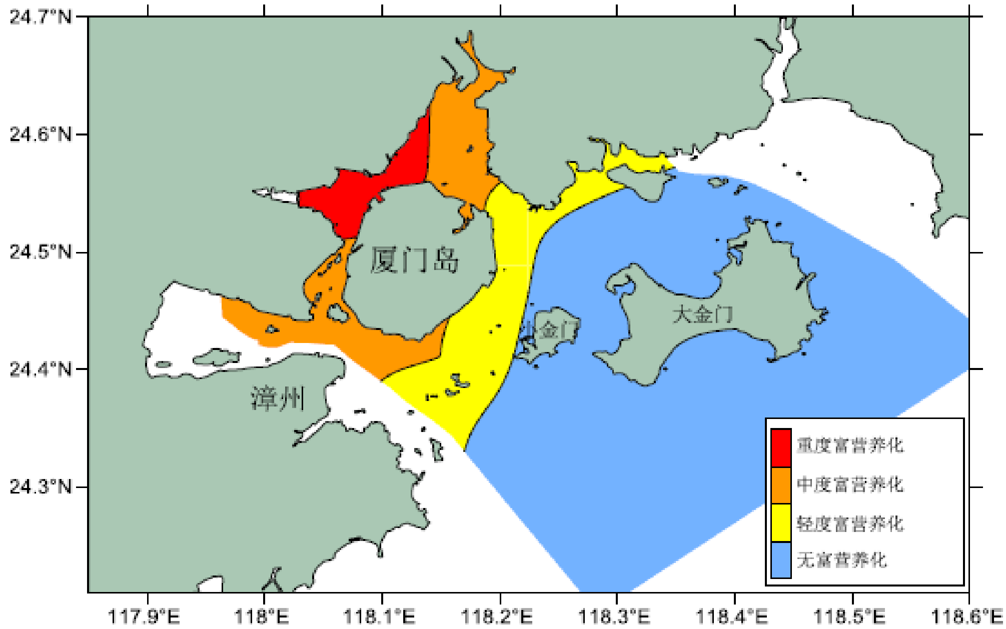


图 4.3-5　厦门湾局部海域水体富营养化状况

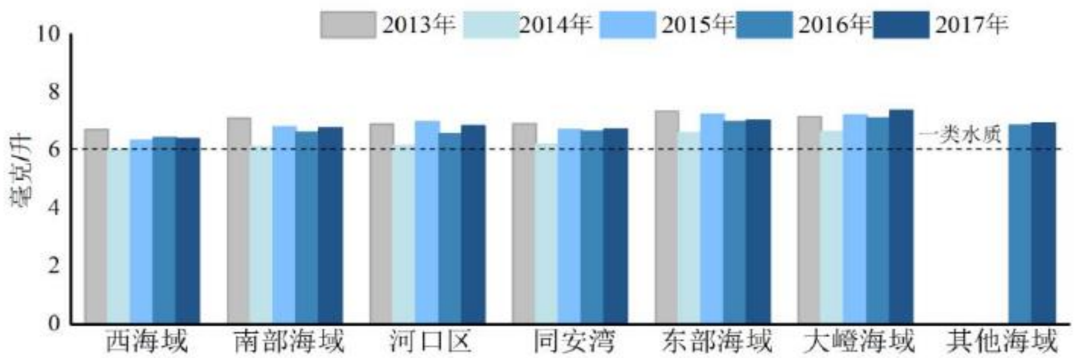
Fig.4.3-5 Local sea water eutrophication status of Xiamen Bay

（1）溶解氧

(1) Dissolved oxygen

2017 年，厦门湾局部海域溶解氧浓度符合第一类海水水质标准。与 2016 年相比，各区域溶解氧浓度均无大变化。

In 2017, the dissolved oxygen concentration in local sea area of Xiamen Bay complies with Class I seawater quality. Compared to 2016, the dissolved oxygen in each region is not changed greatly.



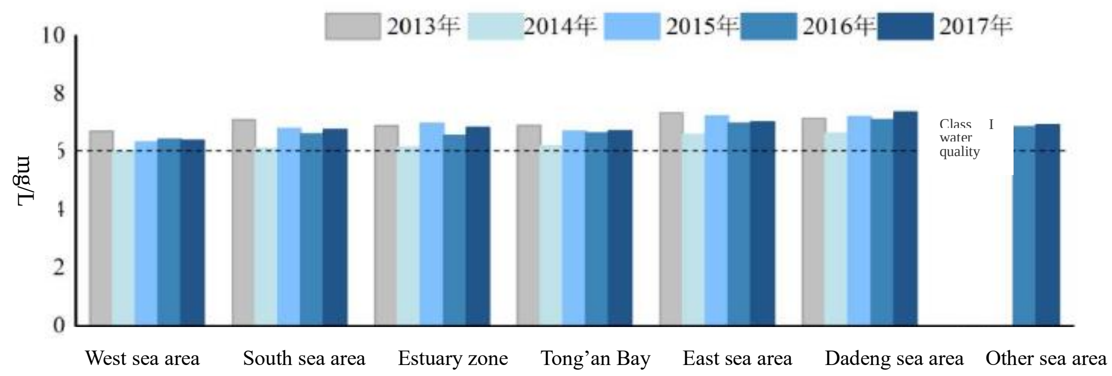


图 4.3-6　2013~2017 年厦门湾局部海域溶解氧浓度变化

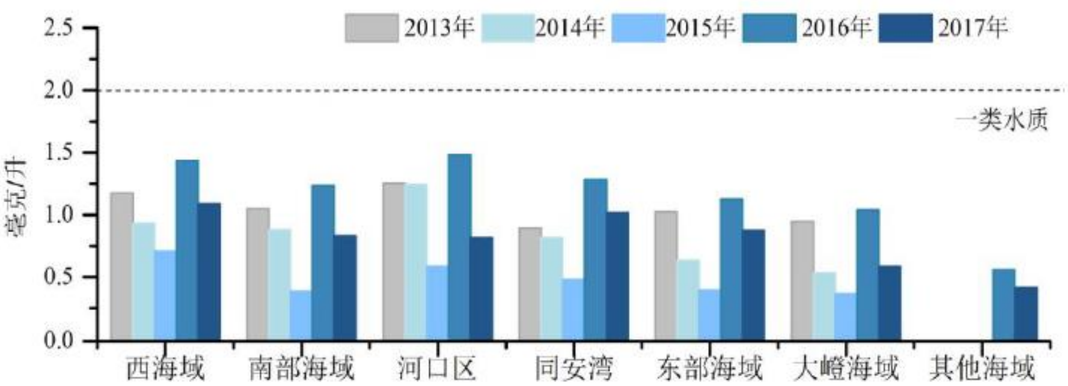
Fig. 4.3-6 2013~2017 Changes in dissolved oxygen concentration in local sea area of Xiamen Bay

（2）化学需氧量

(2) Chemical oxygen demand (COD)

2017 年，厦门湾局部海域化学需氧量浓度符合第一类海水水质标准。与 2016 年相比，各区域化学需氧量浓度均有所降低。

In 2017, the COD in local sea area of Xiamen Bay complies with Class I seawater quality. Compared to 2016, the COD in each region is reduced.



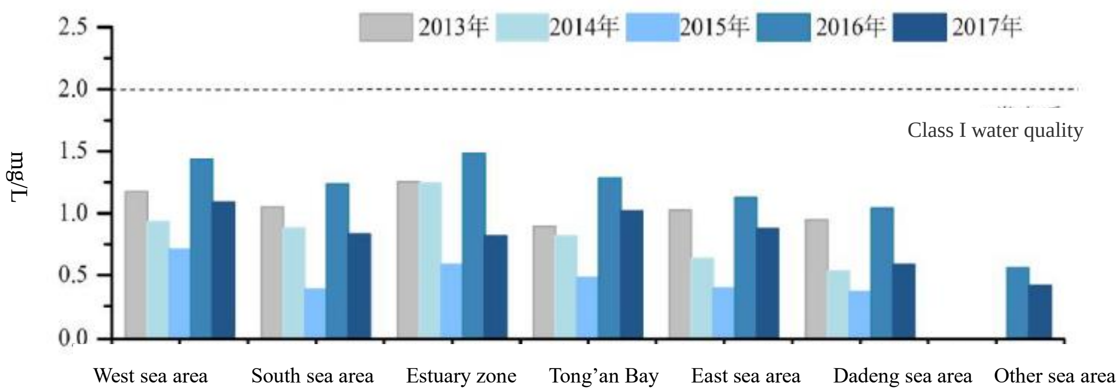


图 4.3-7　2013~2017 年厦门湾局部海域化学需氧量浓度变化

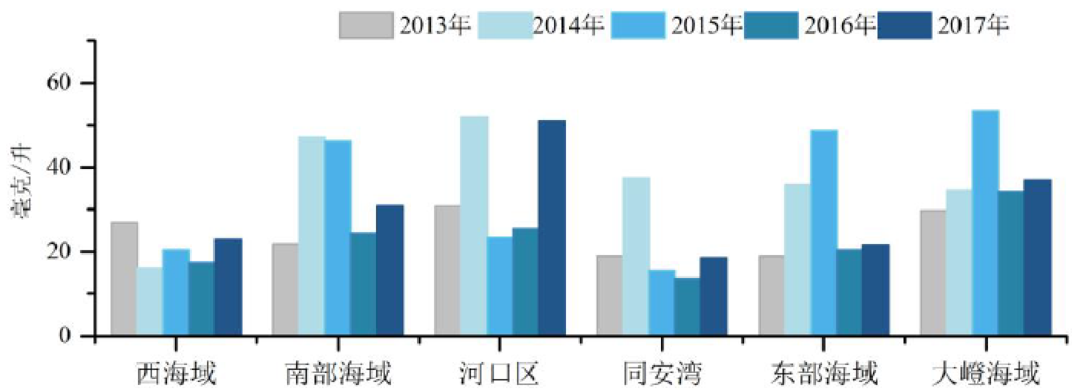
Fig. 4.3-7 2013~2017 Changes in COD concentration in local sea area of Xiamen Bay

（3）悬浮物

(3) Suspended solids

2017 年，厦门岛周边海域悬浮物浓度与 2016 年相比有所升高，其中九龙江河口区浓度升幅较大，其他区域升幅较小。

In 2017, the suspended solid concentration in nearby sea area of Xiamen island is improved compared to that in 2016, in which, the concentration increase in Jiulong River estuary is large, and in other area is small.



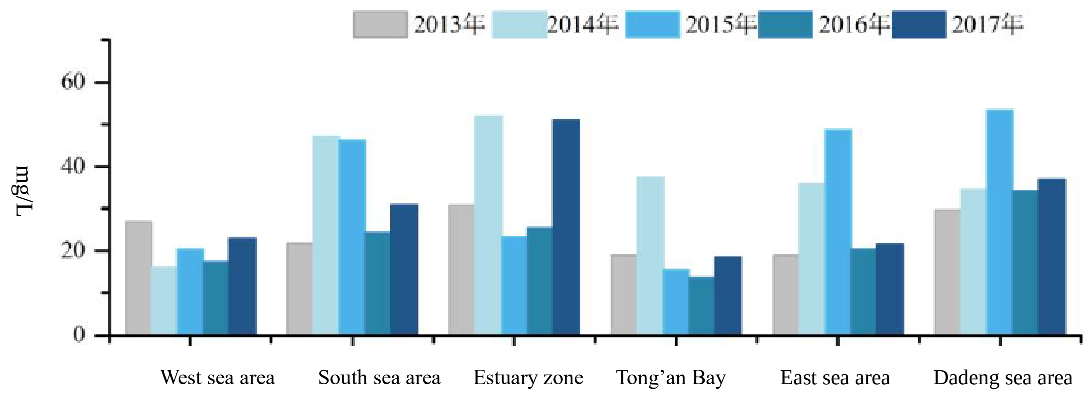


图 4.3-8　2013~2017 年厦门湾局部海域悬浮物浓度变化

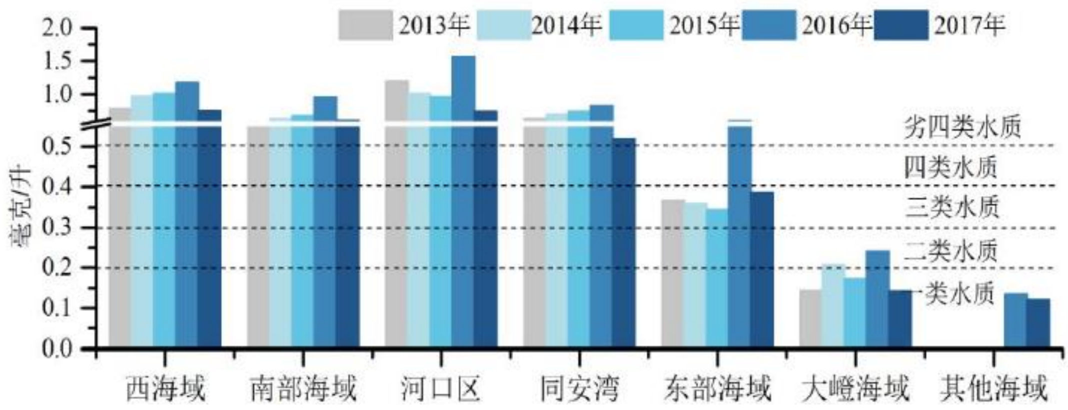
Fig. 4.3-8 2013~2017 Changes in suspended solid concentration in local sea area of Xiamen Bay

（4）无机氮

(4) Inorganic nitrogen

2017 年，大嶝海域无机氮浓度符合第一类海水水质标准，东部海域无机氮浓度符合第三类海水水质标准，西海域、同安湾、九龙江河口区和南部海域均处于劣四类水平；厦门湾局部海域的其他区域无机氮浓度均符合第一类海水水质标准。与 2016 年相比，厦门湾局部海域各区域无机氮浓度均有不同程度降低。

In 2017, the inorganic nitrogen concentration in Dadeng sea area complies with Class I seawater quality standard, while in the east sea area complies with Class III seawater quality standard; the water in the West sea area, Tong'an Bay, Jiulong River Estuary and South sea area is of inferior Class IV level; the inorganic nitrogen concentration in other areas of Xiamen Bay local sea area complies with the Class I seawater quality standard. Compared to 2016, the inorganic nitrogen concentration in each region of local Xiamen Bay area is reduced to different degrees.



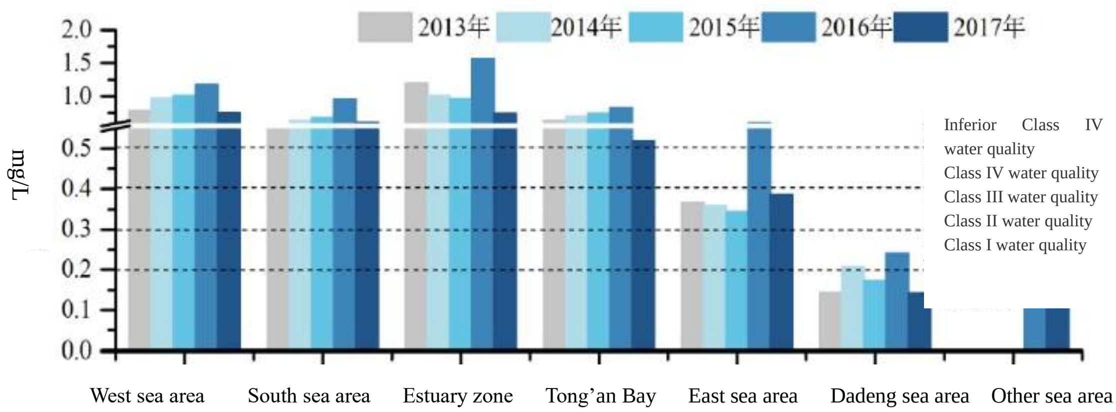
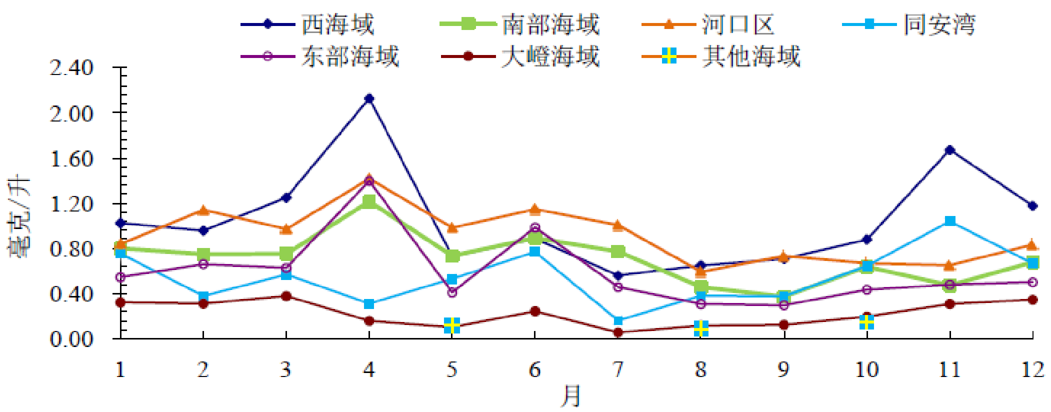


图 4.3-9　2013~2017 年厦门湾局部海域无机氮浓度变化

Fig. 4.3-9 2013~2017 Changes in inorganic nitrogen concentration in local sea area of Xiamen Bay



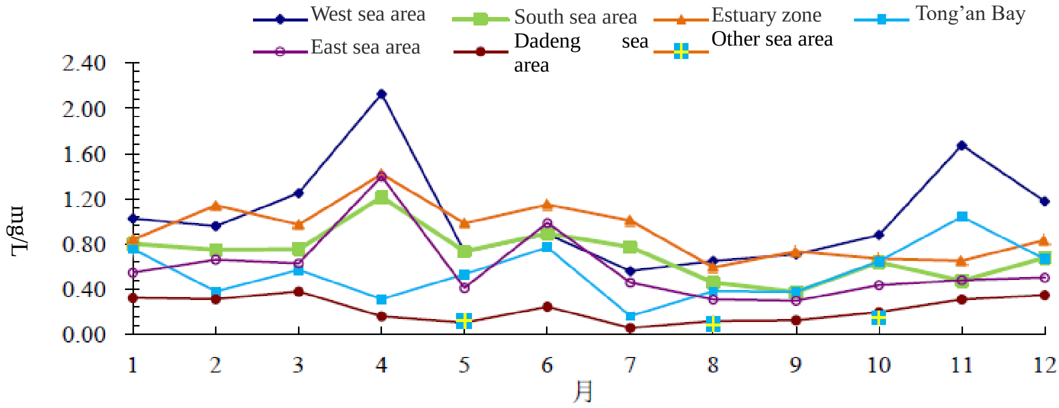


图 4.3-10　2017 年厦门湾局部海域无机氮浓度月变化

Fig. 4.3-10 2017 Monthly change in inorganic nitrogen concentration in local sea area of Xiamen Bay

根据每月水质监测结果，2017 年大嶝海域无机氮浓度符合或优于第二类海水水质标准的月份主要集中在 4~10 月，东部海域无机氮浓度仅 9 月份符合第二类海水水质标准，西海域、同安湾、九龙江河口区和南部海域无机氮浓度常年基本处于第四类或劣四类水平。厦门湾局部海域的其他区域无机氮浓度常年符合第一或第二类海水水质标准。

According to water quality monitoring results in each month, in 2017, the months with inorganic nitrogen concentration in Dadeng sea area complying with or superior to Class II seawater quality standard are mainly from April to October; in the east sea area, the inorganic nitrogen only in September complies with Class II seawater quality standard; the water in the West sea area, Tong'an Bay, Jiulong River Estuary and South sea area is of Class IV or inferior Class IV level all year round. The inorganic nitrogen concentration in other areas of Xiamen Bay local sea area complies with the Class I or Class II seawater quality standard perennially.

（5）活性磷酸盐

(5) Active phosphate

2017 年，大嶝海域和东部海域活性磷酸盐浓度符合第二至三类海水水质标准，南部海域和九龙江河口区符合第四类海水水质标准，西海域和同安湾海域则处于劣四类水平，厦门湾局部海域的其他区域活性磷酸盐浓度均符合第一类海水水质标准。与 2016 年相比，南部海域和九龙江河口区活性磷酸盐浓度略有降低，

厦门湾局部海域的其他区域则有不同程度的升高。

In 2017, the active phosphate concentration in Dadeng sea area and the East sea area complies with Class II-III seawater quality standard, while in the south sea area and Jiulong River Estuary zone complies with Class IV seawater quality standard; the water in the West sea area and Tong’an Bay is of inferior Class IV level; the active phosphate concentration in other areas of Xiamen Bay local sea area complies with the Class I seawater quality standard. Compared to 2016, the active phosphate concentration in the South sea area and Jiulong River Estuary zone is lowered slightly, while each region of local Xiamen Bay area is improved to different degrees.

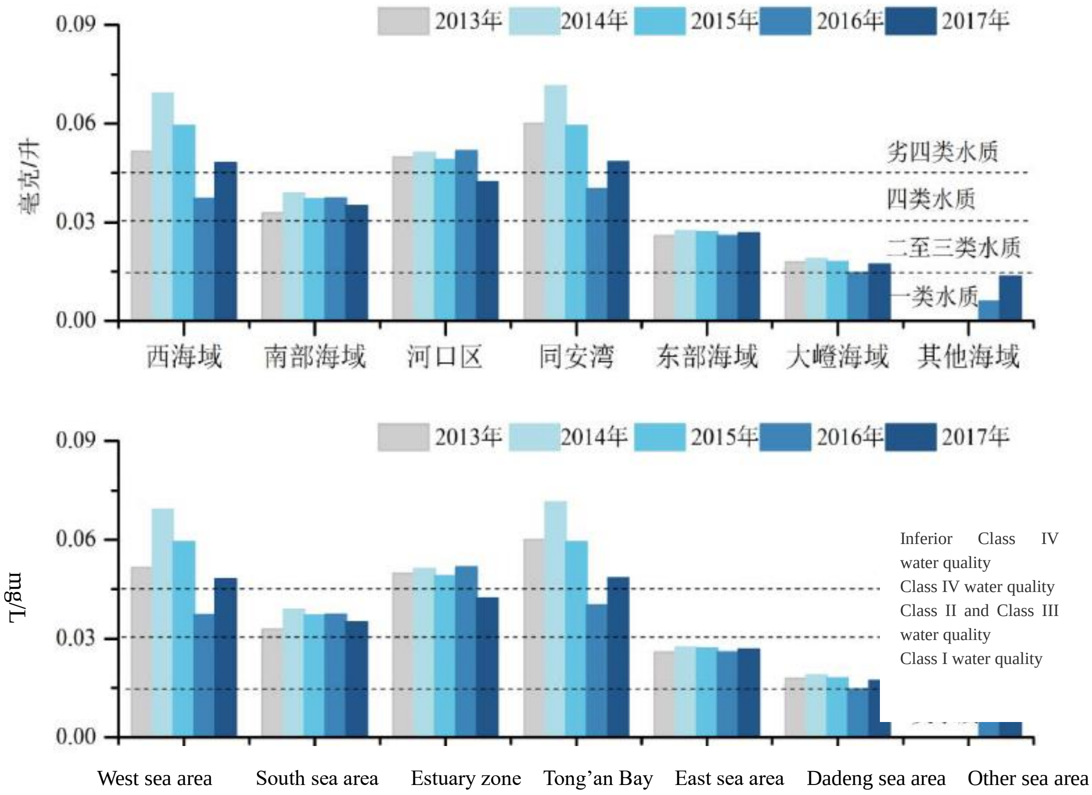
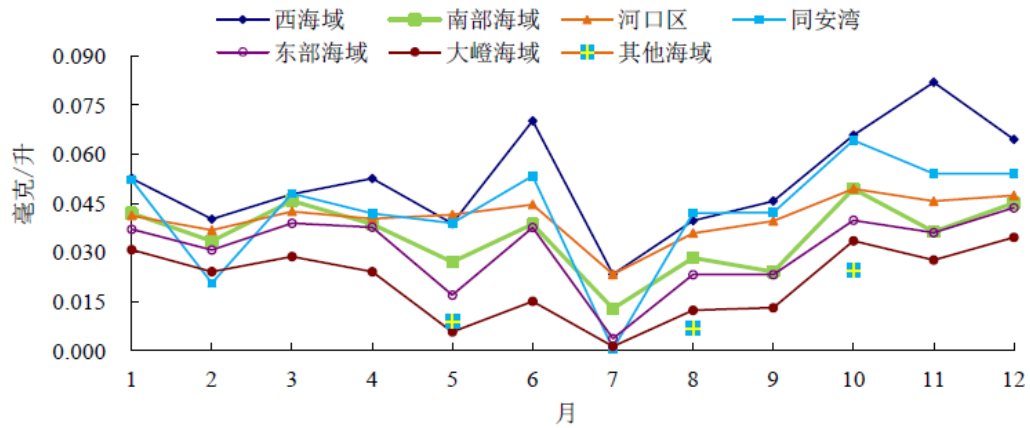


图 4.3-11　2013~2017 年厦门湾局部海域活性磷酸盐浓度变化

Fig. 4.3-11 2013~2017 Changes in active phosphate concentration in local sea area of Xiamen Bay



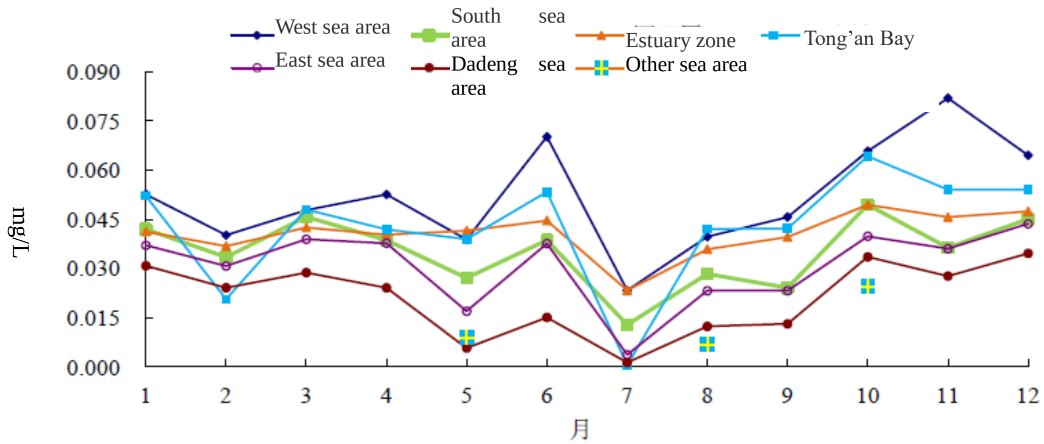


图 4.3-12　2017 年厦门湾局部海域活性磷酸盐含量月变化

Fig. 4.3-12 2017 Monthly changes in active phosphate concentration in local sea area of Xiamen Bay

根据每月水质监测结果，2017 年大嶝海域、东部海域、南部海域、同安湾、河口区和西海域符合第一类和第二类海水水质标准分别有 9 个、4 个、4 个、2 个、1 个和 1 个月份。厦门湾局部海域的其他区域活性磷酸盐浓度常年符合第一类或第二至三类海水水质标准。

According to water quality monitoring results in each month, in 2017, months with water quality in Dadeng sea area, South sea area, Tong'an Bay, Estuary and West sea area complying with Class I and Class II seawater quality are respectively 9, 4, 4, 2, 1, and 1 months. The active phosphate concentration in other areas of Xiamen Bay local sea area complies with the Class I or Class II-III seawater quality standard perennially.

（6）重金属及砷、硫化物、油类和其他有机污染物

(6) Heavy metal, As, sulfide, oils and other organic pollutants

2017 年，厦门湾局部海域重金属（铜、铅、锌、镉、铬、汞）及砷、油类、硫化物、六六六和滴滴涕平均浓度均符合第一类海水水质标准；与 2016 年相比，各监测要素浓度均无大变化。

In 2017, the average concentration of heavy metal (Cu, Pb, Zn, Cd, Cr, Hg), As, oil, sulfide, BHC and DDT in local sea area of Xiamen Bay complies with Class I seawater quality; compared to 2016, the concentration of each factor under monitoring is not changed greatly.

综合分析前文历史数据：2015 至 2017 年，九龙江入海口平均水质相对稳定，均为劣四类海水水质。富营养化是影响九龙江入海口海水水质的主要因素。造成九龙江入海口海水水质呈现富营养化状态的主要原因是无机氮和活性磷盐酸盐含量偏高。相比 2015 和 2016 年，2017 年度九龙江入海口海水水质重度富营养化持续时间和面积都有所减少，海水水质有改善趋势。

Comprehensive analysis on historical data in previous text shows: from 2015 to 2017, the average water quality in Jiulong River Estuary is relatively stable, and belongs to inferior Class IV seawater quality. The eutrophication is a major factor affecting sea water quality in Jiulong River Estuary. The major reason for eutrophication status in sea water of Jiulong River Estuary is that inorganic nitrogen and active phosphate contents are relatively high. Compared to 2015 and 2016, the duration and area of eutrophication in sea water of Jiulong River Estuary is reduced greatly, and sea water quality is improving.

2、海域水环境质量现状监测与评价

2. Seawater environmental quality status monitoring and evaluation

为进一步了解地面水环境评价区当下的海水水质状况，我公司委托福建省闽环试验检测有限公司对相关海域海水水质、沉积物、生态进行调查。

In order to further understand sea water quality in ground water environment evaluation zone, we entrust Fujian Minhuan Testing and Inspection Co., Ltd. to investigate water quality, deposits and ecology of relevant sea area.

（1）监测站位布置

(1) Arrangement of monitoring stations

在排污口附近海域共布置 7 个海水水质调查站位，如图 4.3-13 示，站位坐标见表 4.3-3。

Totally seven sea water investigation stations are arranged nearby the sewage drainage exit, as shown in Fig. 4.3-13, the position coordinates can be seen in Table 4.3-3.

表 4.3-3 调查点位布置一览表

Table 4.3-3 List of investigation station location

点位 Station location	经度E Longitude E	纬度N Latitude N	监测项目 Monitoring item
1	117°53'23.45"	24°28'46.53"	水质、沉积物、 Water quality, deposit,
2	117°53'18.08"	24°25'55.59"	水质、沉积物、生态 Water quality, deposit, ecology
3	117°56′35″	24°27′21″	水质、沉积物、生态 Water quality, deposit, ecology
4	117°56′57″	24°25′31″	水质、沉积物、生态 Water quality, deposit, ecology
5	117°55′58″	24°24′34″	水质、沉积物、生态 Water quality, deposit, ecology
6	118°00′53″	24°26′16″	水质、沉积物、生态 Water quality, deposit, ecology
7	118°00′51″	24°24′59″	水质、沉积物、生态 Water quality, deposit, ecology

图 4.3-13　调查站位图

Fig. 4.3-13 Investigation station map

（2）调查项目

(2) Inspection items

根据项目特点及其所在海域的自然环境特征等状况确定监测的特征参数：pH、COD、溶解氧、悬浮物、无机氮、活性磷酸盐、重金属（铜、铅、镉、锌、总铬、汞、砷）、石油类，共计 14 项。

The characteristic parameters of monitoring are confirmed according to project characteristics and natural environment features in the sea area:　pH, COD, dissolved oxygen, suspended solid, inorganic nitrogen, active phosphate, heavy metal (Cu, Pd, Cd, Zn, total Cr, Hg, As), petroleum materials, totally 14 items.

（3）采样要求和分析方法

(3) Sampling requirements and analysis method

各项目样品采集、保存和分析分别按 GB/T12763-2007《海洋调查规范》和 GB17378-2007《海洋监测规范》中规定的有关方法进行。

The acquisition, preservation and analysis of each item shall be carried out respectively according to GB/T12763-2007 *Specifications for oceanographic survey* and GB17378-2007 *Specifications for marine monitoring*.

（4）时间和频次

(4) Time and frequency

2018 年 9 月 19 日（小潮），分别监测高平潮和低平潮水质。

Sept. 19, 2018 (neap tide), respectively monitor water quality of flood slack and ebb slack;

2018 年 9 月 27 日（大潮），分别监测高平潮和低平潮水质。

Sept. 27, 2018 (spring tide), respectively monitor water quality of flood slack and ebb slack;

（5）评价方法

(5) Evaluation method

根据《环境影响评价技术导则地面水环境》（HJ/T2.3-93），采用单项指标标准指数法进行评价。

In accordance with *Technical guidelines for environmental impact assessment - Surface water environment* (HJ/T2.3-93), the single indicator benchmark index method is adopted for evaluation.

① 一般污染物采用采用单因子标准指数法进行评价，即：

① The common pollutants are evaluated according to single factor benchmark index method, i.e.,

$$S_i = C_i / C_s$$

式中：S_i—第 i 种污染物的标准指数；

In the formula, S_i- Benchmark index of the i^{th} pollutant;

C_i—第 i 种污染物的实测值（mg/L）；

C_i- Actually measured value (mg/L) of the i^{th} pollutant;

Cs—为第 i 种污染物的标准值（mg/L）；

C_s- Standard value (mg/L) of the i^{th} pollutant;

② pH 的标准指数采用下式计算：

② The benchmark index of pH is calculated by the following formula:

$$S_{pH,j}=\begin{cases}\dfrac{7.0-pH_j}{7.0-pH_{sd}} & pH_j\le 7.0\\ \dfrac{pH_j-7.0}{pH_{su}-7.0} & pH_j>7.0\end{cases}$$

式中：pH_j—j 取样点水样 pH 值；

In the formula, pH_j - pH value of water sample in j sampling point;

pH_{sd}—评价标准规定的下限值；

pH_{sd}- Lower limit of evaluation standard;

pH_{su}—评价标准规定的上限值；

pH_{su}- Upper limit of evaluation standard;

③ 溶解氧（DO）的标准指数为：

③ Benchmark index of dissolved oxygen (DO) is:

$$S_{DO,j}=\begin{cases}\dfrac{|DO_f-DO_j|}{DO_f-DO_s} & DO_f\ge DO_s\\ 10-9\dfrac{DO_j}{DO_s} & DO_f<DO_s，DO_f=\frac{468}{31.6+T}\end{cases}$$

式中：$S_{DO.j}$—DO 在监测断面 j 的标准指数；

In the formula, $S_{DO.\ j}$ - Benchmark index of DO on monitoring section;

DO_f—饱和溶解氧浓度；

DO_f- Dissolved oxygen concentration;

DO_s—溶解氧的地表水水质标准；

DO_s - DO surface water quality standard;

DO_j—溶解氧在 j 点的监测值。

DO_j- Monitoring value of DO on j point;

S_i 值越小，水质质量越好，当 S_i 超过 1 时，说明该水质因子超过了规定的水质标准，已经不能满足环境功能区划要求。

The smaller the S_i value is, the better the water quality will be; when S_i exceeds 1, the water quality factor exceeds water quality standard regulated, and has no longer met requirements of environmental function zoning.

（6）评价标准

(6) Evaluation standard

采用 GB3097-1997《海水水质标准》中的第二类海水水质标准进行评价。

The Class II seawater quality standard in *Seawater quality standard* (GB3097-1997) is adopted for evaluation.

3、调查和评价结果

3. Investigation and evaluation results

（1）pH：小潮日高平潮介于 7.32~7.99，平均 7.70，单项因子标准指数介于 0.21~0.66。小潮日低平潮介于 7.34~7.88，平均 7.59，单项因子标准指数介于 0.23~0.59。

(1) pH: The pH of flood slack on neap tide days is 7.32~7.99, averagely 7.70; the single factor benchmark index is 0.21~0.66. The pH of ebb slack on neap tide days is 7.34~7.88, averagely 7.59; the single factor benchmark index is 0.23~0.59.

大潮日高平潮介于 7.68~8.01，平均 7.86，单项因子标准指数介于 0.45~0.65。大潮日低平潮介于 7.33~8.02，平均 7.62，单项因子标准指数介于 0.22~0.68。

The pH of flood slack on spring tide days is 7.68~8.01, averagely 7.86; the single factor benchmark index is 0.45~0.65. The pH of ebb slack on spring tide days is 7.34~7.88, averagely 7.62; the single factor benchmark index is 0.22~0.68.

所有站点水质 pH 均符合所执行的海水水质标准。

The pH value of water quality in all stations complies with the applicable seawater quality standards.

（2）溶解氧：小潮日高平潮介于 5.35~7.38 mg/L，平均 6.21 mg/L，单项因子标准指数介于 0.11~0.7。小潮日低平潮介于 5.56~7.33 mg/L，平均 6.25 mg/L，单项因子标准指数介于 0.17~0.71。

(3) Dissolved oxygen The DO of flood slack on neap tide days is 5.35~7.38 mg/L, averagely6.21 mg/L; the single factor benchmark index is 0.11~0.7. The DO of ebb slack on neap tide days is 5.56~7.33mg/L, averagely 6.25mg/L; the single factor benchmark index is 0.17~0.71.

大潮日高平潮介于 6.02~7.55 mg/L，平均 6.68 mg/L，单项因子标准指数介

于 0.31~0.78。大潮日低平潮介于 6.05~7.56 mg/L，平均 6.78 mg/L，单项因子标准指数介于 0.32~0.79。

The DO of flood slack on spring tide days is 6.02~7.55mg/L, averagely 6.68mg/L; the single factor benchmark index is 0.31~0.78. The DO of ebb slack on spring tide days is 6.05~7.56mg/L, averagely 6.78mg/L; the single factor benchmark index is 0.32~0.79.

所有站点水质 DO 均符合所执行的海水水质标准。

The DO value of water quality in all stations complies with the applicable seawater quality standards.

（3）COD：小潮日高平潮介于 1.23~2.58 mg/L，平均 1.71 mg/L，单项因子标准指数介于 0.45~0.79。小潮日低平潮介于 1.45~2.37mg/L，平均 1.80 mg/L，单项因子标准指数介于 0.45~0.79。

(3) COD: The COD of flood slack on neap tide days is 1.23~2.58mg/L, averagely 1.71mg/L; the single factor benchmark index is 0.45~0.79. The COD of ebb slack on neap tide days is 1.45~2.37mg/L, averagely 1.80mg/L; the single factor benchmark index is 0.45~0.79.

大潮日高平潮介于 1.23~1.89mg/L，平均 1.59 mg/L，单项因子标准指数介于 0.41~0.63。大潮日低平潮介于 1.38~1.93mg/L，平均 1.67 mg/L，单项因子标准指数介于 0.46~0.64。

The COD of flood slack on neap tide days is 1.23~1.89mg/L, averagely 1.59 mg/L; the single factor benchmark index is 0.41~0.63. The COD of ebb slack on spring tide days is 1.38~1.93mg/L, averagely 1.67mg/L; the single factor benchmark index is 0.46~0.64.

所有站点水质 COD 均符合所执行的海水水质标准。

The COD value of water quality in all stations complies with the applicable seawater quality standards.

（4）SPM：小潮日高平潮介于 45.8~120.3 mg/L，平均 83.33 mg/L。小潮日低平潮介于 48.9~84.3mg/L，平均 71.16 mg/L。

(4) SPM: The SPM of flood slack on neap tide days is 45.8~120.3mg/L, averagely 83.33mg/L; The SPM of ebb slack on neap tide days is 48.9~84.3mg/L, averagely 71.16mg/L;

大潮日高平潮介于 56.2~80.3mg/L，平均 71.84 mg/L。大潮日低平潮介于 46.2~75.9mg/L，平均 62.77 mg/L。

The SPM of flood slack on spring tide days is 56.2~80.3mg/L, averagely 71.84mg/L; The SPM of ebb slack on spring tide days is 46.2~75.9mg/L, averagely 62.77mg/L;

（5）无机氮：小潮日高平潮介于 0.72~1.35 mg/L，平均 0.95 mg/L，单项因子标准指数介于 2.40~3.70。小潮日低平潮介于 0.76~1.25mg/L，平均 0.94 mg/L，单项因子标准指数介于 3.53~4.17。

(5) Inorganic nitrogen: The inorganic nitrogen of flood slack on neap tide days is 0.72~1.35 mg/L, averagely 0.95mg/L; the single factor benchmark index is 2.40~3.70. The inorganic nitrogen of ebb slack on neap tide days is 0.76~1.25mg/L, averagely 0.94mg/L; the single factor benchmark index is 3.53~4.17.

大潮日高平潮介于 0.65~1.11mg/L，平均 0.81mg/L，单项因子标准指数介于 2.17~3.70。大潮日低平潮介于 0.65~0.99mg/L，平均 0.79mg/L，单项因子标准指数介于 2.20~3.30。

The inorganic nitrogen of flood slack on spring tide days is 0.65~1.11mg/L, averagely 0.81mg/L; the single factor benchmark index is 2.17~3.70. The inorganic nitrogen of ebb slack on spring tide days is 0.65~0.99mg/L, averagely 0.79mg/L; the single factor benchmark index is 2.20~3.30.

所有站点水质无机氮均超过所执行的海水水质标准。最大招标倍数为 4.17 倍。

The inorganic nitrogen value of water quality in all stations exceeds that in the applicable seawater quality standards. The maximum bidding time is 4.17 times.

（6）活性磷酸盐：小潮日高平潮介于 0.061~0.105mg/L，平均 0.080 mg/L，单项因子标准指数介于 1.93~3.50。小潮日低平潮介于 0.046~0.125mg/L，平均 0.095 mg/L，单项因子标准指数介于 1.53~4.17。

(6) Active phosphate: The active phosphate of flood slack on neap tide days is

0.061~0.105mg/L, averagely 0.080mg/L; the single factor benchmark index is 1.93~3.50. The active phosphate of ebb slack on neap tide days is 0.046~0.125mg/L, averagely0.095mg/L; the single factor benchmark index is 1.53~4.17.

大潮日高平潮介于 0.045~0.114mg/L，平均 0.078mg/L，单项因子标准指数介于 1.50~3.80。大潮日低平潮介于 0.041~0.104mg/L，平均 0.075mg/L，单项因子标准指数介于 1.37~3.47。

The active phosphate of flood slack on spring tide days is 0.045~0.114mg/L, averagely 0.078mg/L; the single factor benchmark index is 1.50~3.80. The active phosphate of ebb slack on spring tide days is 0.041~0.104mg/L, averagely 0.075mg/L; the single factor benchmark index is 1.37~3.47.

所有站点水质活性磷酸盐均超过所执行的海水水质标准。最大招标倍数为 4.17 倍。

The active phosphate value of water quality in all stations exceeds that in the applicable seawater quality standards. The maximum excess multiple is 4.17 times.

（7）重金属及砷、油类

(7) Heavy metal, As and oils

由表 4.3-4~表 4.3-7 可知，重金属（Cu、Pb、Zn、Cd、Cr、Hg）及砷、油类的单项因子标准指数均远小于 1。可知，所有站点水质重金属及石油类均符合所执行的海水水质标准。

Table 4.3-4 ~ Table 4.3-7 show the single factor benchmark index of heavy metal (Cu, Pb, Zn, Cd, Cr, Hg), As and oils is smaller than 1. It is clear that the heavy metal and petroleum in water in all stations complies with the applicable seawater quality standards.

4、小结

4. Brief summary

评价结果表明：站点的无机氮和活性磷酸盐超标，无机氮最大超标倍数 4.17、超标率 100%，活性磷酸盐最大超标倍数 4.17、超标率 100%。主要原因是九龙江上游生产、生活点源或面源污染物通过九龙江径流输入河口区所致。

The evaluation results show: The inorganic nitrogen and active phosphate on the station all exceed standard, and maximum excess multiple of inorganic nitrogen is 4.17 times with over-limit ratio of 100%; the maximum excess multiple of active phosphate is 4.17 times with over-limit ratio of 100%. The main reason is pollutants in industrial and residential point source and surface source upstream Jiulong River flow into the estuary zone through the river.

各站的铜、铅、镉、总铬、砷、石油类含量均符合所执行的海水水质标准，满足近岸海域环境功能区划的要求。

Total content of Cu, Pb, Cd, Total Cr, As and petroleum complies with applicable seawater quality standard, and meets requirements of offshore sea environment function zoning.

表 4.3-4 小潮日高平潮水质现状评价结果一栏表

Table 4.3-4 List of evaluation results for flood slack water quality on neap tide days

检测项目 Test items	单位 Unit	海水水质标准 Seawater quality standard	监测值 Monitoring value							单项因子标准指数 Single factor benchmark index						
			1#	2#	3#	4#	5#	6#	7#	1#	2#	3#	4#	5#	6#	7#
pH	/	7.8-8.5	7.55	7.71	7.65	7.32	7.78	7.99	7.87	0.37	0.47	0.43	0.21	0.52	0.66	0.58
COD	mg/L	≤3	1.55	1.38	2.58	1.88	1.79	1.54	1.23	0.52	0.46	0.86	0.63	0.60	0.51	0.41
DO		＞5	6.12	6.44	5.89	5.95	6.33	5.35	7.38	0.34	0.44	0.27	0.29	0.41	0.11	0.73
SPM		人为增加量≤10 Manmade increment ≤10	89.4	68.5	120.3	100.7	88.3	70.3	45.8	/	/	/	/	/	/	/
无机氮 Inorganic nitrogen		≤0.3	1.11	1.35	0.97	0.93	0.81	0.73	0.72	3.70	4.50	3.23	3.10	2.70	2.43	2.40
活性磷酸盐 Active phosphate		≤0.03	0.058	0.105	0.093	0.091	0.085	0.066	0.061	1.93	3.50	3.10	3.03	2.83	2.20	2.03
Cu	μg/L	≤10	1.58	1.97	2.54	1.68	2.56	1.92	2.32	0.16	0.20	0.25	0.17	0.26	0.19	0.23
Pb		≤5	0.25	0.29	0.22	0.24	0.35	0.28	0.22	0.05	0.06	0.04	0.05	0.07	0.06	0.04
Zn		≤50	4.55	4.68	6.27	5.77	6.83	8.88	9.98	0.09	0.09	0.13	0.12	0.14	0.18	0.20

Cd		≤5	0.12	0.07	0.12	0.1	0.07	0.09	0.09	0.02	0.01	0.02	0.02	0.01	0.02	0.02
Cr		≤100	5.17	4.89	4.16	3.56	4.05	3.99	3.85	0.05	0.05	0.04	0.04	0.04	0.04	0.04
Hg		≤0.2	0.03	0.08	0.04	0.04	0.03	0.05	0.06	0.15	0.40	0.20	0.20	0.15	0.25	0.30
As		≤30	1.75	2.63	2.87	2.33	2.39	2.55	2.66	0.06	0.09	0.10	0.08	0.08	0.09	0.09
石油类 Petroleum		≤50	13	15	11	13	12	13	14	0.26	0.30	0.22	0.26	0.24	0.26	0.28

表 4.3-5　小潮日低平潮水质现状评价结果一栏表

Table 4.3-5 List of evaluation results for ebb slack water quality on neap tide days

检测项目 Test items	单位 Unit	海水水质标准 Seawater quality standard	监测值 Monitoring value							单项因子标准指数 Single factor benchmark index						
			1#	2#	3#	4#	5#	6#	7#	1#	2#	3#	4#	5#	6#	7#
pH	/	7.8-8.5	7.46	7.68	7.56	7.77	7.34	7.88	7.45	0.31	0.45	0.37	0.51	0.23	0.59	0.30
COD	mg/L	≤3	1.64	1.45	2.37	1.98	2.03	1.77	1.35	0.55	0.48	0.79	0.66	0.68	0.59	0.45
DO		＞5	6.08	6.34	5.92	5.99	6.54	5.56	7.33	0.33	0.41	0.28	0.30	0.47	0.17	0.71
SPM		人为增加量≤10 Manmade increment ≤10	82.3	70.3	68.4	84.3	78.5	65.4	48.9	/	/	/	/	/	/	/
无机氮 Inorganic nitrogen		≤0.3	1.05	1.25	0.91	0.88	0.76	0.87	0.89	3.50	4.17	3.03	2.93	2.53	2.90	2.97
活性磷酸盐 Active phosphate		≤0.03	0.046	0.125	0.103	0.098	0.124	0.083	0.085	1.53	4.17	3.43	3.27	4.13	2.77	2.83
Cu	μg/L	≤10	1.57	1.89	2.34	1.73	2.34	1.91	2.33	0.16	0.19	0.23	0.17	0.23	0.19	0.23
Pb		≤5	0.22	0.27	0.23	0.25	0.33	0.21	0.33	0.04	0.05	0.05	0.05	0.07	0.04	0.07
Zn		≤50	4.55	4.68	5.89	5.71	6.54	7.81	7.72	0.09	0.09	0.12	0.11	0.13	0.16	0.15
Cd		≤5	0.14	0.08	0.15	0.15	0.17	0.34	0.09	0.03	0.02	0.03	0.03	0.03	0.07	0.02

Cr		≤100	5.13	4.87	4.09	3.54	5.05	4.18	3.87	0.05	0.05	0.04	0.04	0.05	0.04	0.04
Hg		≤0.2	0.03	0.07	0.05	0.05	0.04	0.04	0.06	0.15	0.35	0.25	0.25	0.20	0.20	0.30
As		≤30	1.88	2.95	2.98	2.34	2.51	2.88	2.82	0.06	0.10	0.10	0.08	0.08	0.10	0.09
石油类 Petroleum		≤50	13	11	13	15	12	13	14	0.24	0.28	0.22	0.22	0.26	0.24	0.24

表 4.3-6 大潮日高平潮水质现状评价结果一栏表

Table 4.3-6 List of evaluation results for flood slack water quality on spring tide days

检测项目 Test item	**单位 Unit**	**海水水质标准 Seawater quality standard**	**监测值 Monitoring value**							**单项因子标准指数 Single factor benchmark index**						
			1#	**2#**	**3#**	**4#**	**5#**	**6#**	**7#**	**1#**	**2#**	**3#**	**4#**	**5#**	**6#**	**7#**
pH	/	7.8-8.5	7.87	7.89	7.83	7.98	8.01	7.77	7.68	0.58	0.59	0.55	0.65	0.67	0.51	0.45
COD	mg/L	≤3	1.54	1.32	1.89	1.74	1.83	1.58	1.23	0.51	0.44	0.63	0.58	0.61	0.53	0.41
DO		＞5	6.34	6.43	6.02	6.09	6.78	7.54	7.55	0.41	0.44	0.31	0.33	0.55	0.78	0.78
SPM		人为增加量≤10 Manmade increment ≤10	65.2	73.5	76.4	80.3	80.2	71.1	56.2	/	/	/	/	/	/	/
无机氮 Inorganic nitrogen		≤0.3	0.93	1.11	0.83	0.81	0.69	0.65	0.67	3.10	3.70	2.77	2.70	2.30	2.17	2.23
活性磷酸盐 Active phosphate		≤0.03	0.045	0.047	0.089	0.098	0.114	0.081	0.071	1.50	1.57	2.97	3.27	3.80	2.70	2.37
Cu	μg/L	≤10	1.55	1.78	2.32	1.67	1.89	2.33	2.51	0.16	0.18	0.23	0.17	0.19	0.23	0.25
Pb		≤5	0.33	0.34	0.34	0.28	0.33	0.34	0.35	0.07	0.07	0.07	0.06	0.07	0.07	0.07
Zn		≤50	5.55	5.87	6.34	6.81	7.77	8.89	8.91	0.11	0.12	0.13	0.14	0.16	0.18	0.18
Cd		≤5	0.12	0.11	0.16	0.15	0.22	0.33	0.34	0.02	0.02	0.03	0.03	0.04	0.07	0.07

Cr		≤100	6.13	8.89	4.34	4.35	4.36	5.77	5.89	0.06	0.09	0.04	0.04	0.04	0.06	0.06
Hg		≤0.2	0.03	0.04	0.03	0.05	0.04	0.07	0.07	0.15	0.20	0.15	0.25	0.20	0.35	0.35
As		≤30	2.01	2.35	2.84	2.14	2.22	2.77	2.81	0.07	0.08	0.09	0.07	0.07	0.09	0.09
石油类 Petroleum		≤50	12	14	11	11	13	12	12	0.24	0.28	0.22	0.22	0.26	0.24	0.24

表 4.3-7 大潮日低平潮水质现状评价结果一栏表

Table 4.3-7 List of evaluation results for ebb slack water quality on spring tide days

检测项目 Test items	单位 Unit	海水水质标准 Seawater quality standard	监测值 Monitoring value							单项因子标准指数 Single factor benchmark index						
			1#	2#	3#	4#	5#	6#	7#	1#	2#	3#	4#	5#	6#	7#
pH	/	7.8-8.5	7.68	7.71	7.66	7.56	8.02	7.33	7.35	0.45	0.47	0.44	0.37	0.68	0.22	0.23
COD	mg/L	≤3	1.52	1.38	1.62	1.84	1.84	1.93	1.59	0.51	0.46	0.54	0.61	0.61	0.64	0.53
DO		＞5	6.62	6.74	6.05	6.12	6.83	7.56	7.55	0.50	0.53	0.32	0.34	0.56	0.79	0.78
SPM		人为增加量≤10 Manmade increment ≤10	48.3	70.4	77.1	71.2	75.9	46.2	50.3	/	/	/	/	/	/	/
无机氮 Inorganic nitrogen		≤0.3	0.92	0.99	0.81	0.85	0.68	0.65	0.66	3.07	3.30	2.70	2.83	2.27	2.17	2.20
活性磷酸盐 Active phosphate		≤0.03	0.055	0.042	0.041	0.098	0.104	0.088	0.095	1.83	1.40	1.37	3.27	3.47	2.93	3.17
Cu	μg/L	≤10	1.23	1.88	2.31	1.59	1.78	2.18	2.43	0.12	0.19	0.23	0.16	0.18	0.22	0.24
Pb		≤5	0.31	0.32	0.43	0.33	0.36	0.29	0.25	0.06	0.06	0.09	0.07	0.07	0.06	0.05
Zn		≤50	6.71	6.81	6.31	7.72	5.73	5.63	8.83	0.13	0.14	0.13	0.15	0.11	0.11	0.18
Cd		≤5	0.11	0.12	0.15	0.16	0.21	0.33	0.32	0.02	0.02	0.03	0.03	0.04	0.07	0.06

Cr		≤100	5.11	6.18	4.33	4.19	4.15	5.78	5.72	0.05	0.06	0.04	0.04	0.04	0.06	0.06
Hg		≤0.2	0.02	0.03	0.03	0.05	0.04	0.06	0.07	0.10	0.15	0.15	0.25	0.20	0.30	0.35
As		≤30	1.99	2.18	2.74	2.04	2.13	2.67	2.38	0.07	0.07	0.09	0.07	0.07	0.09	0.08
石油类 Petroleum		≤50	15	16	16	12	15	13	11	0.30	0.32	0.32	0.24	0.30	0.26	0.22

4.3.1.3 海洋沉积物质量现状调查与评价

4.3.1.3 Investigation and evaluation on marine sediment quality

1、调查范围与技术方法

1. Investigation scope and technical methods

（1）调查站位布置

(1) Investigation station layout

站位布置见表 4.3-3 和图 4.3-13。

The investigation station layout can be seen in Table 4.3-3 and Fig. 4.3-13.

（2）调查项目

(2) Inspection items

根据项目特点及其所在海域的自然环境特征等状况确定监测的特征参数，具体为汞、铜、铅、锌、铬、镉、砷、石油类、硫化物、有机碳。

The characteristic parameters of monitoring are confirmed according to project characteristics and natural environment features in the sea area, specifically Hg, Cu, Pb, Zn, Cr, Cd, As, petroleum, sulfide, and organic carbon.

（3）采样要求和分析方法

(3) Sampling requirements and analysis method

调查取样与分析方法按 GB/T12763-2007《海洋调查规范》和 GB17378-2007《海洋监测规范》执行。取底质表层 0～2cm 沉积物样品。

The investigation, sampling and analysis method shall follow GB/T12763-2007 *Specifications for oceanographic survey* and GB17378-2007 *Specifications for marine monitoring*. The 0~2cm surface sediment of bottom characteristics is taken.

（4）时间和频次

(4) Time and frequency

进行秋季 1 个航次的调查。

The investigation for one shipping time in the Autumn is carried out.

2、调查与评价结果

2. Investigation and evaluation results

（1）评价标准与评价方法

(1) Evaluation standard and method

各站均执行第一类海洋沉积物质量标准(GB18668-2002)。采用单项标准指数评价法。

Each station shall implement the Class I standard of *Marine Sediment Quality* (GB18668-2002). Single factor benchmark index evaluation shall be adopted.

（2）调查结果

(2) Investigation results

① 硫化物：介于 24×10^{-6}~250×10^{-6}之间，平均 119.26×10^{-6}，单项因子标准指数介于 0.08~0.74。符合所执行海洋沉积物质量标准。

① Sulfide: between 24×10^{-6}~250×10^{-6}, averagely 119.26×10^{-6}; single factor benchmark index is between 0.08~0.74. Comply with applicable quality standard of *Marine Sediment Quality*.

② 有机碳：有机碳含量介于 0.81%～1.31%之间，平均 1.01%。单项因子标准指数介于 0.41~0.66。符合所执行海洋沉积物质量标准。

② Organic carbon: Total organic carbon is between 0.81%~1.31%, averagely 1.01%. Single factor benchmark index is between 0.41~0.66. Comply with applicable quality standard of *Marine Sediment Quality*.

③ 石油类：介于 119×10^{-6}～300×10^{-6} 之间，平均 189×10^{-6}。单项因子标准指数介于 0.25~0.60。符合所执行海洋沉积物质量标准。

③ Petroleum: between 119×10^{-6}~300×10^{-6}, averagely 189×10^{-6}. Single factor benchmark index is between 0.25~0.60. Comply with applicable quality standard of *Marine Sediment Quality*.

④ 铬：铬含量介于 66.3×10^{-6}～80.1×10^{-6} 之间，平均 72.50×10^{-6}。单项因子标准指数介于 0.83~1.0。符合所执行海洋沉积物质量标准。

④ Cr: Content of Cr is between 66.3×10^{-6}~80.1×10^{-6}, averagely 72.50×10^{-6}. Single factor benchmark index is between 0.83~1.0. Comply with applicable quality standard of *Marine Sediment Quality*.

⑤ 铜：铜含量介于 9.8×10^{-6}～44.5×10^{-6}之间，平均 20.99×10^{-6}。单项因子标准指数介于 0.28~1.27。最大超标倍数为 1.27 倍。超标率为 28.6%。

⑤ Cu: Content of Cu is between 9.8×10^{-6}~44.5×10^{-6}, averagely 20.99×10^{-6}. Single factor benchmark index is between 0.28~1.27. The maximum excess multiple is 1.27 times. The over-limit ratio is 28.6%.

⑥ 锌：锌含量介于 46.2×10^{-6}～120.7×10^{-6}之间，平均 73.11×10^{-6}。单项因子标准指数介于 0.31~0.80。符合所执行海洋沉积物质量标准。

⑥Zn: Content of Zn is between 46.2×10^{-6}~120.7×10^{-6}, averagely 73.11×10^{-6}. Single factor benchmark index is between 0.31~0.80. Comply with applicable quality standard of *Marine Sediment Quality*.

⑦ 砷：砷含量介于 9.9×10^{-6}～15.2×10^{-6} 之间，平均 11.6×10^{-6}。单项因子标准指数介于 0.53~0.76。符合所执行海洋沉积物质量标准。

⑦ As: Content of As is between 9.9×10^{-6}~15.2×10^{-6}, averagely 11.6×10^{-6}. Single factor benchmark index is between 0.53~0.76. Comply with applicable quality standard of *Marine Sediment Quality*.

⑧ 镉：镉含量介于 0.011×10^{-6}～0.045×10^{-6} 之间，平均 0.03×10^{-6}。单项因子标准指数介于 0.02~0.09。符合所执行海洋沉积物质量标准。

⑧ Cd: Content of Cd is between 0.011×10^{-6}~0.045×10^{-6}, averagely 0.03×10^{-6}. Single factor benchmark index is between 0.02~0.09. Comply with applicable quality standard of *Marine Sediment Quality*.

⑨ 铅：铅含量介于 20.7×10^{-6}～58.1×10^{-6} 之间，平均 41.83×10^{-6}。单项因子标准指数介于 0.35~0.97。符合所执行海洋沉积物质量标准。

⑨ Pb: Content of Pb is between 20.7×10^{-6}~58.1×10^{-6}, averagely 41.83×10^{-6}. Single factor benchmark index is between 0.35~0.97. Comply with applicable quality standard of *Marine Sediment Quality*.

⑩ 汞：汞含量介于 0.021×10^{-6}～0.085×10^{-6} 之间，平均 0.05×10^{-6}。单项因子标准指数介于 0.15~0.43。符合所执行海洋沉积物质量标准。

⑩ Hg: Content of Hg is between 0.021×10^{-6}~0.085×10^{-6}, averagely 0.05×10^{-6}. Single factor benchmark index is between 0.15~0.43. Comply with applicable quality standard of *Marine Sediment Quality*.

小结：除 2 个站位的 Cu 有超标，其余站位检测指标全部符合所执行海洋沉

积物质量标准。

Brief summary: Cu exceeds limit in two stations, and inspection indexes of other stations all comply with applicable quality standard of Marine Sediment Quality.

表 4.3-8 海洋沉积物现状评价结果一栏表

Table 4.3-8 List of marine sediment status evaluation results

检测项目 Test items	单位 Unit	海洋沉积物标准 Marine sediment quality	监测值 Monitoring value							单项因子标准指数 Single factor benchmark index						
			1#	2#	3#	4#	5#	6#	7#	1#	2#	3#	4#	5#	6#	7#
硫化物 Sulfide	10^{-6}	≤300	50	24	250	223	198	35	55	0.17	0.08	0.83	0.74	0.66	0.12	0.18
Cr		≤80	70.3	68.3	66.3	68.9	75.1	78.5	80.1	0.88	0.85	0.83	0.86	0.94	0.98	1.00
Cu		≤35	40.8	44.5	15.2	13.4	12.9	9.8	10.3	1.17	1.27	0.43	0.38	0.37	0.28	0.29
Zn		≤150	120.7	70.4	77.1	71.2	75.9	46.2	50.3	0.80	0.47	0.51	0.47	0.51	0.31	0.34
As		≤20	15.2	14.8	12.4	11.8	11.1	10.6	9.9	0.76	0.74	0.62	0.59	0.56	0.53	0.50
Cd		≤0.5	0.037	0.042	0.045	0.029	0.035	0.011	0.017	0.07	0.08	0.09	0.06	0.07	0.02	0.03
Pb		≤60	58.1	55.2	40.3	48.9	44.3	20.7	25.3	0.97	0.92	0.67	0.82	0.74	0.35	0.42
Hg		≤0.2	0.085	0.081	0.076	0.032	0.029	0.033	0.021	0.43	0.41	0.38	0.16	0.15	0.17	0.11
石油类 Petroleum		≤500	300	251	259	119	135	132	127	0.60	0.50	0.52	0.24	0.27	0.26	0.25
有机碳 Organic carbon	%	≤2	1.31	1.22	0.98	0.96	0.91	0.88	0.81	0.66	0.61	0.49	0.48	0.46	0.44	0.41

4.3.1.4 海洋生态环境现状调查与评估

4.3.1.4 Investigation and evaluation on current status of marine ecological environment

1、调查时间、频次、范围与技术方法

1. Investigation time, frequency, scope and technical methods

（1）调查时间、频次、范围

(1) Investigation time, frequency and scope

秋季（2018 年 9 月）在项目附近海域布置 9 个海洋生态大面调查站点，3 条潮间带底栖生物调查断面。站位布设图如图 4.3-14 所示，经纬度详见表 4.3-9。

Nine large-scale investigation stations for marine ecology and three intertidal zone benthos investigation cross sections are arranged near the project in Autumn (September 2018). The investigation station layout can be seen in Table 4.3-14 and specific geographic coordinates can be seen in Table 4.3-9.

（2）各专项调查方法

(2) Method of each special investigation

1）叶绿素 a 调查使用 2.5 L 有机玻璃采水器采集水样。采样层次分为表层和底层，每份样品取 500-1000 mL 水样，将滤膜至于滤器上，加入 5 mL 碳酸镁溶液，接着用 GF/F 膜过滤水样，滤膜用 90%丙酮萃取，定容至 10 mL，用分光光度计测量。

1) The 2.5L organic glass water sampler acquires water sample for investigation on chlorophyll a. The sampling layer is divided into surface layer and bottom layer. Each sample contains 500-1000mL water sample. Place the filter membrane on the filter, add 5mL magnesium carbonate, and filter the water sample with GF/F membrane; the filter membrane is extracted with 90% acetone, size to 10mL and measure with spectrophotometer.

2）浮游植物

2) Phytoplankton

本次调查浮游植物采样使用浅水III浮游生物网，采集的样本用 Lugo 溶液固定带回实验室，再随机抽取分样样品在倒置显微镜下分析计数，结果以 cells/m^3

表示。

The investigation on phytoplankton adopts shallow water III plankton net, and sample acquired is fixed with Lugo solution and taken back to the laboratory. Take samples at random and analyze and count below the inverted microscope. The unit of result is cells/m^3.

3）浮游动物

3) Zooplankton

用浅水 I 型浮游生物网（网长 145cm，网口直径 50cm，筛绢孔宽 0.505mm）从底至表垂直拖取样品，并用样品体积量 5%的中性甲醛溶液固定。

Take sample with shallow water Type I zooplankton net (net is 145cm long, net inlet diameter is 50cm, and bolting silk hole is 0.505mm wide) from bottom or surface vertically, and fix with neutral formaldehyde solution equaling to 5% of sample volume.

样品的鉴定与计数则是借助于浮游动物计数框、体视显微镜和普通光学显微镜等将全部样品进行种类鉴定并按种计个体数，然后换算成个体密度（个/m^3）。

For identification and counting, all samples are identified and counted by species through zooplankton counting cell, stereo microscope and common optical microscope, and converted to individual density (piece/m^3).

4）潮下带大型底栖生物

4) Macrobenthos in subtidal zone

使用 0.05m^2 抓斗式采泥器，每站连续取样不少于 4 次，每站所采泥样合并为一个样品，用网目为 1mm 的过筛器分选标本，生物样品置样品瓶中用固定液保存。

Take samples continuously in every station for at least four times with 0.05m^2bottom sampler, and combine mud samples acquired in all stations into one sample; screen and separate specimen with 1mm-mesh filter, and place into sample bottle and reserve with stationary liquid.

5）潮间带底栖生物

5) Benthos in intertidal zone

本次调查大潮期的低潮时潮间带大型底栖生物的现状。将潮间带划分为高、中、低三个潮区。每条断面布设 5 个站，岩相定量取样按每站 25 cm×25 cm 的样方采集 2 次，软相定量取样按每站 25 cm×25 cm×30 cm 的样方采集 4 次，并用网目孔径为 0.5 mm 的过筛器淘洗分选样品，同时进行定性取样与观察。详情见《海洋调查规范》GB12763.6-2007 第 12 节。

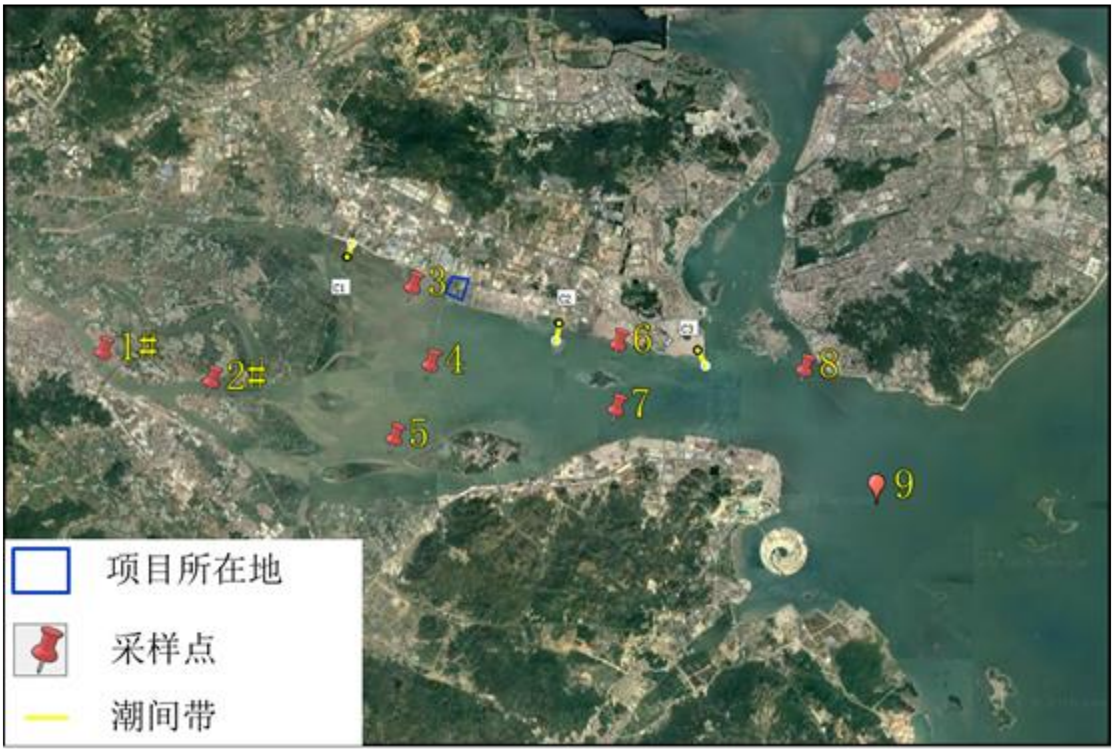
The investigation aims at current status of macrobenthos in intertidal zone at low tide during spring tide period. The intertidal zone is divided into high, medium and low tidal zones. Five stations are arranged on each section. Take samples of lithofacies quantitatively twice according to 25cm×25cm quadrates per station; soft phase four times according to 25cm×25cm×30cm quadrates per station; prepare samples with 0.5mm-mesh filter, and take sample qualitatively and observe. See Section 12 of *Specifications for oceanographic survey - Part 6: Marine biological survey* (GB12763.6-2007).

表 4.3-9 调查站位坐标

Table 4.3-9 Coordinates of investigation stations

站位 Station	经度E Longitude E	纬度N Latitude N	监测项目 Monitoring item
1	117° 50′ 02″	24° 26′ 06″	生态 Biology
2	117° 52′ 19″	24° 25′ 33″	水质、沉积物、生态 Water quality, deposit, ecology
3	117° 56′ 35″	24° 27′ 21″	水质、沉积物、生态 Water quality, deposit, ecology
4	117° 56′ 57″	24° 25′ 31″	水质、沉积物、生态 Water quality, deposit, ecology
5	117° 55′ 58″	24° 24′ 34″	水质、沉积物、生态 Water quality, deposit, ecology
6	118° 00′ 53″	24° 26′ 16″	水质、沉积物、生态 Water quality, deposit, ecology
7	118° 00′ 51″	24° 24′ 59″	水质、沉积物、生态 Water quality, deposit,

			ecology
8	118° 04′ 56″	24° 25′ 44″	沉积物、生态 Deposit, ecology
9	118° 06′ 25″	24° 23′ 27″	沉积物、生态 Deposit, ecology
C1	117° 55′ 18″	24° 28′ 20″	潮间带 Intertidal zone
C2	117° 59′ 40″	24° 26′ 40″	潮间带 Intertidal zone
C3	118° 02′ 48″	24° 26′ 08″	潮间带 Intertidal zone



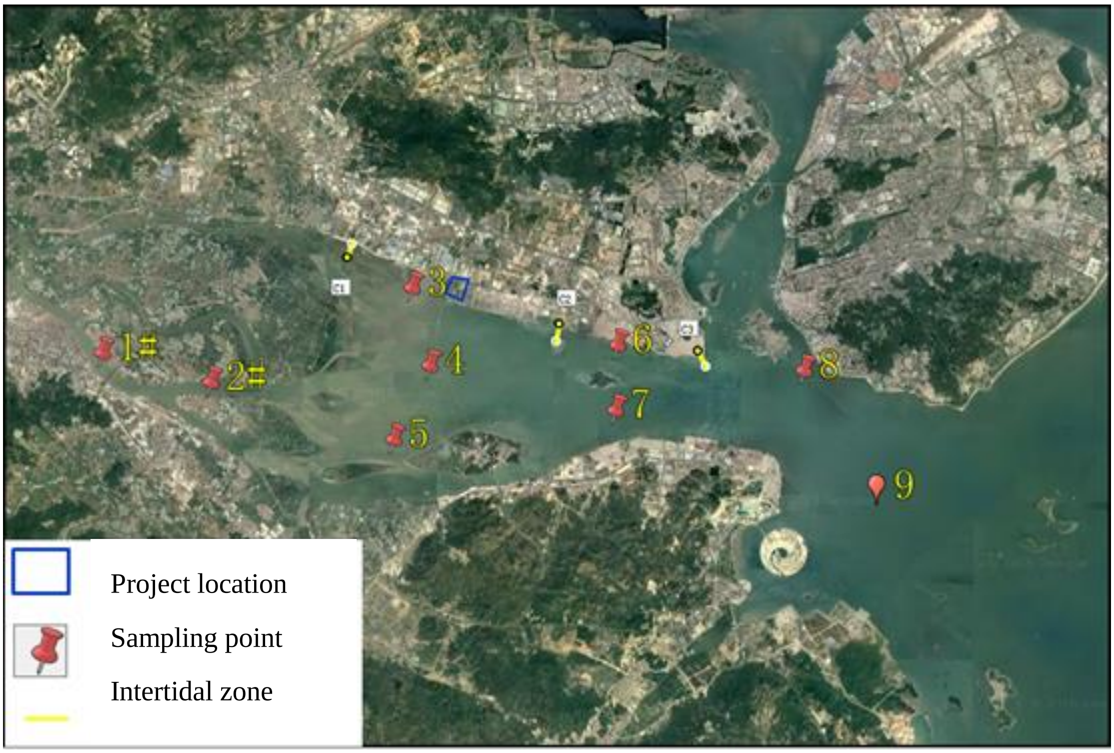


图 4.3-14 调查站位图

Fig. 4.3-14 Investigation station map

2、叶绿素

2. Chlorophyll

项目附近海域现场观察数据详见表 4.3-10。

The field observation data in the sea area nearby the project can be seen in Table 4.3-10.

本次调查结果表明：小潮时，表层叶绿素 a 的平均值为 4.79 mg/m^3；底层叶绿素 a 的平均值为 2.02 mg/m^3。低潮时，表层叶绿素的变化范围介于 6.92-3.69 mg/m^3，均值为 5.29 mg/m^3，底层叶绿素的变化范围介于 2.73-1.68 mg/m^3，均值为 2.12 mg/m^3；高潮时，表层叶绿素的变化范围介于 6.14-2.96 mg/m^3，均值为 4.28 mg/m^3，底层叶绿素的变化范围介于 2.73-1.68 mg/m^3，均值为 2.12 mg/m^3；高潮时，表层叶绿素的变化范围介于 6.14-2.96 mg/m^3，均值为 4.28 mg/m^3，底层叶绿素的变化范围介于 2.46-1.49 mg/m^3，均值为 1.92 mg/m^3。总体呈现从河口向外逐渐降低的趋势，且同一站位表层叶绿素 a 含量高于底层。

The investigation results show: during neap tide, the mean value of surface chlorophyll a is 4.79mg/m^3; mean value of bottom chlorophyll a is 2.02mg/m^3. During low tide, the change scope of surface chlorophyll is 6.92-3.69 mg/m^3 and mean value is 5.29mg/m^3; change scope of bottom chlorophyll is 2.73-1.68 mg/m^3 and mean value is 2.12mg/m^3; during high tide, the change scope of surface chlorophyll is 6.14-2.96 mg/m^3 and mean value is 4.28mg/m^3; change scope of bottom chlorophyll is 2.73-1.68 mg/m^3 and mean value is 2.12mg/m^3; during high tide, the change scope of surface chlorophyll is 6.14-2.96 mg/m^3 and mean value is 4.28mg/m^3; change scope of bottom chlorophyll is 2.46-1.49 mg/m^3 and mean value is 1.92mg/m^3. The overall trend is gradually lower from estuary outwards, and the surface chlorophyll a content in the same station is higher than bottom chlorophyll content.

表 4.3-10 叶绿素 a 含量分布情况 **单位：**mg/m^3

Table 4.3-10 Chlorophyll a content distribution map, unit: mg/m^3

站号 Station No.	小潮 Neap tide				大潮 Spring tide			
	低潮 Low tide		高潮 High tide		低潮 Low tide		高潮 High tide	
	表层 Surface	底层 Bottom	表层 Surface	底层 Bottom	表层 Surface	底层 Bottom	表层 Surface	底层 Bottom
1	6.92	2.73	6.14	2.46	7.25	3.14	5.54	2.30
2	6.32	2.54	5.23	2.40	6.94	3.06	5.38	2.04
3	5.51	2.21	4.72	2.04	6.06	2.98	4.66	1.76
4	5.48	2.06	4.29	1.89	5.92	2.98	4.43	1.68
5	5.68	1.98	4.73	1.86	6.08	3.01	4.75	1.75
6	5.45	2.17	4.16	2.03	5.79	2.55	4.12	1.55
7	4.91	2.04	3.21	1.64	5.56	2.76	4.30	1.55
8	3.78	1.68	3.08	1.55	4.25	2.33	3.01	1.33
9	3.69	1.68	2.96	1.49	4.17	2.18	3.12	1.39

3、浮游植物

3. Phytoplankton

（1）种类组成与分布

(1) Species composition and distribution

① 种类组成

① Species composition

本次调查共鉴定记录浮游植物 4 门 33 属 85 种(包括变种和变型等，下同)，其中蓝藻门 2 属 3 种，绿藻门 1 属 1 种，甲藻门 3 属 5 种，硅藻门 27 属 76 种。硅藻种类占优势。

Totally 85 species belong to 33 categories and 4 families (including variant and deformation, similarly hereinafter), in which 3 species belonging to 3 categories of cyanophyta, 1 specie belonging to 1 category of chlorophyta, 5 species belonging to 3 categories of Pyrroptata, and 76 species belonging to 27 categories of bacillariophyta. The diatoms are dominant.

② 种类分布

② Species distribution

秋季各站浮游植物种类数平均为 32 种；监测区域各站种类数由西向东有逐渐增加的趋势。种类最少的为 1 站，为 21 种；种类最多的为 8 站，有 41 种。1-5 站位种类数小于 30 种，6-9 站位种类数大于 30 种。

The phytoplankton species in Autumn are averagely 32 in each station; the number of species is increasing gradually from the west to the east in each station of the monitoring zone. The Station 1 has the least species, totally 21 species; Station 8 has the most species, totally 41. The species in Stations 1-5 are less than 30, and in Stations 6-9 are larger than 30.

（2）细胞密度分布

(2) Cell density distribution

小潮期，低潮时各站浮游植物平均数量为 122.31×10^4 cells/m^3，高潮时浮游植物的平均数量为 107.97×10^4 cells/m^3;其中低潮时硅藻平均数量为 121.09×10^4 cells/m^3，高潮时硅藻平均数量为 106.46×10^4 cells/m^3，分别占浮游植物总数量的 99.0%和 98.6%；。高潮期，低潮时各站浮游植物平均数量为 121.86×10^4 cells/m^3，高潮时浮游植物的平均数量为 108.37×10^4 cells/m^3；其中低潮时硅藻平均数量为 120.89×10^4 cells/m^3，高潮时硅藻平均数量为 107.17×10^4 cells/m^3，分别占浮游植物总数量的 99.2%和 98.9%；浮游植物数量最多的 3 站为 255.42×10^4 cells/m^3，数量最少的 9 站为 29.30×10^4 cells/m^3；调查区域浮游植物数量总体情况为自西向东有逐渐减少的趋势。

During the neap tide period, the mean quantity of phytoplankton in each station at low tide is 122.31×10^4 cells/m^3, and at high tide is 107.97×10^4 cells/m^3, in which, mean quantity of diatoms at low tide is 121.09×10^4 cells/m^3 and at high tide is

106.46×10^4, respectively accounting for 99.0% and 98.6% of total phytoplankton quantity; During the spring tide period, the mean quantity of phytoplankton in each station at low tide is 121.86×10^4 cells/m^3, and at high tide is 108.37×10^4 cells/m^3, in which, mean quantity of diatoms at low tide is 120.89×10^4 cells/m^3 and at high tide is 107.17×10^4, respectively accounting for 99.2% and 98.9% of total phytoplankton quantity; The number in Station 3 with the most phytoplankton quantity is 255.42×10^4cells/m^3, while in Station 9 with the least quantity is 29.30×10^4 cells/m^3; the overall situation of phytoplankton quantity is gradually reducing from the west to the east.

（3）浮游植物生态类群

(3) Ecological group of phytoplankton

秋季浮游植物优势种主要为中肋骨条藻、琼氏圆筛藻、奇异棍形藻、洛氏角毛藻、具槽直链藻、锤状中鼓藻等。1 至 7 站多以中肋骨条藻、琼氏圆筛藻为主要优势种，8、9 站多以中肋骨条藻、奇异棍形藻、洛氏角毛藻等为主要优势种。各站位浮游植物主要优势种数量和比例如表 4.3-11 所示。

The advantageous species of phytoplankton are mainly skeletonema costatum, coscinodiscus jonesianus, bacillaria paradoxa, chaetoceros lorenzianus, melosira sulcata, and bellerochea malleus, etc. The advantageous species in Stations 1-7 are mainly skeletonema costatum and coscinodiscus jonesianus, and in Station 8 and 9 are mainly skeletonema costatum, bacillaria paradoxa and chaetoceros lorenzianus. Quantity and proportion of main superior species of phytoplankton in each station can be seen in Table 4.3-11.

表 4.3-11　浮游植物主要优势种数量和比例　　　　单位： 10^4 cells/m^3

Table 4.3-11 Quantity and proportion of main superior species of phytoplankton, unit: 10^4cells/m^3

站位号 Station No.	小潮 Neap tide		大潮 Spring tide	
	低潮 Low tide	高潮 High tide	低潮 Low tide	高潮 High tide
1	中肋骨条藻（181.80，84.5 %） Skeletonema costatum (181. 80, 84. 5%) 琼氏圆筛藻（8.49，3.9%） Coscinodiscus jonesianus (8. 49, 3. 9%)	中肋骨条藻（132.43，86.2%） Skeletonema costatum (132.43, 86.2%) 琼氏圆筛藻（6.49，4.2%） Coscinodiscus jonesianus (6.49, 4.2%)	中肋骨条藻（170.88，83.5%） Skeletonema costatum (170.88, 83.5%) 琼氏圆筛藻（7.49，3.7%） Coscinodiscus jonesianus (7.49, 3.7%)	中肋骨条藻（140.46，83.7%） Skeletonema costatum (140.46, 83.7%) 琼氏圆筛藻（7.59，4.0%） Coscinodiscus jonesianus (7.59, 4.0%)
2	中肋骨条藻（179.38，90.0%） Skeletonema costatum (179. 38, 90. 0%) 琼氏圆筛藻（7.37，3.7%） Coscinodiscus jonesianus (7. 37, 3. 7%)	中肋骨条藻（163.64，86.7%） Skeletonema costatum (163.64, 86.7%) 琼氏圆筛藻（8.16，4.3%） Coscinodiscus jonesianus (8.16, 4.3%)	中肋骨条藻（167.98，90.2%） Skeletonema costatum (167.98, 90.2%) 琼氏圆筛藻（7.01，3.6%） Coscinodiscus jonesianus (7.01, 3.6%)	中肋骨条藻（156.35，89.2%） Skeletonema costatum (156.35, 89.2%) 琼氏圆筛藻（7.07，3.6%） Coscinodiscus jonesianus (7.07, 3.6%)
3	中肋骨条藻（198.56，82.2%） Skeletonema costatum (198. 56, 82. 2%) 琼氏圆筛藻（16.19，6.7%） Coscinodiscus jonesianus (16. 19, 6. 7%)	中肋骨条藻（191.28，81.7%） Skeletonema costatum (191.28, 81.7%) 琼氏圆筛藻（17.15，7.3%） Coscinodiscus jonesianus (17.15, 7.3%)	中肋骨条藻（209.15，86.8%） Skeletonema costatum (209.15, 86.8%) 琼氏圆筛藻（16.92，7.0%） Coscinodiscus jonesianus (16.92, 7.0%)	中肋骨条藻（194.21，82.6%） Skeletonema costatum (194.21, 82.6%) 琼氏圆筛藻（17.53，7.5%） Coscinodiscus jonesianus (17.53, 7.5%)
4	中肋骨条藻（123.43，83.7%）	中肋骨条藻（116.36，84.1%）	中肋骨条藻（132.81，87.1%）	中肋骨条藻（105.72，81.7%）

	Skeletonema costatum (123. 43, 83. 7%) 琼氏圆筛藻（8.09，5.5%） Coscinodiscus jonesianus (8. 09, 5. 5%)	Skeletonema costatum (116.36, 84.1%) 琼氏圆筛藻（7.36，5.3%） Coscinodiscus jonesianus (7.36, 5.3%)	Skeletonema costatum (132.81, 87.1%) 琼氏圆筛藻（8.17，5.2%） Coscinodiscus jonesianus (8.17, 5.2%)	Skeletonema costatum (105.72, 81.7%) 琼氏圆筛藻（9.03，7.0%） Coscinodiscus jonesianus (9.03, 7.0%)
5	中肋骨条藻（83.28，72.2%） Skeletonema costatum (83. 28, 72. 2%) 琼氏圆筛藻（12.08，10.5%） Coscinodiscus jonesianus (12. 08, 10. 5%)	中肋骨条藻（76.43，73.7%） Skeletonema costatum (76.43, 73.7%) 琼氏圆筛藻（11.93，11.5%） Coscinodiscus jonesianus (11.93, 11.5%)	中肋骨条藻（85.21，75.1%） Skeletonema costatum (85.21, 75.1%) 琼氏圆筛藻（17.19，15.5%） Coscinodiscus jonesianus (17.19, 15.5%)	中肋骨条藻（71.51，70.9%） Skeletonema costatum (71.51, 70.9%) 琼氏圆筛藻（17.59，17.4%） Coscinodiscus jonesianus (17.59, 17.4%)
6	中肋骨条藻（33.21，60.2%） Skeletonema costatum (33. 21, 60. 2%) 琼氏圆筛藻（7.96，14.4%） Coscinodiscus jonesianus (7. 96, 14. 4%)	中肋骨条藻（29.53，64.9%） Skeletonema costatum (29.53, 64.9%) 琼氏圆筛藻（7.95，17.5%） Coscinodiscus jonesianus (7.95, 17.5%)	中肋骨条藻（40.2，61.8%） Skeletonema costatum (40.2, 61.8%) 琼氏圆筛藻（7.04，10.8%） Coscinodiscus jonesianus (7.04, 10.8%)	中肋骨条藻（27.39，61.7%） Skeletonema costatum (27.39, 61.7%) 琼氏圆筛藻（7.52，16.9%） Coscinodiscus jonesianus (7.52, 16.9%)
7	中肋骨条藻（15.88，44.5%） Skeletonema costatum (15. 88, 44. 5%) 琼氏圆筛藻（4.36，12.3%） Coscinodiscus jonesianus (4. 36, 12. 3%)	中肋骨条藻（14.06，51.2%） Skeletonema costatum (14.06, 51.2%) 琼氏圆筛藻（4.59，16.7%） Coscinodiscus jonesianus (4.59, 16.7%)	中肋骨条藻（15.91，43.8%） Skeletonema costatum (15.91, 43.8%) 琼氏圆筛藻（4.94，13.1%） Coscinodiscus jonesianus (4.94, 13.1%)	中肋骨条藻（14.46，52.3%） Skeletonema costatum (14.46, 52.3%) 琼氏圆筛藻（3.59，12.9%） Coscinodiscus jonesianus (3.59, 12.9%)
8	中肋骨条藻(28.21，45.6%) Skeletonema costatum (28. 21, 45. 6%)	中肋骨条藻(19.72，36.8%) Skeletonema costatum (19.72, 36.8%)	中肋骨条藻(29.50，43.3%) Skeletonema costatum (29.50, 43.3%)	中肋骨条藻(16.50，23.21%) Skeletonema costatum (16.50, 23.21%)

	奇异棍形藻(8.01，12.9%) Bacillaria paradoxa (8. 01, 12. 9%)	洛氏角毛藻(5.93，11.0%) Chaetoceros lorenzianus (5.93, 11.0%)	奇异棍形藻(6.01，8.9%) Bacillaria paradoxa (6.01, 8.9%)	洛氏角毛藻(5.75，8.3%) Chaetoceros lorenzianus (5.75, 8.3%)
9	奇异棍形藻(6.50，22.2%) Bacillaria paradoxa (6. 50, 22. 2%) 洛氏角毛藻(3.71，12.7%) Chaetoceros lorenzianus (3. 71, 12. 7%)	奇异棍形藻(5.70，21.4%) Bacillaria paradoxa (5.70, 21.4%) 琼氏圆筛藻(4.44，16.1%) Coscinodiscus jonesianus (4.44, 16.1%)	奇异棍形藻(6.99，23.7%) Bacillaria paradoxa (6.99, 23.7%) 洛氏角毛藻(3.44，11.5%) Chaetoceros lorenzianus (3.44, 11.5%)	奇异棍形藻(5.50，23.2%) Bacillaria paradoxa (5.50, 23.2%) 洛氏角毛藻(3.17，13.4%) Chaetoceros lorenzianus (3.17, 13.4%)

4、浮游动物

4. Zooplankton

（1）种类组成与分布

(1) Species composition and distribution

① 种类组成

① Species composition

本次调查共记录各类浮游动物 43 种，包括水母类 5 种，枝角类 4 种，桡足类 24 种，糠虾和毛颚类各 2 种，轮虫、介形类、磷虾、十足类、多毛类和被囊类各 1 种，另外还有若干类阶段性浮游幼虫和鱼卵、仔鱼。低潮期，浮游动物中占优势的种类有火腿许水蚤(*Schmackeria poplesia*)(30.9%) 、厦门矮隆水蚤(*Bestiola amoyensis*)(18.1%)、中华异水蚤(*Acartiella sinensis*)(15.4%)、强额拟哲水蚤 (*Paracalanus crassirostris*)(13.4%) 、针刺拟哲水蚤 (*Paracalanus aculeatus*)(6.1%)，高潮期浮游动物中占优势的种类有中华异水蚤(*Acartiella sinensis*)(27.4%)、火腿许水蚤(*Schmackeria poplesia*)(25.3%) 、厦门矮隆水蚤(*Bestiola amoyensis*)(17.9%)、强额拟哲水蚤(*Paracalanus crassirostris*)(8.4%)。

This investigation totally records 43 species of zooplanktons, including five species of jellyfish, four species of cladocera, 24 species of copepoda, two species of shirmp and Chaetognatha each; 1 specie each of rotifer, Ostracoda, euphausiid, decapod, polychaetes and tunicates; moreover, there are several staged planktonic larva, roe and larva fish. During the low tide period, the advantages species of zooplankton are Schmackeria poplesia (30. 9%), Bestiola amoyensis (18. 1%), Acartiellasinensis (15. 4%), Paracalanus crassirostris (13. 4%), Paracalanus aculeatus (6. 1%); during the high tide period, the advantages species of zooplankton are Acartiellasinensis (27. 4%), Schmackeria poplesia (25. 3%), Bestiola amoyensis (17. 9%), Paracalanus crassirostris (8. 4%).

② 种类分布

② Species distribution

本次调查浮游动物种类数有 6～19 种，其中以 4、11、站较多，在 15 种以上， 1、2 站较少，在 10 种以下，其它各站在 10~14 种，监测海区浮游动物种

类分布以九龙江上游较少，九龙江下游至厦门湾外面种类数有所增加。

In this investigation, there are 6~19 species of zooplanktons, in which the species in Station 4 and 11 are the most, above 15 species; in Station 1 and 2 are the least, below 10; the species are 10~14 in other stations. The zooplankton species in sea area under monitoring are distributed less upstream of Jiulong River and more downstream the river to outside of Xiamen Bay.

（2）总个体密度的分布

(2) Total individual density distribution

本次调查浮游动物总个体密度平均值达 5720.35 个/m³，变化范围 582.50～24416.67 个/m³，其中 1 站数量最高，为 24416.67 个/m³， 2、3、4 和 5 站在 5056.94 个/m³～14710.42 个/m³，其它各站在 5000.00 个/m³ 以下，以 9 站最低，为 582.50 个/m³，浮游动物总个体密度以九龙江上游高于下游，厦门港外较九龙江内低。

The mean value of total individual density of zooplankton in this investigation reaches 5720.35 individuals/m³, and change scope of 582.50~24416.67 individuals/m³, in which the number in Station 1 is the highest, i.e. 24416.67 individuals /m³; in Station 2, 3, 4 and 5 is respectively 5056.94 individuals/m³~14710.42 individuals /m³, and in other station is below 5000.00 individuals/m³. The number is the least in Station 9, i.e., 582.50individuals/m³. The total individual density of zooplankton is higher upstream of Jiulong River than downstream, and is lower outside the Xiamen Port than that in Jiulong River.

5、潮下带大型底栖生物

5. Macrobenthos in subtidal zone

（1）种类组成与分布

(1) Species composition and distribution

本次调查潮下带底栖生物共出现 46 种，分属扁形动物门、纽形动物门、环节动物门、软体动物门、节肢动物门、棘皮动物门 6 门。其中环节动物多毛类种类最多，有 27 种，占总种类数的 58.7%；软体动物居第二，有 12 种，占总种数的 26.1％；节肢动物甲壳类居第三，有 5 种，占总种数的 10.9％，其它类

动物有 2 种，占总种数的 4.3％。主要种类有背蚓虫 *Notomastus latericeus*、触手才女虫 *Polydora tentaculata*、光滑倍棘蛇尾 *Amphioplus laevis*、光滑河篮蛤 *Potamocorbula laevis*、加州中蚓虫 *Mediomastus californiensis*、奇异稚齿虫 *Paraprionospio pinnata*、双腮内卷齿蚕 *Aglaophamus dibranchis*、索沙蚕 *Lumbrineris* sp.、滑指矶沙蚕 *Eunice indica*、锥唇吻沙蚕 *Glycera onomichiensis* 等。各测站出现的底栖生物种类数并不丰富，在 2~20 种之间，平均为 6 种。

The investigation records 46 species of macrobenthos in subtidal zone, belonging to six families of platyhelminthes, Nemertea, Annelida, Mollusca, Arthropoda and echinodermata. The species of polychaetes annelida are the most, totally 27 species, accounting for 58.7% of total species; followed by Mollusca, accounting for 26.1%; the crustacea Arthropoda ranks the third, totally five species, accounting for 10.9%; 2 are other species, accounting for 4.3%. Main species are Notomastus latericeus, Polydora tentaculata, Amphioplus laevis, Potamocorbula laevis, Mediomastus californiensis, Paraprionospio pinnata, Aglaophamus dibranchis, Lumbrineris sp., Eunice indica, Glycera onomichiensis, etc. The species of benthos in each monitoring station are not rich, between 2~20, averagely 6.

（2）密度组成与分布

(2) Density composition and distribution

本次调查各站的密度范围为 17 个/m^2～270 个/m^2 之间，平均值为 116 个/m^2。其中 1 号取样站的密度最高，为 270 个/m^2；底栖生物密度最低的是 9 号取样站，为 17 个/m^2。

The density scope in each station shown in this investigation shall be 17 individuals/m^2~270 individuals/m^2, averagely 116 individuals/m^2. The density in Sampling Station 1 is the highest, 270 individuals/m^2; density in Sampling Station 9 is the lowest, 17 individuals/m^2.

（3）生物量组成及分布

(3) Biomass composition and distribution

本次调查潮下带底栖生物生物量波动在 0.03 g/m^2～658.96 g/m^2 范围内，平均生物量为 51.96 g/m^2。3 号取样站生物量最高达 658.96 g/m^2，原因是在此采集

到重量较大的文蛤；生物量最低的是 4 号取样站，为 0.03 g/m^2。

The biomass fluctuation of benthos in subtidal zone in this investigation is 0.03 g/m^2~658.96g/m^2, averagely 51.96g/m^2. The biomass quantity in Sampling Station 3 reaches 658.96g/m^2 because heavy meretrix lusoria are acquired; the biomass quantity in Sampling Station 4 is the lowest, 0.03 g/m^2.

6、潮间带大型底栖生物

6. Macrobenthos in intertidal zone

（1）种类组成与分布

(1) Species composition and distribution

本次调查潮间带底栖生物共有 7 门 42 科 51 种，其中环节动物最多，有 21 种，占总种数的 41.2%。节肢动物次之，有 18 种，占总种数的 35.3%。软体动物有 6 种，占总种数的 11.8%，其他动物有 5 种(星虫动物 1 种，纽形动物 1 种，脊索动物 3 种)，棘皮动物有 1 种。环节动物、节肢动物和软体动物占总种数的 88.3%，三者构成潮间带生物主要类群。优势种和主要种有：薄片蜾蠃蜚（*Corophium lamellatum*）、独指虫（*Aricidea fragilis*）、宁波泥蟹（*Ilyoplax ningpoensis*）、粗糙滨螺（*Littoraria* (*Palustorina*) *articulata*）、东方长眼虾（*Ogyrides orientalis*）、洼颚倍棘蛇尾（*Amphioplus (Lymanella) depressus*）、红狼牙鰕虎鱼（*Odontamblyopus rubicundus*）、光滑河篮蛤（*Potamocorbula laevis*）、短拟沼螺（*Assiminea brevicula*）、齿吻沙蚕（*Nephtys* sp.）、背蚓虫（*Notomastus* sp.）。

This investigation records 52 species of benthos in intertidal zone belonging to 42 categories of 7 families, in which the Annelida species are the most, totally 21 species, accounting for 41.2%, followed by arthropoda, totally 18 species, accounting for 35.3%; six species are molluscs, accounting for 11.8%; five species are other animals (one Sipuncula specie, one nemertean, three chordates) and one echinoderm specie. Species of annelida, arthropoda and molluscs account for 88.3% of total species, and constitute main class groups of creatures in intertidal zone. Advantageous and major species are: Corophium lamellatum, Aricideafragilis, Ilyoplaxningpoensis, Littoraria (Palustorina) articulata, Ogyrides orientalis, Amphioplus (Lymanella) depressus, Odontamblyopusrubicundus, Potamocorbulalaevis, Assimineabrevicula, Nephtys sp., and Notomastussp.

3 条断面种类数和种类组成不尽相同，种数以 C1（25 种）>C2（21 种）>C3（20 种），各条断面主要以环节动物为主要贡献种群。

Species and types on three sections are different, and species C1 (25) >C2 (21) >C3 (20); major contributing group on each section is annelida.

（2）密度组成与分布

(2) Density composition and distribution

本次调查的 3 条潮间带断面中，C1 的平均栖息密度为 139 ind/m^2。以节肢动物平均栖息密度最高，平均栖息密度为 70 ind/m^2。断面 C2 的平均栖息密度为 75 ind/m^2，以节肢动物占优势，为 34 ind/m^2。C3 平均栖息密度为 417 ind/m^2，以软体动物占绝对优势。

Among three intertidal sections in this investigation, the average inhabiting density in C1 is 139 ind/m^2. The average inhabiting density of arthropod is the highest, i.e., 70 ind/m^2. The average inhabiting density of C2 is 75 ind/m^2, with arthropod dominant, i.e., 34 ind/m^2. The average inhabiting density of C3 is 417 ind/m^2 with molluscs dominant.

（3）生物量组成及分布

(3) Biomass composition and distribution

本次调查的 3 条潮间带断面中，断面 C1 的平均生物量为 1.54 g/m^2，其中软体动物的平均生物量最低，其余类别生物量在 0.15~0.53 g/m^2。断面 C2 的平均生物量为 24.49 g/m^2，其他动物的平均生物量最高，为 23.32 g/m^2。断面 C3 的平均生物量为 114.58 g/m^2，其中软体动物最多，为 99.36 g/m^2，也是此次调查生物量最大类别。

Among three intertidal sections in this investigation, the average biomass quantity on section C1 is 1.54 g/m^2, in which, that of molluscs is the lowest, and of other species is 0.15~0.53 g/m^2. The average biomass quantity on section C2 is 24.49 g/m^2, in which, that of other species is the highest, 23.32 g/m^2. The average biomass quantity on section C2 is 114.58 g/m^2, in which, that of molluscs is the highest, 99.36

g/m^2. It is the specie with the largest biomass quantity in this investigation.

4.3.2 环境空气质量现状调查与评价

4.3.2 Investigation and evaluation of current status of ambient air quality

2018 年 1 月 20 日～26 日，福建恒信环保安全技术有限公司对项目所在地周边环境空气中 TSP、PM_{10}、SO_2、NO_2 因子进行监测，$PM_{2.5}$、CO、NH_3、H_2S 监测数据来源于《漳州台商投资区凤山埔尾片区产业发展规划环境影响报告书》中的环境空气质量现状的监测数值（漳州市科环检测技术有限公司于 2018 年 3 月 8 日～14 日对 $PM_{2.5}$、CO、NH_3、H_2S 因子的监测数据）。

From Jan. 20 to Jan. 26, 2018, Fujian Hengxin Environmental Safety Technology Co., Ltd. monitored factors of TSP, PM_{10}, SO_2, NO_2 in ambient air where the project locates; the monitoring data of $PM_{2.5}$, CO, NH_3 and H_2S is from relevant data in *Environmental Impact Report for Industrial Development Planning in Fengshan Puwei District of Zhangzhou Taiwan Investment Zone* (monitoring data of Zhangzhou Scientific Environment Testing Technology Co., Ltd. on factors of $PM_{2.5}$, CO, NH_3 and H_2S from March 8 to March 14, 2018).

（1）监测因子

(1) Monitoring factor

TSP、PM_{10}、$PM_{2.5}$、CO、SO_2、NO_2、NH_3、H_2S。

TSP, $PM_{10,}$ $PM_{2.\ 5}$, CO, SO_2, NO_2, NH_3, H_2S

（2）监测点位

(2) Monitoring station

根据项目监测期间所在地主导风向（东风）和周围敏感点分布情况，在评价区域范围内布置测点进行监测，各监测点见表 4.3-12 所示。

According to dominant wind direction (east wind) and nearby sensitive point distribution where the project locates during monitoring period, the monitoring points are arranged within the evaluation area. Layout of each monitoring point can be seen in Table 4.3-12.

表 4.3-12　环境空气现状监测点位

Table 4.3-12 Monitoring stations of current ambient air status

监测点名称 Name of monitoring station		相对厂界位置 Relative plant boundary position	距离（m） Distance (m)
本次评价监测点位 Monitoring station for the evaluation	1#沙坂村 1# Shaban Village	东，年主导风上风向 East, up wind of annual prevailing wind direction	35
	2#埔尾村 2# Puwei Village	南，年主导风侧风向 South, side wind of annual prevailing wind direction	250
	3#上房村 3# Shangfang Village	北，年主导风侧风向 North, side wind of annual prevailing wind direction	1800
	4#丁厝村 4# Dingcuo Village	西，年主导风下风向 West, down wind of annual prevailing wind direction	100
	5#杨厝村 5# Yangcuo Village	西，年主导风下风向 West, down wind of annual prevailing wind direction	65
	6#吴宅村 6# Wuzhai Village	西，年主导风下风向 West, down wind of annual prevailing wind direction	2400
规划环评监测点位 Planned monitoring station for environmental impact assessment	沙坂村 Shaban Village	东，年主导风上风向 East, up wind of annual prevailing wind direction	35
	上房村 Shangfang Village	北，年主导风侧风向 North, side wind of annual prevailing wind direction	1800
	内丁农场 Neiding Farm	西北，年主导风下风向 Northwest, down wind of annual prevailing wind direction	1300
	吴宅村 Wuzhai Village	西，年主导风下风向 West, down wind of annual prevailing wind direction	2400
	杨厝村 Yangcuo Village	西，年主导风下风向 West, down wind of annual prevailing wind direction	65
	流传村 Liuchuan Village	西南，年主导风下风向 Southwest, down wind of annual prevailing wind direction	2000

图 4.3-15　规划环评大气监测点位图

Fig. 4.3-15 Layout of planned air monitoring station for environmental impact assessment

（3）监测频次

(3) Monitoring frequency

按照《环境影响评价技术导则-大气环境》（HJ2.2-2008）相关规定如下：

In accordance with *Guidelines for Environmental Impact Assessment - Atmospheric Environment* (HJ2.2-2008),

小时浓度要求：SO_2、NO_2、CO、H_2S、NH_3 每天 4 次，分别在 02 时、08 时、14 时、20 时，每次采样时间 45min。

Requirements for concentration per hour: SO_2, NO_2, CO, H_2S and NH_3 four times per day, respectively at 02:00, 08:00, 14:00, and 20:00; sampling time per time is 45min.

日均浓度要求：每天采样时间 SO_2、NO_2、PM_{10}、CO 为 20h，TSP 为 24h。

Requirements for daily average concentration: Sampling time for SO_2, NO_2, PM_{10} and CO per day shall be 20h, and for TSP shall be 24h.

（4）监测采样及项目分析方法

(4) Monitoring sampling and project analysis method

采样、样品保存和分析方法均按照国家环境保护局发布的《环境监测技术规范》及《空气和废气监测分析方法》的要求进行，具体详见表 4.3-13。

The sampling, sample preservation and analysis method shall be carried out in accordance with *Technical Code for Environment Monitoring* and *Air and Waste Gas Monitoring and Analysis Method*, specifically referring to Table 4.3-13.

表 4.3-13　环境空气质量监测频次和分析方法

Table 4.3-13 Monitoring frequency and analysis method for ambient air quality

项目 Item	采样 Sampling 时间 Time	频次 Frequency（次/d）(Time/d)	监测 Monitoring 天数（d）Days (d)	分析方法 Analysis method	最低检出限 Minimum limit of detection（mg/m^3）(mg/m^3)
TSP	24h	1	7	GB/T 15432-1995 环境空气总悬浮颗粒物的测定重量法 Ambient air- Determination of total suspended particulates - Gravimetric method	0.001（日均值） 0. 001 (daily mean value)
PM_{10}	20h	1	7	HJ 618-2011 环境空气PM_{10}的测定重量法 Determination of atmospheric articles PM_{10} in ambient by gravimetric method	0.010（日均值） 0. 010 (daily mean value)
NO_2	20h	1	7	GB/T 15435-1995 环境空气二氧化氮的测定 Saltzman Ambient air - Determination of nitrogen dioxide - Saltzman method	0.006（日均值） 0. 006 (daily mean value)
	02、08、14、20h 02, 08, 14, 20h	4	7		0.015（小时值） 0. 015 (hour value)
SO_2	20h	1	7	HJ 482-2009 环境空气二氧化硫的测定 Ambient air - Determination of sulfur dioxide - 甲醛吸收-副玫瑰苯分光光度法 Formaldehyde absorbing-pararosaniline spectrophotometry	0.004（日均值） 0. 004 (daily mean value)
	02、08、14、20h 02, 08,	4	7		0.007（小时值） 0. 007 (hour

	14, 20h				value)
$PM_{2.5}$	20h	1	7	HJ 618-2011 环境空气$PM_{2.5}$的测定重量法 Determination of atmospheric articles $PM_{2.5}$ in ambient by gravimetric method	0.010（日均值） 0. 010 (daily mean value)
CO	20h	1	7	GB9801-1988 空气质量 一氧化碳的测定 非分散红外法 Air quality - Determination of carbon monoxide - NDIR method	0.3
	02、08、14、20h 02, 08, 14, 20h	4	7		
NH_3	02、08、14、20h 02, 08, 14, 20h	4	7	HJ 533-2009 环境空气和废气氨的测定纳氏试剂分光光度法 Air and exhaust g - Determination of ammoni- Nessler's reagent spectrophotometry	0.004（一次值） 0. 004 (primary value)
H_2S	02、08、14、20h 02, 08, 14, 20h	4	7	《空气和废气监测分析方法》 Air and Waste Gas Monitoring and Analysis Method 第四版增补版亚甲基蓝分光光度法 The fourth supplementary edition - Methylene blue spectrophotometry	0.001（一次值） 0. 001 (primary value)

（5）评价标准

(5) Evaluation standard

常规污染因子执行《环境空气质量标准》（GB3095-2012）和修改单的二级标准进行评价，特征污染因子 NH_3、H_2S 参照《工业企业设计卫生标准》（TJ36-79）中居住区最高允许浓度限值执行。

The conventional pollutant factors shall be evaluated in accordance with *Ambient Air Quality Standard* (GB3095-2012) and the class II standard of the amendment, and characteristic pollution factors NH_3 and H_2S shall refer to maximum allowable concentration limit in residential area in *Health Standard for Design of Industrial Enterprises* (TJ36-79).

（6）评价方法

(6) Evaluation method

评价采用单项目污染最大污染指数法加超标率法进行评价。单项污染物最大

污染指数法是污染物监测浓度的最大值与该污染物所采用的评价标准值的比值，其表达式为：

The maximum pollution index method for single project pollution and over-limit ratio method are adopted for evaluation. The former refers to the ratio between the maximum value of the monitored concentration of pollutants and the evaluation standard value adopted for the pollutant. The expression is:

$$I_{ij} = C_{imax}/C_{oi}$$

式中：C_{imax}——第 i 个项目监测浓度的最大值，mg/m^3；

In the formula, C_{imax}- Maximum value of monitored concentration of the i^{th} project, mg/m^3;

C_{oi}——第 i 个项目评价标准值，mg/m^3；

C_{oi} - Evaluation standard value of the i^{th} project, mg/m^3;

I_{ij}——第 i 个项目污染指数。

I_{ij} - Pollution index of the i^{th} project;

（7）评价结果

(7) Evaluation results

详见表 4.3-14~表 4.3-19。评价结果显示：评价范围内大气环境中 TSP、PM_{10}、SO_2、NO_2、NH_3、H_2S 监测浓度值均未超过相应标准，评价指数 I_{ij} 值均小于 1，环境空气质量符合环境空气二类功能区要求，区域环境空气质量良好。

See Table 4.3-14~Table 4.3-19. The evaluation results show: The monitoring concentration value of TSP, PM_{10}, SO_2, NO_2, NH_3 and H_2S in air within the evaluation scope does not exceed corresponding standard. The evaluation index I_{ij} is smaller than 1, and ambient air quality complies with requirements of ambient air Class II function zone. The regional ambient air quality is favorable.

表 4.3-14 TSP 日平均浓度评价结果

Table 4.3-14 Evaluation results of TSP daily average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range （mg/m^3） (mg/m^3)	评价指数范围 Evaluation index scope （Iij） (I_{ij})	超标率 Over-limit ratio （%） (%)	最大值占标率（%） Ratio of maximum pollutant

					concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.086～0.122	0.27~0.41	0	41
2	埔尾村 Puwei Village	0.073~0.1	0.24~0.33	0	33
3	上房村 Shangfang Village	0.092~0.118	0.31~0.39	0	39
4	丁厝村 Dingcuo Village	0.088~0.114	0.29~0.38	0	38
5	杨厝村 Yangcuo Village	0.08~0.114	0.27~0.38	0	38
6	吴宅村 Wuzhai Village	0.084~0.1	0.28~0.33	0	33

表 4.3-15 PM_{10}日平均浓度评价结果

Table 4.3-15 Evaluation results of PM_{10}daily average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range （mg/m^3） (mg/m^3)	评价指数范围 Evaluation index scope （Iij） (Iij)	超标率 Over-limit ratio （%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.062~0.09	0.41~0.60	0	60
2	埔尾村 Puwei Village	0.062~0.082	0.41~0.55	0	55
3	上房村 Shangfang Village	0.075~0.09	0.50~0.60	0	60
4	丁厝村 Dingcuo Village	0.06~0.088	0.40~0.57	0	57
5	杨厝村 Yangcuo Village	0.06~0.087	0.40~0.58	0	58
6	吴宅村 Wuzhai Village	0.058~0.084	0.39~0.56	0	56

表 4.3-16 SO_2日平均浓度评价结果

Table 4.3-16 Evaluation results of SO_2daily average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range （mg/m³） (mg/m³)	评价指数范围 Evaluation index scope （Iij） (Iij)	超标率 Over-limit ratio （%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.02~0.028	0.13~0.19	0	19
2	埔尾村 Puwei Village	0.02~0.027	0.13~0.18	0	18
3	上房村 Shangfang Village	0.02~0.029	0.13~0.19	0	19
4	丁厝村 Dingcuo Village	0.018~0.025	0.12~0.17	0	17
5	杨厝村 Yangcuo Village	0.014~0.024	0.09~0.16	0	16
6	吴宅村 Wuzhai Village	0.018~0.025	0.12~0.17	0	17

表 4.3-17　NO_2 日平均浓度评价结果

Table 4.3-17 Evaluation results of NO_2daily average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range （mg/m³） (mg/m³)	评价指数范围 Evaluation index scope （Iij） (Iij)	超标率 Over-limit ratio （%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.03~0.037	0.375~0.46	0	46
2	埔尾村 Puwei Village	0.03~0.035	0.375~0.44	0	44
3	上房村 Shangfang Village	0.034~0.048	0.425~0.60	0	60
4	丁厝村 Dingcuo Village	0.03~0.039	0.375~0.49	0	49
5	杨厝村	0.028~0.036	0.35~0.45	0	45

	Yangcuo Village				
6	吴宅村 Wuzhai Village	0.024~0.033	0.30~0.412	0	41.5

表 4.3-18 SO_2 小时平均浓度评价结果

Table 4.3-18 Evaluation results of SO_2 hourly average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range （mg/m³） (mg/m³)	评价指数范围 Evaluation index scope （Iij） (Iij)	超标率 Over-limit ratio （%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.01~0.038	0.02~0.076	0	7.6
2	埔尾村 Puwei Village	0.012~0.037	0.024~0.074	0	7.4
3	上房村 Shangfang Village	0.013~0.047	0.026~0.094	0	9.4
4	丁厝村 Dingcuo Village	0.01~0.044	0.02~0.088	0	8.8
5	杨厝村 Yangcuo Village	0.012~0.038	0.024~0.076	0	7.6
6	吴宅村 Wuzhai Village	0.014~0.041	0.028~0.082	0	8.2

表 4.3-19 NO_2 小时平均浓度评价结果

Table 4.3-19 Evaluation results of NO_2 hourly average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range （mg/m³） (mg/m³)	评价指数范围 Evaluation index scope （Iij） (Iij)	超标率 Over-limit ratio （%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.015~0.043	0.075~0.22	0	22
2	埔尾村 Puwei Village	0.016~0.042	0.08~0.21	0	21

3	上房村 Shangfang Village	0.019~0.048	0.095~0.24	0	24
4	丁厝村 Dingcuo Village	0.016~0.048	0.08~0.24	0	24
5	杨厝村 Yangcuo Village	0.019~0.044	0.095~0.22	0	22
6	吴宅村 Wuzhai Village	0.019~0.044	0.095~0.22	0	22

② 引用数据

② Reference data

$PM_{2.5}$、CO、NH_3、H_2S 监测数据来源于《漳州台商投资区凤山埔尾片区产业发展规划环境影响报告书》中的环境空气质量现状的监测数值，监测结果详见表 4.3-20~表 4.3-24。

The monitoring data of $PM_{2.5}$, CO, NH_3 and H_2S is from relevant data in *Environmental Impact Report for Industrial Development Planning in Fengshan Puwei District of Zhangzhou Taiwan Investment Zone*. The monitoring results can be seen in Table 4.3-20 ~ Table 4.3-24.

表 4.3-20 $PM_{2.5}$ 日平均浓度评价结果

Table 4.3-20 Evaluation results of $PM_{2.5}$daily average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range （mg/m^3） (mg/m^3)	评价指数范围 Evaluation index scope （Iij） (Iij)	超标率 Over-limit ratio （%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.026~0.030	0.35~0.40	0	40
2	上房村 Shangfang Village	0.028~0.033	0.37~0.44	0	44
3	内丁农场 Neiding Farm	0.029~0.034	0.39~0.45	0	45
4	吴宅村 Wuzhai Village	0.029~0.034	0.39~0.45	0	45
5	杨厝村 Yangcuo Village	0.026~0.030	0.35~0.40	0	40
6	流传村 Liuchuan Village	0.024~0.030	0.32~0.40	0	40

表 4.3-21　CO 日平均浓度评价结果

Table 4.3-21 Evaluation results of CO daily average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range（mg/m^3）(mg/m^3)	评价指数范围 Evaluation index scope（Iij）(Iij)	超标率 Over-limit ratio（%）(%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.5~0.7	0.13~0.18	0	18
2	上房村 Shangfang Village	0.5~0.7	0.13~0.18	0	18
3	内丁农场 Neiding Farm	0.6~0.7	0.15~0.18	0	18
4	吴宅村 Wuzhai Village	0.6~0.7	0.15~0.018	0	18
5	杨厝村 Yangcuo Village	0.5~0.6	0.13~0.15	0	15
6	流传村 Liuchuan Village	0.5~0.7	0.13~0.18	0	18

表 4.3-22　CO 小时平均浓度评价结果

Table 4.3-22 Evaluation results of CO hourly average concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range（mg/m^3）(mg/m^3)	评价指数范围 Evaluation index scope（Iij）(Iij)	超标率 Over-limit ratio（%）(%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.5~0.8	0.05~0.08	0	8
2	上房村 Shangfang Village	0.5~0.7	0.05~0.07	0	7
3	内丁农场 Neiding Farm	0.6~0.8	0.05~0.08	0	8
4	吴宅村 Wuzhai Village	0.5~0.7	0.05~0.07	0	7
5	杨厝村 Yangcuo Village	0.5~0.7	0.05~0.07	0	7

6	流传村 Liuchuan Village	0.5~0.7	0.05~0.07	0	7

表 4.3-23 NH_3 一次值浓度评价结果

Table 4.3-23 Evaluation results of NH_3 primary value concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range（mg/m³） (mg/m³)	评价指数范围 Evaluation index scope（Iij） (Iij)	超标率 Over-limit ratio（%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	0.008~0.041	0.04~0.21	0	21
2	上房村 Shangfang Village	0.014~0.048	0.07~0.24	0	24
3	内丁农场 Neiding Farm	0.010~0.043	0.05~0.22	0	22
4	吴宅村 Wuzhai Village	0.011~0.047	0.06~0.24	0	24
5	杨厝村 Yangcuo Village	0.012~0.053	0.06~0.27	0	27
6	流传村 Liuchuan Village	0.010~0.038	0.05~0.19	0	19

表 4.3-24 H_2S 一次值浓度评价结果

Table 4.3-24 Evaluation results of H_2S primary value concentration

序号 No.	监测点 Monitoring point	浓度范围 Concentration range（mg/m³） (mg/m³)	评价指数范围 Evaluation index scope（Iij） (Iij)	超标率 Over-limit ratio（%） (%)	最大值占标率（%） Ratio of maximum pollutant concentration to standard concentration (%)
1	沙坂村 Shaban Village	＜0.001	＜0.1	0	＜0.1
2	上房村 Shangfang Village	＜0.001	＜0.1	0	＜0.1
3	内丁农场 Neiding Farm	＜0.001	＜0.1	0	＜0.1
4	吴宅村	＜0.001	＜0.1	0	＜0.1

	Wuzhai Village				
5	杨厝村 Yangcuo Village	＜0.001	＜0.1	0	＜0.1
6	流传村 Liuchuan Village	＜0.001	＜0.1	0	＜0.1

由表 4.3-20~表 4.3-24 可知，$PM_{2.5}$、CO、NH_3、H_2S 均未超过相应标准，评价指数 Iij 值均小于 1，环境空气质量符合环境空气二类功能区要求，区域环境空气质量良好。

According to Table 4.3-20 ~Table 4.3-24, the monitoring concentration value of $PM_{2.5}$, CO, NH_3 and H_2S in air within the evaluation scope does not exceed corresponding standard. The evaluation index I_{ij} is smaller than 1, and ambient air quality complies with requirements of ambient air Class II function zone. The regional ambient air quality is favorable.

4.3.3 地下水环境质量现状调查与评价

4.3.3 Investigation and evaluation on underground water environment quality

2018 年 1 月 20 日～22 日福建恒信环保安全技术有限公司对厂址周边的沙坂村、蔡店村、埔尾村的地下水水质进行现状监测调查。

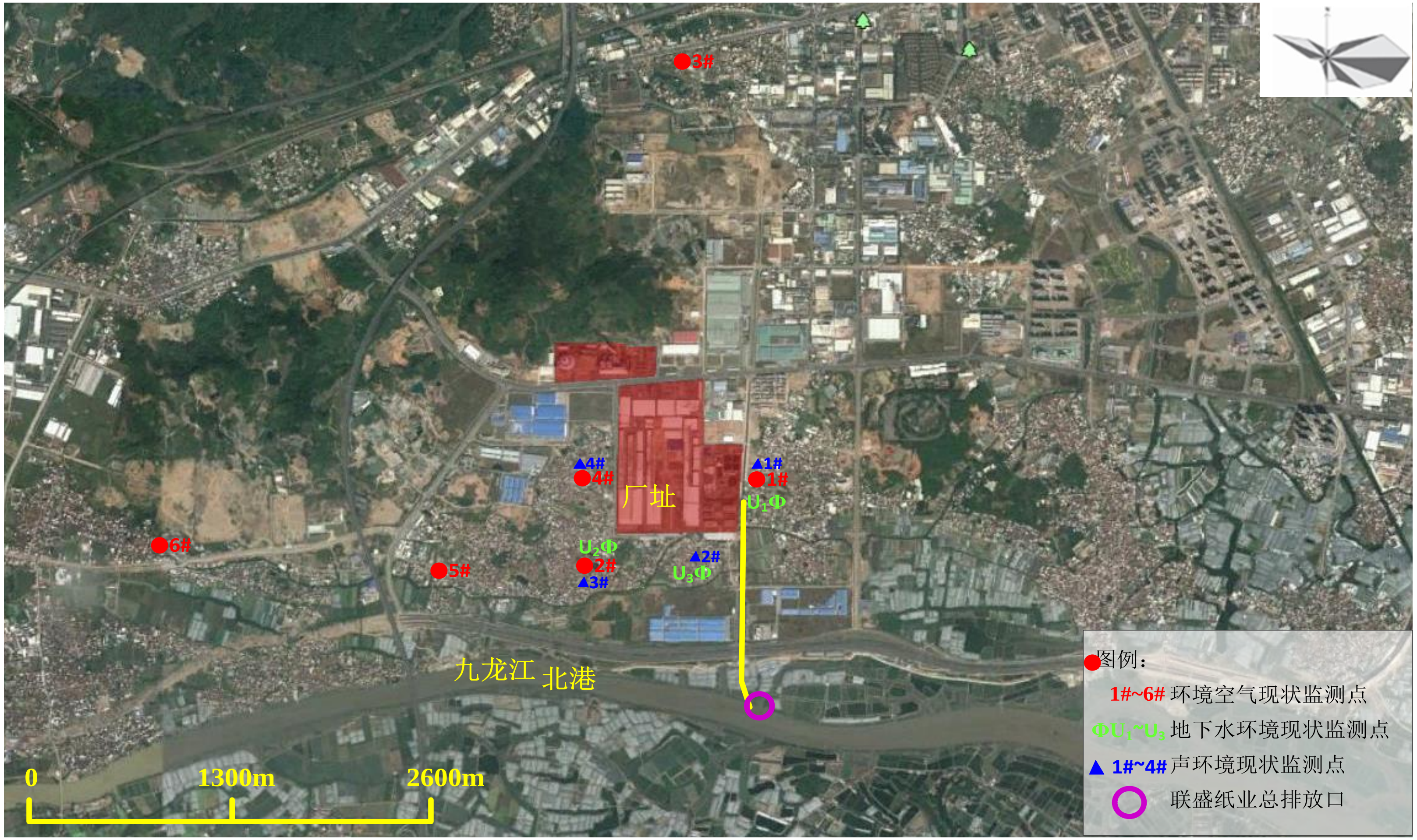
From Jan. 20~Jan. 22, 2018, Fujian Hengxin Environmental Safety Technology Co., Ltd. monitored and investigated current status of underground water quality in Shaban Village, Caidian Village and Puwei Village near the plant site.

（1）监测点位

(1) Monitoring station

根据地下水流向和周围环境状况，在项目所在地周边村庄共布设 3 个测点，具体监测点位见表 4.3-25。

According to underground water flow direction and ambient environment status, three monitoring points are arranged in nearby villages. Specific monitoring points can be seen in Table 4.3-25.


3#
4#
4#
1#
1#
厂址
U_1Φ
6#
5#
U_2Φ
2#
3#
2#
U_3Φ
九龙江
北港
0
1300m
2600m
图例：
1#~6# 环境空气现状监测点
ΦU_1~U_3 地下水环境现状监测点
1#~4# 声环境现状监测点
联盛纸业总排放口

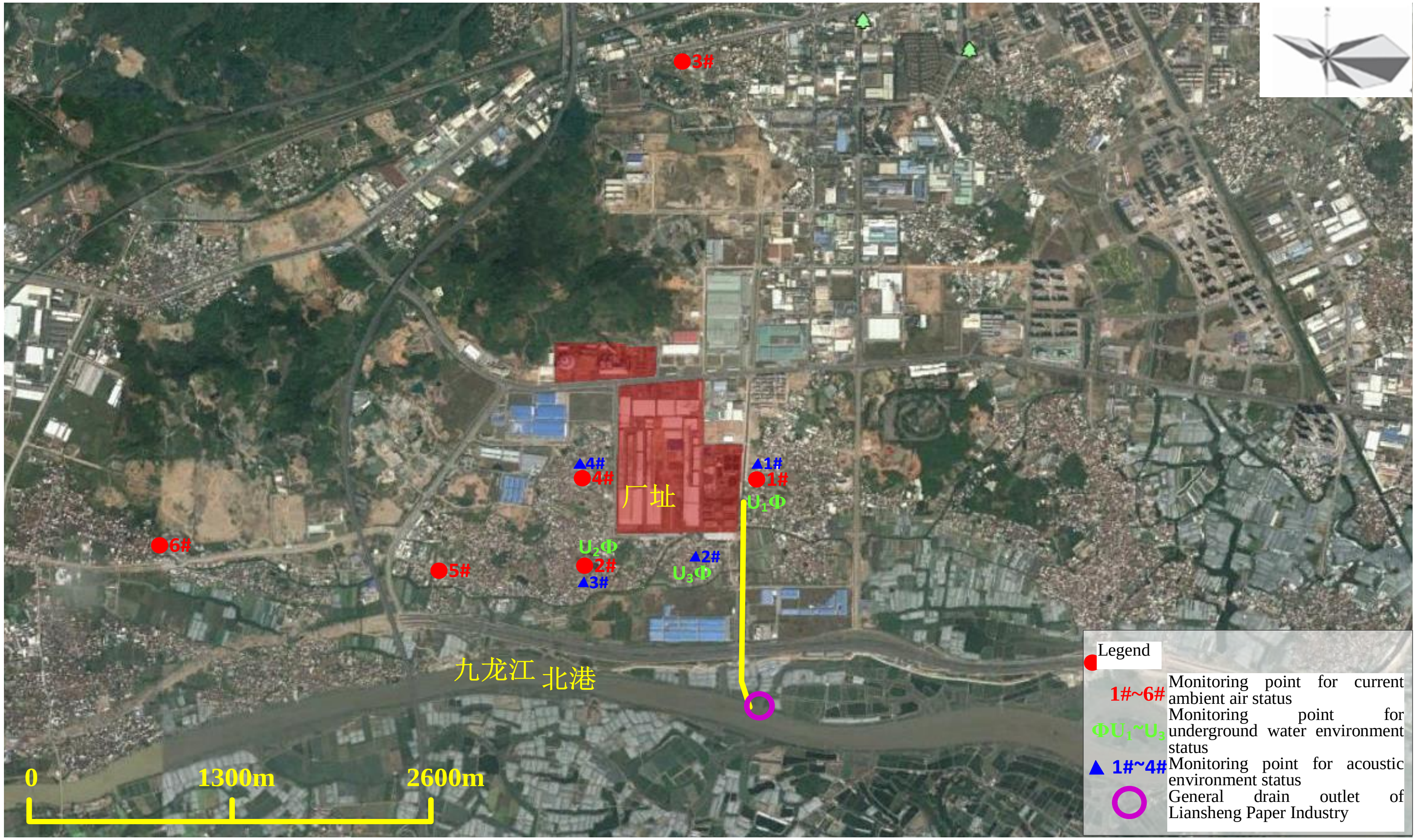


图 4.3-16 监测点位图

Fig. 4.3-16 Monitoring points layout

表 4.3-25 地下水水质监测点位一览表

Table 4.3-25 List of underground water quality monitoring points

监测点编号 Monitoring point No.	监测点位置 Monitoring point location	监测点性质 Monitoring point nature	与本项目方位、距离 Direction and distance from this project	监测频率 Monitoring frequency
ΦU_1	沙坂村 Shaban Village	侧面 Side	E、300m E, 300m	一期二天 Two days in one period 一天一次 Once a day
ΦU_2	埔尾村 Puwei Village	下游 Downstream	S、250m S, 250m	
ΦU_3	蔡店村 Caidian Village	下游 Downstream	SE、200m SE, 200m	

（2）监测项目

(2) Monitoring item

pH、氨氮、硝酸盐、亚硝酸盐、挥发性酚类、氰化物、砷、汞、铬（六价）、总硬度、铅、氟化物、镉、铁、锰、溶解性总固体、高锰酸盐指数、硫酸盐、氯化物、色度，共计 20 项。

pH, Ammonia nitrogen, nitrate, nitrite, volatile phenolic, cyanide, As, Hg, Cr (VI), total hardness, Pb, fluoride, Cd, Fe, Mn, TDS, permanganate index, sulfate, chloride, chromaticity, totally 20 items.

（3）监测分析方法

(3) Monitoring and analysis method

样品的采集、保存和分析方法按《地下水环境监测技术规范》（HJ/T164-2004）的规定和国家标准分析方法的要求进行。

The sampling, sample preservation and analysis method shall be carried out in accordance with Technical specifications for environmental monitoring of groundwater (HJ/T164-2004), and requirements of national standard analysis method.

（4）监测结果

(4) Monitoring results

地下水质监测结果见表 4.3-26。

(4) Monitoring results of underground water quality can be seen in Table 4.3-26.

表 4.3-26 地下水监测结果

Table 4.3-26 Monitoring results of underground water

监测因子 Monitoring factor	ΦU1沙坂村 ΦU1 Shaban Village		ΦU2埔尾村 ΦU2 Puwei Village		ΦU3蔡店村 ΦU3 Caidian Village	
	2018.2.20	2018.2.21	2018.2.20	2018.2.21	2018.2.20	2018.2.21
pH	6.65	6.73	6.70	6.93	6.54	7.05
氨氮 Ammonia nitrogen	0.122	0.134	0.128	0.136	0.110	0.105
硝酸盐 Nitrate	0.375	0.383	0.399	0.297	0.279	0.356
亚硝酸盐 Nitrite	0.011	0.014	0.014	0.013	0.016	0.015
挥发性酚类 Volatile phenol	≤0.002	≤0.002	≤0.002	≤0.002	≤0.002	≤0.002
氰化物 Cyanide	≤0.002	≤0.002	≤0.002	≤0.002	≤0.002	≤0.002
砷 As	≤0.0001	≤0.0001	≤0.0001	≤0.0001	≤0.0001	≤0.0001
汞 Hg	≤1.0×10^{-6}	≤1.0×10^{-6}	≤1.0×10^{-6}	≤1.0×10^{-6}	≤1.0×10^{-6}	≤1.0×10^{-6}
铬（六价） Cr (VI)	≤0.004	≤0.004	≤0.004	≤0.004	≤0.004	≤0.004
总硬度 Total hardness	66	68	70	73	68	68
铅	≤0.0025	≤0.0025	≤0.0025	≤0.0025	≤0.0025	≤0.0025

Pb						
氟化物 Fluoride	0.845	0.836	0.824	0.943	0.906	0.894
镉 Cd	≤0.0005	≤0.0025	≤0.0005	≤0.0025	≤0.0005	≤0.0025
铁 Fe	0.045	0.044	0.041	0.049	0.041	0.051
锰 Mn	≤0.05	≤0.05	≤0.05	≤0.05	≤0.05	≤0.05
溶解性总固体 TDS	189	190	236	223	201	196
高锰酸盐指数 Permanganate index	0.34	0.35	0.52	0.51	0.45	0.38
硫酸盐 Sulfate	45.2	44.6	50.8	50.9	43.3	49.7
氯化物 Chloride	13.1	12.9	15.6	15.9	14.4	16.9
色度 Chromaticity	5	5	5	5	10	10

（5）评价标准

(5) Evaluation standard

以《地下水质量标准》GB/T14848-2017 中的III类标准作为评价标准。

The evaluation standard follows Class III standard in *Underground Water Environment Quality Standard* (GB/T 14848-2017).

（6）评价方法

(6) Evaluation method

根据《环境影响评价技术导则地下水环境》（HJ610-2016），采用标准指数法进行评价。

In accordance with *Technical guidelines for environmental impact assessment - Underground water environment* (HJ610-2016), the standard indicator benchmark index method is adopted for evaluation.

①一般污染物采用采用单因子标准指数法进行评价，即：

① The common pollutants are evaluated according to single factor benchmark index method, i.e.,

$$P_i = C_i / C_{si}$$

式中：P_i—第 i 个水质因子的标准指数，无量纲；

In the formula, P_i - Benchmark index of the i^{th} water quality factor, dimensionless;

C_i—第 i 个水质因子的监测浓度值，mg/L；

C_i - Monitoring concentration value of the i^{th} water quality factor, mg/L;

C_{si}—为第 i 种 i 个水质因子的标准浓度值，mg/L。

C_{si} - Standard concentration value of the i^{th} kind and i^{th} water quality factor, mg/L;

②pH 的标准指数采用下式计算：

② The benchmark index of pH is calculated by the following formula:

$$S_{pH,j}=\begin{cases}\dfrac{7.0-pH_j}{7.0-pH_{sd}} & pH_j\le 7.0\\ \dfrac{pH_j-7.0}{pH_{su}-7.0} & pH_j>7.0\end{cases}$$

式中：pH_j—j 取样点水样 pH 值；pH_{sd}—评价标准规定的下限值；pH_{su}—评价标准规定的上限值；

In the formula, pHj - pH value of water sample in j sampling point; pH_{sd}- Lower limit of evaluation standard; pHsu- Upper limit of evaluation standard;

标准指数＞1，表明该水质因子已经超过了规定的水质标准，指数值越大，超标越严重。

Benchmark index >1, showing the water quality factor has exceeded regulated water quality standard; the higher the index value is, the more serious the out-of-limit will be.

（7）评价结果

(7) Evaluation results

评价结果见表 4.3-27，地下水水质各评价因子标准指数均小于 1，各项监测指标均符合 GB/T14848-2017《地下水质量标准》中III类标准，区域地下水环境质量现状较好。

The evaluation results can be seen in Table 4.3-27. The benchmark index of each evaluation factor regarding underground water quality is smaller than 1. Each monitoring index complies with Class III standard of GB/T14848-2017 *Underground Water Environment Quality Standard*, and regional underground water environment quality is favorable.

表 4.3-27　地下水环境现状评价结果　单位：mg/L，pH 除外

Table 4.3-27 Evaluation results of underground water environment status, Unit: mg/L, pH is excluded

点位 Station location 项目 Item	ΦU1沙坂村 ΦU1 Shaban Village			ΦU2埔尾村 ΦU2 Puwei Village			ΦU3蔡店村 ΦU3 Caidian Village			
	标准指数 Benchmark index	超标率 Over-limit ratio	是否达标 Reach the standard or not	标准指数 Benchmark index	超标率 Over-limit ratio	是否达标 Reach the standard or not	标准指数 Benchmark index	超标率 Over-limit ratio	是否达标 Reach the standard or not	标准值 Standard value
PH	0.54~0.7	0	达标 Up to standard	0.14~0.60	0	达标 Up to standard	0.033~0.92	0	达标 Up to standard	6.5~8.5
氨氮 Ammonia nitrogen	0.244~0.268	0	达标 Up to standard	0.256~0.272	0	达标 Up to standard	0.21~0.22	0	达标 Up to standard	0.50
硝酸盐 Nitrate	0.0187~0.0191	0	达标 Up to standard	0.015~0.020	0	达标 Up to standard	0.014~0.018	0	达标 Up to standard	20.0
亚硝酸盐 Nitrite	0.011~0.014	0	达标 Up to standard	0.013~0.014	0	达标 Up to standard	0.015~0.016	0	达标 Up to standard	1.00
挥发性酚类 Volatile phenol	0.5	0	达标 Up to standard	0.5	0	达标 Up to standard	0.5	0	达标 Up to standard	0.002
氰化物 Cyanide	0.02	0	达标 Up to	0.02	0	达标 Up to	0.02	0	达标 Up to	0.05

			standard			standard			standard	
砷 As	0.005	0	达标 Up to standard	0.005	0	达标 Up to standard	0.005	0	达标 Up to standard	0.01
汞 Hg	0.0005	0	达标 Up to standard	0.0005	0	达标 Up to standard	0.0005	0	达标 Up to standard	0.001
铬（六价） Cr (VI)	0.04	0	达标 Up to standard	0.04	0	达标 Up to standard	0.04	0	达标 Up to standard	0.05
总硬度 Total hardness	0.147~0.151	0	达标 Up to standard	0.156~0.162	0	达标 Up to standard	0.151	0	达标 Up to standard	450
铅 Pb	0.125	0	达标 Up to standard	0.125	0	达标 Up to standard	0.125	0	达标 Up to standard	0.01
氟化物 Fluoride	0.836~0.845	0	达标 Up to standard	0.824~0.943	0	达标 Up to standard	0.894~0.906	0	达标 Up to standard	1.0
镉 Cd	0.05	0	达标 Up to standard	0.05	0	达标 Up to standard	0.05	0	达标 Up to standard	0.005
铁 Fe	0.147~0.15	0	达标 Up to standard	0.137~0.163	0	达标 Up to standard	0.137~0.17	0	达标 Up to standard	0.3
锰	0.25	0	达标	0.25	0	达标	0.25	0	达标	0.10

Mn			Up to standard			Up to standard			Up to standard	
溶解性总固体 TDS	0.189~0.19	0	达标 Up to standard	0.223~0.236	0	达标 Up to standard	0.196~0.201	0	达标 Up to standard	1000
高锰酸盐指数 Permanganate index	0.11~0.12	0	达标 Up to standard	0.17~0.173	0	达标 Up to standard	0.127~0.15	0	达标 Up to standard	3.0
硫酸盐 Sulfate	0.178~0.18	0	达标 Up to standard	0.20~0.204	0	达标 Up to standard	0.17~0.20	0	达标 Up to standard	250
氯化物 Chloride	0.05~0.0524	0	达标 Up to standard	0.062~0.064	0	达标 Up to standard	0.0577~0.068	0	达标 Up to standard	250
色度 Chromaticity	0.33	0	达标 Up to standard	0.33	0	达标 Up to standard	0.67	0	达标 Up to standard	15

注：未检出值按最低检出限的50%统计。

Note: The undetected value shall be calculated according to 50% of the minimum limit of detection.

根据上表监测结果可以看出，各监测点位地下水水质满足《地下水质量标准》（GB/T 14848-2017）III类的要求，区域地下水水质良好。

The monitoring results in aforesaid table shows the underground water quality in each monitoring point complies with Class III standard of GB/T14848-2017 *Underground Water Environment Quality Standard*, and regional underground water quality is favorable.

4.3.4 声环境质量现状调查与评价

4.3.4 Investigation and evaluation on acoustic environment quality

厂界声环境质量现状监测值引用厦门市华测检测技术有限公司 2018 年 1 月 5 日对项目厂界声环境现状监测数值（监测点位见图 4.3-17）；敏感点声环境质量现状监测值采用福建恒信环保安全技术有限公司于 2018 年 1 月 20 日～22 日对沙坂村、埔尾村、丁厝村及蔡店村声环境现状的监测数值。

The monitoring value of acoustic environment quality status at plant boundary is quoted from that of the project measured by Xiamen Center Testing Technology Co., Ltd. on Jan. 5, 2018 (monitoring point can be seen in Fig. 4.3-17); the monitoring value of acoustic environment on sensitive point adopts the data of acoustic environment status in Shaban Village, Puwei Village, Dingcuo Village and Caidian Village monitored by Fujian Hengxin Environmental Safety Technology Co., Ltd. from Jan. 20~Jan. 22, 2018.

（1）监测点位

(1) Monitoring station

项目厂界布设监测点 12 个，详见表 4.3-28。

Totally 12 monitoring points are arranged on the project boundary, referring to Table 4.3-28.

表 4.3-28 厂界及敏感点声环境质量现状监测点位一览表

Table 4.3-28 List of acoustic quality status monitoring points on plant boundary and sensitive points

监测点编号		监测点位置	监测点性质	与本项目方位、距离
北厂	1#	厂界北侧	厂界噪声点	北侧、1m

区 North plant	2#	厂界东侧	Noise point of plant boundary	东侧、1m
	3#	厂界南侧		南侧、1m
	4#	厂界西侧		西侧、1m
南厂区 South plant	1#	厂界北侧		北侧、1m
	2#	厂界东侧		东侧、1m
	3#	厂界南侧		南侧、1m
	4#	厂界西侧		西侧、1m
N1 沙坂村		沙坂村	声环境敏感点 Acoustic environmental sensitive point	东侧、35m
N2 埔尾村		埔尾村		南侧、60m
N3 丁厝村		丁厝村		西侧、60m
N4 蔡店村		蔡店村		南侧、60m

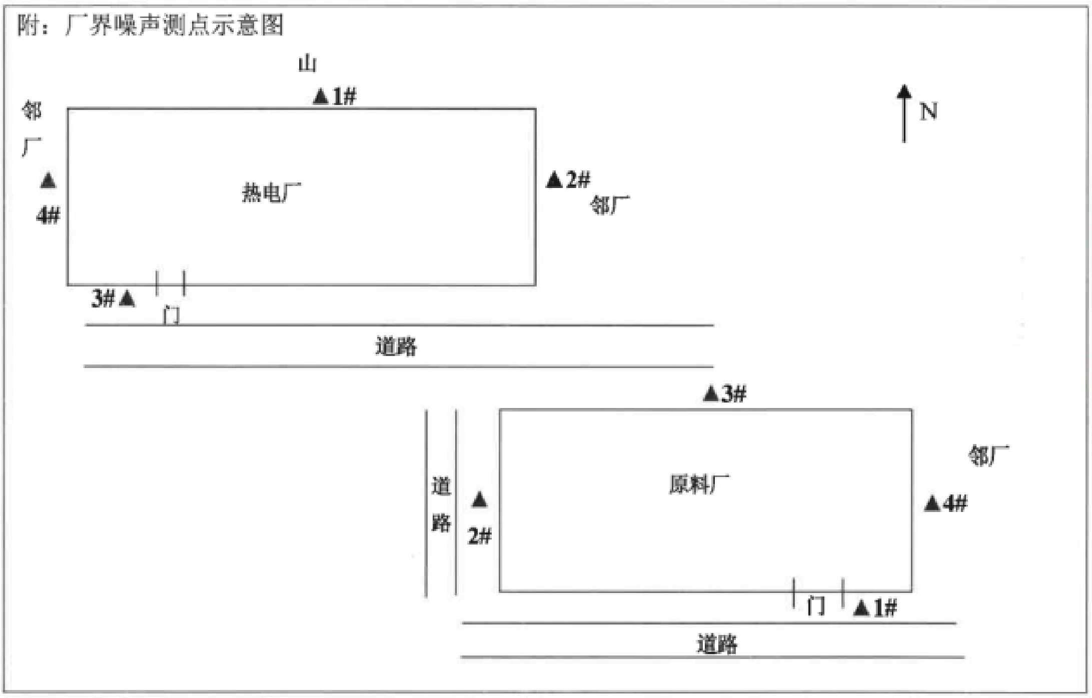


图 4.3-17　声环境质量（厂界）现状监测点位图

Fig. 4.3-17 Diagram of acoustic quality status (plant boundary) monitoring points

（2）监测时间、频次、项目

(2) Monitoring time, frequency and item

监测时间及频次：2018 年 1 月 5 日，监测 1 天。每天昼夜各监测 1 次。

Monitoring time and frequency: Jan. 5, 2018, monitoring for one day; Monitor once per day and night each;

监测项目：等效 A 声级。

Monitoring item: Equivalent sound level A

（3）测量仪器及方法

(3) Measurement instruments and method

测量仪器选用噪声分析仪等，厂界噪声监测执行《声环境质量标准》（GB3096-2008）的 3 类标准。

The measurement instruments select noise analyzer, and monitoring of noise on plant boundary shall implement Class III standard in *Acoustic Environment Quality Standard* (GB3096-2008).

（4）评价标准

(4) Evaluation standard

厂界声环境质量执行《声环境质量标准》(GB3096-2008)中的 3 类标准，其中厂区中部（临角江路侧）执行 4a 类标准。

The acoustic environment quality on plant boundary implements Class III standard in *Acoustic Environment Quality Standard* (GB3096-2008), and Class 4a standard shall be implemented for the middle area of the plant zone (close to Jiaojiang Road).

（4）监测与评价结果

(4) Monitoring and evaluation results

声环境质量现状监测及评价结果详见表 4.3-29。

The acoustic environmental quality status monitoring and evaluation results can be seen in Table 4.3-29.

表 4.3-29 监测及评价结果单位：dB（A）

Table 4.3-29 Monitoring and evaluation results, Unit: dB (A)

<table>
<tr><th colspan="2" rowspan="2">监测点位
Monitoring point location</th><th colspan="2">监测结果[dB(A)]
Monitoring result [dB(A)]</th><th rowspan="2">评价标准[dB(A)]
Evaluation standard [dB(A)]</th><th colspan="2">评价结果
Evaluation results</th></tr>
<tr><th>昼间
Daytime</th><th>夜间
Night time</th><th>昼间
Daytime</th><th>夜间
Night time</th></tr>
<tr><td rowspan="2">北厂区
North plant area</td><td>厂界北侧
North side of plant boundary</td><td>63</td><td>54</td><td rowspan="2">昼间：65
Daytime: 65
夜间：55
Night time: 55</td><td>达标
Up to standard</td><td>达标
Up to standard</td></tr>
<tr><td>厂界东侧
East side of plant boundary</td><td>59</td><td>49</td><td>达标
Up to standard</td><td>达标
Up to standard</td></tr>
</table>

	厂界西侧 West side of plant boundary	60	51		达标 Up to standard	达标 Up to standard
	厂界南侧 South side of plant boundary	59	49	昼间：70 Daytime: 70 夜间：55 Night time: 55	达标 Up to standard	达标 Up to standard
南厂区 South plant area	厂界北侧 North side of plant boundary	55	53		达标 Up to standard	达标 Up to standard
	厂界东侧 East side of plant boundary	54	51	昼间：65 Daytime: 65 夜间：55 Night time: 55	达标 Up to standard	达标 Up to standard
	厂界西侧 West side of plant boundary	52	49		达标 Up to standard	达标 Up to standard
	厂界南侧 South side of plant boundary	54	52		达标 Up to standard	达标 Up to standard
N1 沙坂村 N1 Shaban Village		54.2~56.4	47.6~49.4	昼间：60 Daytime: 60 夜间：50 Night time: 50	达标 Up to standard	达标 Up to standard
N2 埔尾村 N2 Puwei Village		53.8~58.4	48.0~48.4		达标 Up to standard	达标 Up to standard
N3 丁厝村 N3 Dingcuo Village		54.8~55.2	49.8~50.0		达标 Up to standard	达标 Up to standard
N4 蔡店村 N4 Caidian Village		57.2~58.2	46.2~48.2		达标 Up to standard	达标 Up to standard

监测结果表明：厂界控制点昼间、夜间噪声均能够《声环境质量标准》（GB3096-2008）中的 3 类及 4a 类标准。各敏感点昼间、夜间声环境质量监测值均满足《声环境质量标准》（GB3096-2008）中的 2 类标准。

Monitoring results show: The noise on plant boundary during day time and night time meets Class 3 and 4a standard in *Acoustic Environment Quality Standard* (GB3096-2008). The monitoring value of noise on each sensitive point during daytime and night time meets Class II standard in *Acoustic Environment Quality Standard* (GB3096-2008).

4.4 区域污染源调查

4.4 Investigation on Regional Pollution Source

根据调查，厂址附近主要污染源为周边道路（角江路、经二路等）交通污染源、工业企业污染源。

According to the investigation, main pollution source near the plant site shall be traffic pollution on nearby roads (Jiaojiang Road, Jinger Road, etc.) and industrial enterprise pollution.

表 4.4-1 区域污染源调查情况

Table 4.4-1 Investigation on regional pollution sources

项目名称 Project name	进展 Progress	水污染物排放量(t/a) Water pollutant discharge (t/a)			大气污染物排放量(t/a) Air pollutant discharge (t/a)		
		排水量 Displacement	COD	氨氮 Ammonia nitrogen	SO_2	NOx	烟粉尘 Smoke and dust
漳州市益盛环保能源有限公司垃圾发电（造纸废渣） Waste power generation (waste sludge from paper mill) of Zhangzhou Yisheng Environmental Energy Co., Ltd.	已投产 In production	3.03万 30,300	/	/	12.15	328.96	63.43
联盛纸业（龙海）有限公司造纸废渣回收 Recovery of waste sludge for paper making from Liansheng Paper Industry (Longhai) Co., Ltd.	已投产 In production	11.73万 117,300	/	/	/	/	/
漳州金沙拉链有限公司拉链生产 Zipper production of Zhangzhou Jinsha Zipper Co., Ltd.	已投产 In production	0.06万 600	0.05	0.01	/	/	/
漳州统实包装有限公司塑料软包装 Plastic soft packaging of Zhangzhou Tongshi Packaging Co., Ltd.	已投产 In production	/	/	/	/	/	/
福建福贞金属包装有限公司金属包装容器 Metal packaging container of Fujian Fuzhen Metal Packaging Co., Ltd.	已投产 In production	/	/	/	/	/	/

龙海森茂塑胶有限公司塑胶丝、塑胶日用制品 Plastic fabric and plastic housewares of Longhai Senmao Plastics Co., Ltd.	已投产 In production	/	/	/	/	/	/
福建绿宝食品集团有限公司罐头食品 Canned food of Fujian Lubao Food Group Co., Ltd.	已投产 In production	/	/	/	/	/	/
福建圣莉雅环保壁纸有限公司壁纸 Wall papers of Fujian Shengliya Environmental Wall Paper Co., Ltd.	已投产 In production	/	/	/	/	/	/

5 施工期环境影响分析

5 Environment Impact Analysis in Construction Period

本项目位于联盛纸业（龙海）有限公司现有厂址内。用地面积为 105.67 亩，为厂区内扩建用地，属于工业用地，不占用耕地。

Located in the existing site of Liansheng Paper Industry (Longhai) Co., Ltd., this Project covers an area of 105.67mu as future extension land within the plant, which is the industrial land, without any farmland occupied.

施工期 18 个月，项目在建设期间各项施工活动将不可避免地对周围环境产生影响。主要包括扬尘和废气、废水、噪声、固体废物等对周围环境的影响，由于在现有厂址内，因此施工期对生态环境的影响有限。最后，针对可能造成的影响提出相应的污染防治措施及生态保护对策。

This Project lasts for 18 months; during which various construction activities will inevitably affect the surrounding environment, mainly the impact of flying dust and waste gas, wastewater, noise, solid waste, etc. on the surrounding environment. However, the project location in existing site limits such impact on the ecological environment during the construction period. Finally, corresponding pollution prevention measures and ecological protection measures shall be proposed for possible impacts.

5.1 环境空气影响分析

5.1 Analysis of Impact on Ambient Air

施工期对环境空气的影响主要表现在扬尘和废气的影响。

Impact on the ambient air during the construction period is mainly reflected by the impact of flying dust and waste gas.

（1）扬尘

(1) Flying dust

施工扬尘主要来源于施工过程中土方开挖、运输及堆放；建筑材料如石灰、水泥、砂等在装卸、堆放等过程中产生的扬尘；施工垃圾堆放、清运产生的扬尘；灰土拌合产生扬尘；车辆来往造成地面扬尘等。

Construction flying dust is mainly caused by earth excavation, transportation and stacking during construction; flying dust from the handling, stacking and other processes of building materials such as lime, cement, sand, etc.; flying dust from construction waste stacking and clearing; flying dust from lime soil mixing; ground flying dust from traffic flow, etc.

施工期内扬尘污染的特点为：扬尘飘移的距离较近，影响范围较小，无累积影响，采取有效措施，可将其影响降至最小程度。

Dust pollution during the construction period is mainly featured by the short travel of flying dust, smaller impact range and absence of cumulative impact, and effective measures can be taken to minimize its impact.

（2）废气

(2) Waste gases

废气主要来源于施工机械、运输车辆和施工车辆等排放的尾气和施工人员生活燃气废气。

Waste gas mainly comes from the tail gas discharged from construction machinery, transport vehicles and construction vehicles, and domestic gas emissions of construction workers.

施工中将会有各种工程及运输用车来往于施工现场，主要有运输卡车、翻斗车、挖掘机、铲车、推土机等。一般燃汽油和柴油卡车排放的尾气中含有 HC、颗粒物、CO、NO_x 等有害物质。

Various engineering and transportation vehicles will enter and leave the site during the construction, mainly including transport trucks, tipping wagons, excavators, forklifts, bulldozers, etc. Generally, tail gas emitted by gasoline and diesel trucks contains harmful substances such as HC, particulate matter, CO and NOx.

施工场汽车尾气对环境空气的影响有如下几个特点：①车辆在施工场范围内活动，尾气呈无组织排放污染形式；②汽车排气筒高度较低，尾气扩散范围不大，对周围地区影响较小；③车辆为非连续行驶状态，污染物排放时间及排放量相对较少。因此要求施工机械和运输车辆燃用规定标准的燃料油，从源头上减少污染物的排放。

The impact of automobile exhaust on the ambient air in construction site is featured as follows: ① The tail gas is in the form of unorganized emission pollution when vehicles are acting within the construction site; ② Low height of automobile exhaust funnels, small tail gas diffusion range, and less impact on the surrounding areas; ③ Pollutant emission time and emission volumes are relatively few when vehicles are in a non-continuous driving state. Therefore, construction machinery and transport vehicles are required to be fueled with fuel oil of prescribed standard to reduce pollutant emissions from sources.

施工区施工营地生活燃料采用清洁燃料，如电、天然气等，燃气废气产生量很小，用电不产生废气，施工营地有少量油烟产生，对大气环境影响较小。

Fuel for construction camps in construction area shall be clean fuel, such as electricity and natural gas. The amount of gas emissions is small, the electricity generates no waste gas; and a small amount of oil fume generated in construction camps has little impact on the atmospheric environment.

（3）采取废气污染防治措施

(3) Take control measures for waste gas pollution

为减少施工期产生的扬尘和废气对环境空气的影响，施工单位应做好如下污染控制工作：

To reduce the impact of flying dust and waste gas generated during the construction period on the ambient air, the construction organization shall well complete following pollution controls:

①做好施工期环境监理工作；

① Environmental supervision during the construction period;

②施工单位加强对施工人员的环境教育工作；

② Strengthened environmental education for construction workers by construction organizations;

③施工现场应设置围栏；

③ Fence building in the construction site;

④地面开挖时，对作业面适当喷水；

④ Appropriate water spraying onto the working surface in case of ground excavation;

⑤砂、石料及开挖后的土石方应定点堆放，并对弃土、弃渣等容易产生扬尘点采取喷水措施，加强大风季节的施工管理，采取拦挡苫盖措施；

⑤ Fixed-point stacking of sand, stones and earth-rock after excavation; water spraying for sources of dust such as waste soil and waste slag; strengthened construction management for windy seasons, with measures for blocking and covering;

⑥运输道路营及时洒水，保持路面湿润。砂石、渣土、水泥或其它建筑材料运输过程中要采取苫盖措施，必要时采用密闭专用车辆；

⑥ Timely water spraying onto transport road camps to keep the road wet. Covering measures are required for the transportation of sand-gravel materials, muck, cement or other building materials; if necessary, the closed special vehicles shall be adopted;

⑦混凝土采用集中拌和，尽量采用商品混凝土；

⑦ Centralized concrete mixing; commercial concrete as far as possible;

⑧建筑垃圾应及时清运；

⑧ Timely clearing and transportation of construction wastes;

⑨施工时暂时不用的设备及时关停，减少废气的排放；

⑨ Timely shut-down of equipment temporarily unused during construction, to reduce the emission of waste gas;

⑩加强运输车辆和施工机械的维修保养，减少尾气排放。

⑩ Strengthened maintenance of transport vehicles and construction machinery, to reduce exhaust emissions.

施工期采取上述措施后，可减轻施工活动对环境空气质量带来的不良影响。

Adopting the above measures during the construction period can alleviate adverse effects of construction activities on ambient air quality.

5.2 水污染影响分析

5.2 Water Pollution Impact Analysis

施工期的废水有施工生产废水和施工人员的生活污水。其中生产废水主要为设备清洗、物料清洗、进出车辆清洗及建筑结构养护等过程产生；生活污水主要来自于施工人员的生活排水。

Wastewater generated during the construction period includes construction wastewater and domestic sewage of construction workers. Wherein, wastewater is mainly produced by equipment cleaning, material cleaning, traffic vehicle cleaning, maintenance of building structure and others; domestic sewage mainly comes from the domestic drainage of construction workers.

（1）施工生产废水

(1) Construction wastewater

施工生产废水主要包括土方阶段、结构阶段混凝土养护排水以及各种车辆冲洗水。施工废水设沉淀池，冲洗废水收集入沉淀池沉淀后回用。本项目只有少量施工废水，由于施工场地所在区域有一层较厚的粘土层，隔水隔污能力较强，可有效阻止废水和废水污染物的下渗；另外，施工场地废水无有毒有害物质，并且在下渗过程中，经过土壤的吸收和分解，可大大减少废水污染物进入地下水的几率，并且这种下渗只是短暂的，会随着施工期的结束而结束，基本不会对区域地下水环境产生影响。

Construction wastewater mainly generated from concrete curing drainage in the earthwork stage and structural stage, and vehicles flush water. The sedimentation tank shall be set for construction wastewater, to reuse the washing wastewater upon collection in sedimentation tank and sedimentation. There is only a small amount of construction wastewater in this Project; and a thick clay layer in construction areas with strong water-blocking and pollutant-blocking ability can effectively prevent the infiltration of wastewater and wastewater pollutants. Additionally, wastewater at the construction site contains no toxic and harmful substances. The soil absorption and decomposition during the infiltration can considerably reduce the probability of wastewater pollutants infiltrating into the groundwater; given that such infiltration is only short-lived and will end with the construction period, it will hardly affect the regional groundwater environment.

（2）施工人员生活污水

(2) Domestic sewage of construction workers

施工阶段根据不同的工作类型和强度，平均施工人数 200 人/d 左右，按人均用水量 80L/d，排水量按用水量的 80%计，生活污水排放量为 12.8m^3/d，主要污染物是化学需氧量、生化需氧量及悬浮物，若不处理直接外排，会对环境产生一定的影响。施工人员生活依托现有厂内已有生活设施，生活废水可随已有完善的污水管网收集入污水处理厂处理。

During the construction stage, according to different types and intensity of works, there are about 200 construction workers/d on average; and the per capita water consumption is 80L/d. The water discharge is calculated as the 80% of water consumption, and the domestic sewage discharge is 12.8m3/d. The main pollutants are chemical oxygen demand, biochemical oxygen demand and suspended solids that will have a certain impact on the environment if discharged directly without any treatment. The living of construction workers depends on the existing living facilities in the existing factory, and the domestic wastewater can be collected into the sewage treatment plant through the existing improved sewage pipe network.

（3）施工废水污染防治措施

(3) Take control measures for construction wastewater pollution

建设单位和施工单位务必重视施工废水的排放管理，杜绝废水不经处理和无组织排放，防止施工废水排放后对环境的影响。

The employer and construction organization must pay close attention to the discharge management of construction wastewater, to eliminate the untreated and unorganized discharge of wastewater, and prevent the environmental impact of construction wastewater discharge.

采取的具体措施：

Specific measures include:

①施工单位应加强对污水的排放管理，尤其是生活污水必须经处理后达标排放；

① The construction organization shall strengthen the management of sewage discharge; in particular, the domestic sewage must be subject to up-to-standard discharge upon the treatment;

②对各种车辆、设备使用的燃油、机油和润滑油等应加强管理，所有废弃油脂类均要集中收集，不得随意倾倒；

② The management of fuel, engine oil and lubricating oil used in various vehicles and equipment shall be strengthened. All discarded oils shall be subject to centralized collection collected and shall not be discarded at will;

③加强施工机械维护，防止施工机械漏油；进行机械冲洗和设备清洗时，应固定地点，不可将产生的污水随时随地排放；

③ The maintenance of construction machinery shall be strengthened to prevent oil leakage from construction machinery. For the mechanical washing and equipment cleaning, there shall be fixed point; the generated sewage shall not be discharged anytime and anywhere;

④对回填土方、渣土、砂石料应及时遮盖，减少雨水冲刷产生的污水，并将产生的污水引排至临时储水池；

④ The backfilled earthwork, muck, sand-gravel materials shall be covered in time to reduce the sewage generated by the rainwater flushing; and the sewage generated thereby shall be discharged to the temporary storage pond;

⑤合理安排施工期，尽量避开雨季施工，大雨来临前对施工场地的物料做好遮蔽和围挡，重视施工期的水土保持。

⑤ The construction period shall be reasonably arranged, to try to avoid the construction in rainy seasons. Before the heavy rain, the materials at the construction site shall be well covered and fenced; and the soil and water conservation shall be emphasized during the construction period.

5.3 噪声影响分析

5.3 Noise Impact Analysis

施工噪声主要来自建筑工地及建筑物建设过程中，施工机械中主要的噪声设备为打桩机、装载机、推土机、挖掘机、混凝土搅拌机及建筑材料运输、车辆马达的轰鸣、喇叭声、设备的安装过程中机械的碰撞声等产生的噪声。

Construction noise is mainly made during the construction of construction sites and buildings. The major noisy equipment in the construction machinery is the pile driver, loader, bulldozer, excavator and concrete mixer. Construction noise mainly includes the mechanical collision sound during the transportation of building materials, roars of vehicle motors, sound of horns and equipment installation.

施工噪声源可近似为点声源。根据点声源噪声衰减模式，可估算出离声源不同距离处的噪声值。预测模式如下：

The construction noise source can be approximated as the point sound source. The noise value at different distances from the sound source can be estimated according to the noise attenuation mode at point sound sources. The prediction mode is as follows:

$$L_i = L_0 - 20\lg\frac{R_i}{R_0} - \Delta L$$

$$L = 10\lg\Sigma 10^{0.1\times L_i}$$

式中：L_i、L_0—为 R_i 和 R_0 处的设备噪声级；

Wherein, Li and L0 refer to the equipment noise level at Ri and R0;

ΔL—为障碍物、植被、空气等产生的附加衰减量。

ΔL is the additional attenuation for obstacles, vegetation, air, etc.

在不考虑建筑物噪声衰减的情况下，各类施工设备在不同距离的噪声预测结果见表 0-1。

See Table 5.31 for the noise predictions of various construction equipment at different distances without considering the noise attenuation of buildings.

表 0-1　施工期各类机械作业达标距离一览表

Table 5.31 List for Compliant Distances of Various Mechanical Operations during the Construction Period

编号 S/N	施工阶段 Construction stage	设备名称 Equipment name	噪声标准值dB（A） Noise standard value dB(A)		达标距离（m） Compliant distance (m)	
			昼间 Daytime	夜间 Nighttime	昼间 Daytime	夜间 Nighttime
1	基础工程施工和主体结构施工阶段 Foundation engineering construction and construction of main structures	装载机 Loader	70	55	40	223
2		推土机 Bulldozer	70	55	28	158
3		挖掘机 Excavator	70	55	50	281
4		平地机 Land leveler	70	55	50	281
5		压路机 Road roller	70	55	50	281
6		打桩机 Pile driver	70	55	158	889
7		混凝土搅拌输送车 Truck mixer	70	55	16	89
8		混凝土泵车 Concrete pump truck	70	55	28	158
9		振捣棒 Vibrator	70	55	50	281
10		木工机械 Wood-working machine	70	55	50	281
11		吊车 Crane	70	55	9	50
12	屋面工程施工和装饰工程施工阶段 Roofing project construction and decoration project construction	吊车 Crane	70	55	9	50
13		电钻 Electric drill	70	55	63	354
14		电锯 Electric saw	70	55	89	500
15		木工机械 Wood-working machine	70	55	50	281
16		升降机 Elevator	70	55	10	56
17	全过程 Overall	运输车辆 Transport vehicle	70	55	16	89

	process					

根据预测结果分析，在基础工程施工和主体结构施工阶段噪声排放最大的为打桩机，其昼间和夜间达标距离分别为 158m 和 889m；屋面工程施工和装饰工程施工阶段噪声排放最大的为电锯，其昼间和夜间达标距离分别为 89m 和 500m，故施工噪声会对厂界 1000m 范围以内声环境敏感点沙坂村、蔡店村、埔尾村、杨厝村和丁厝村等造成不同程度的影响，特别是夜间造成影响较大。因此，施工过程中要合理安排作业时间，合理布置施工机械位置及运输车辆的行驶路线，夜间禁止安排打桩作业。考虑到本项目在现有厂址的正中间位置，现有工程厂房对噪声的衰减起到一定的作用，具有隔声降噪的效果，会一定程度上减少噪声对周围声环境敏感的不利影响，并且施工噪声影响是暂时的，随着施工期结束而消失。

According to the analysis of prediction results, the highest noise during the construction of foundation engineering and main structures comes from the pile driver, with the daytime and nighttime compliant distances of 158m and 889m respectively. The highest noise during the construction of roofing project and decoration project comes from the electric saw, with the daytime and nighttime compliant distances of 89m and 500m respectively. In this way, the construction noise will affect the acoustic environment sensitive points (namely Shaban Village, Caidian Village, Puwei Village, Yangcuo Village and Dingcuo Village) within the 1,000m of the factory boundary at different levels, especially at night. Therefore, the working shall be reasonably scheduled; the location of construction machinery and the driving route of transport vehicles should be reasonably arranged. Pile driving is prohibited at night. Given that the project is rightly located in the center of the existing site, the existing engineering workshops play a certain role in the noise attenuation and has the function of sound insulation and noise reduction, which will reduce the adverse effect of noise on surrounding acoustic environment to some extent. Further, the impact of construction noise is temporary and will disappear as the construction period ends.

为了减轻工程施工期噪声的环境影响，施工单位应采取以下控制措施：

To reduce the environmental impact of noise during construction period, the construction organization shall take the following control measures:

（1）加强施工管理，合理安排施工作业时间，避免夜间施工，将高噪声施工机械尽量布置在远离居民点的一侧，尽量压缩工区汽车数量与行车密度，尽可能减少车辆鸣笛，并适当降低车辆速度，对闲置不用的设备立即关闭。

(1) Construction management shall be strengthened, with reasonable construction scheduling to avoid night construction. The high-noise construction machinery shall be placed as far as possible away from the residential areas; the number of vehicles and the driving density in the work area shall be reduced to the greatest extent, to minimize the vehicle whistle, while appropriately lowering the vehicle speed. Devices that are not in use shall be shut down immediately.

（2）选用低噪声设备和工艺，加强检查、维护和保养机械设备，保持润滑，紧固各部件，减少运行震动噪声。整体设备应安放稳固，并于地面保持良好接触，有条件的应使用减振机座，降低噪声。

(2) Low-noise equipment and processes shall be selected, with strengthened inspection, maintenance and repair of mechanical equipment, maintained lubrication, tightened components and reduced running vibration noise. The overall equipment shall be placed stably and kept in good contact with the ground. If necessary, the vibration damping machine base shall be used to reduce noise.

（3）对各施工环节中噪声较为突出且又难以对声源进行降噪的设备装置，采取临时围障措施，围障最好敷以吸声材料，以求达到降噪效果。

(3) Temporary barrier measures shall be taken for equipment with sharp noise and difficult noise reduction from sound sources in each construction link. Such barriers are preferably covered with sound-absorbing materials for noise reduction.

（4）做好劳动保护工作，为在高噪声源附近操作的作业人员配备防护耳塞或耳罩；按规定操作机械设备，在支架拆卸等过程中减少碰撞噪声，减轻人为噪声对声环境的影响。

(4) Labor protection shall be well ensured, by providing protective earplugs or earmuffs for workers operating near strong noise sources. Mechanical equipment shall be operated as required; during the support disassembly, collision noise shall be reduced to alleviate the impact of human noise on the acoustic environment.

5.4 固体废弃物环境影响分析

5.4 Environmental Impact Analysis of Solid Wastes

施工期间将产生一定的建筑垃圾和生活垃圾，如果不采取措施进行严格管理，将使施工现场的环境恶化，并对周围环境产生不良影响。

A certain amount of construction waste and domestic waste will be generated during the construction period. The failure of taking measures for strict management will worsen the site environment and further adversely affect the surrounding environment.

建筑垃圾主要是一些废弃的砖瓦沙石，水泥以及装修废弃物等。施工过程中的建筑垃圾要及时清运，并尽量加以回收利用。

Construction waste is mainly abandoned bricks and sandstones, cement, decoration waste, etc. Construction waste generated during construction shall be timely cleared, and further reused as much as possible.

施工人员生活垃圾每人每天排放量约 1kg/（d.人），施工期人数平均为 200 人左右，可产生生活垃圾约 0.2t/d。生活垃圾应定点收集，与现有工程生活垃圾一同由当时环卫部门集中进行无害化处理。

The daily emission volume of each construction worker is about 1kg/(d.), and there are about 200 construction workers on average during the construction period, which can generate about 0.2t/d of domestic waste. Domestic waste shall be collected at a fixed point, and shall be subject to the collective bio-safety disposal together with the domestic waste of existing engineering by the then environment & sanitation departments.

5.5 生态影响分析

5.5 Ecological Impact Analysis

（1）水土流失分析

(1) Analysis of water and soil loss

由于在项目建设过程中不可避免发生地表扰动，拟建项目建设和运营的过程中会产生水土流失，其中，产生水土流失的主要时段在施工准备期和施工期，主

要是由场地平整、地基开挖、土料回填、临时弃渣堆放等土建工程引起的：根据施工特点，在土建施工过程中将造成对原地表开挖、扰动和再塑，使地表植被遭到破坏，失去原有固土和防冲能力，特别是建筑物基础开挖和回填过程中，部分土料和剥离表土需在项目区内临时堆存，表层土结构松散，在大风和暴雨天气条件下，易造成较大的水土流失；建筑物基础施工过程中使用大量泥浆水，如果排放不合理，也将造成大量的水土流失；建筑物的砌筑必然会有骨料的冲洗、混凝土的现场搅拌、施工设备的清洗，这些操作程序都会产生施工废水，施工废水的排放合理与否，一方面会对周边环境造成一定影响，另一方面可能会引起新的水土流失。拟建项目运营期涉及水土流失的区域为拟建厂址范围。

The inevitable surface disturbance during the project construction decides the occurrence of water and soil loss during the construction and operation of the proposed project. Wherein, the construction preparation and construction period are the main period of water and soil loss that is mainly caused by civil works, such as site formation, foundation excavation, backfilling of soil aggregates and temporary slag stacking. According to the construction characteristics, the excavation, disturbance and remodeling of original surfaces will occur during the civil construction, which will destroy surface vegetation and make the original soil fixation and anti-shock ability lost. In particular, a part of the soil aggregates and stripped topsoil shall, during the building foundation excavation and backfilling, be temporarily stored in the project area, with loose topsoil structure, which can easily cause large-scale water and soil loss in case of strong wind and heavy rain. A large amount of muddy water is used in the construction of building foundations, whose unreasonable discharge will also cause a large amount of water and soil loss. The building construction is inevitably accompanied by the flushing of aggregates, the on-site concrete mixing and the cleaning of construction equipment, which all will generate construction wastewater. The reasonability of discharging construction wastewater will have a certain impact on the surrounding environment on the one hand and may cause new water and soil loss on the other hand. Areas suffering from water and soil loss during the operation period of the proposed project are the proposed sites.

因此，项目在施工期和运营期如不采取有效的水土流失防治措施，将加剧区域水土流失，对周围环境产生不利影响。拟建项目设计中已考虑厂区绿化、设置完善的排水方案。针对项目施工建设期和运营期的主要提出以下措施：

Therefore, the failure of taking effective control measures for water and soil loss during the construction period and operation period will aggravate regional water and soil loss and adversely affect the surrounding environment. Plant greening and improved drainage plan designing have been considered in the proposed project. Following measures are proposed mainly for the project construction period and operation period:

①施工期

① Construction period

厂区场平进行表土剥离，填方边坡设浆砌石挡土墙，厂外设浆砌石排水沟，修建盖板式排水明沟，临时堆土区和表土堆放场设置装土麻袋拦挡、人工挖排水沟和密目网苫盖，施工生产生活区设置临时排水措施，施工裸露场地用密目网覆盖，厂区周围填方边坡采用植物措施进行防护，施工结束后对厂区进行绿化。

Topsoil stripping is required in the plant, the masonry retaining wall shall be set for filling slope; the masonry drainage ditch and cover type open drain shall be built outside the factory. The temporary soli staking area and the topsoil stacking yard shall be provided with soil-filled sacks for blocking, artificially-excavated drainage ditched and dense meshes for covering. Temporary drainage measures shall be taken in the construction, production and living areas; exposed construction sites shall be covered with dense meshes. The filling slope around the plant is protected by vegetation measures, and the plant area shall be greened upon the construction completion.

②运营期

② Operation period

完善车间及外部场地的绿化。

The greening of workshops and external sites shall be improved.

因此，采取完善的水土保持措施，施工期及运营期严格按照相关措施执行，

拟建项目产生的水土流失将会降到最低程度。

Therefore, taking sound soil and water conservation measures and implementing the construction period and operation period in strict accordance with relevant measures will minimize the water and soil loss caused by the proposed project.

（2）土地利用变更影响分析

(2) Analysis of impact on land use change

项目位于联盛纸业（龙海）有限公司现有厂区范围内，用地范围内目前主要为荒草地。项目的建设将破坏现有的土地利用格局，项目建成后，现有的荒草地等将被以水泥硬化地为主的工业建设用地所替代，将在一定程度上对土壤及植被水源涵养、局地小气候和景观造成一定程度的影响。

This Project is located in the existing plant of Liansheng Paper Industry (Longhai) Co., Ltd., with the wasteland in the range of its land use. The project construction will destroy the existing land use pattern. Upon the completion, the existing wasteland will be replaced by the industrial construction land (mainly the cement hardening ground); this will have a certain impact on soil and vegetation water conservation, local microclimate and landscape.

①土地资源影响分析

① Analysis of impact on land resources

拟建项目用地目前主要为荒草地，不涉及占用农田及养殖水域，不会直接影响到周边农民的经济利益。

The land for the proposed project is mainly wasteland at present, which involves no farmland and aquaculture waters, and will not directly affect the economic interests of surrounding farmers.

②土壤影响分析

② Analysis of impact on soil

工程施工建设必须先将施工场地地表植被清除，地表植被被破坏后，表层土壤裸露于空气中，土壤温度变幅增大，土壤中有机质强烈分解，有机质含量降低，导致土壤肥力下降。同时地表植被覆盖层破坏将使土壤的腐殖质含量降低，降低了土壤的通透性，减少了土壤水解氮的含量，降低了土壤的肥力，导致土壤退化，

使其性质朝不利方向发展，对植被恢复造成一定程度的不良影响。

The project construction requires the vegetation removal from the construction site. Upon the destruction of surface vegetation, the surface soil will be exposed to the air, the fluctuation range of soil temperature will be widened, the organic matter in the soil will be decomposed strongly, and the organic content will decrease, resulting in a decrease in soil fertility. Additionally, the destruction of surface vegetation cover will reduce the soil humus content, soil permeability, soil hydrolyzed nitrogen and soil fertility, consequently leading to soil degradation and adverse development of soil properties, as well as a certain degree of adverse influence on vegetation restoration.

③景观环境影响分析

③ Analysis of impact on landscape environment

拟建项目用地现状以荒草地为主。工程建成后，现有的大片荒草地将被厂内的构筑物和道路等建设用地所替代，局部区域的环境景观也将转变为人工工业景观。建设单位应在项目建设过程中，通过加强水土保持和绿化美化工作，塑造人工的景观、美化区域环境。

The proposed project land at present is mainly wasteland. After the project completion, the existing large-scale wasteland will be replaced by the construction land in plant area, such as buildings and roads; and the environmental landscape of local areas will also be transformed into an artificial industrial landscape. The employer shall, during the project construction, strengthen the soil and water conservation and afforestation & beautification through shaping the artificial landscape and beautifying regional environment.

拟建项目建设对景观环境的影响主要限于工程用地范围及其附近的局部区域，对大范围的区域环境景观影响不大，并且通过科学设计和人为绿化等活动可在一定程度上改善局部景观环境质量。

The impact of the proposed project construction on landscape is mainly limited to the project land and its local areas nearby, with little impact on the wide-range regional environmental landscape. And the local landscape environment can be improved to some extent through scientific design and artificial greening activities.

（3）植被影响分析

(3) Analysis of impact on vegetation

拟建项目建设征用土地首先需要将征地范围内的地表植被剥离，将造成一定的植被生物量损失；同时工程建设场地地表硬化将导致分布在该区域的植被赖以生存的土壤永久性丧失，人为踩踏等活动干扰也将影响附近现有土壤的理化性质，不利于工程建成后的植被恢复。此外，工程施工还会导致施工场界周围一定范围内空气中粉尘浓度上升，一些粉尘会沉降、附着在施工场地及其周围的植被叶片上，影响植物正常的光和作用和呼吸作用，严重时甚至阻塞叶片毛细孔，导致叶片萎缩。拟建项目占地目前主要是荒草地，其上的植被均为当地广布物种，工程施工不会导致植物物种灭绝，拟建项目的建设对项目所在地植被的影响较小，同时，工程施工建设对当地植被的影响是暂时性的，且影响范围有限，工程建成后，原有的植物生物量可通过场地绿化、复垦等措施得以部分恢复。因此，本工程施工建设不会对区域生态系统造成显著不利影响，对植物的影响程度有限，是可接受的。

In the land acquired for the construction of proposed project, the surface vegetation within the scope of land acquisition shall be peeled off at first, which will result in a certain loss of vegetation biomass. Meanwhile, the surface hardening of the construction site will result in the permanent loss of the soil on which the vegetation in the area depends. The disturbance of human activities such as trampling will also affect physical and chemical properties of the existing soil nearby, which is not conducive to the vegetation restoration upon the completion. In addition, the construction will also increase the concentration of dust in the surrounding air around a certain boundary of the construction site. Some dust will settle and adhere to the vegetation leaves on the construction site and its surrounding areas, which will affect normal photosynthesis & respiration of plants, and even block capillary pores of leaves, causing the leaves to shrink. The land occupied by the proposed project is mainly wasteland, and the vegetation is all local species; and construction will extinct plant species since the construction of the proposed project will have little impact on the vegetation there. Further, the impact of project construction on local vegetation is temporary, with a limited scope of impact. Upon project completion, the original plant biomass can be partially restored through measures such as site greening and reclamation. Therefore, the construction of this Project will have no significant adverse impact on the regional ecosystem, with limited and acceptable impacts on plants.

（4）对动物资源生态影响分析

(4) Analysis of the ecological impact on animal resources

拟建项目对于当地动物资源生态影响分析主要从对鸟类的影响进行分析，这种影响不仅存在于施工期，也存在于项目的运营期。

The ecological impact analysis of the proposed project on local animal resources is mainly to analyze the impact on birds, which can be observed not only in the construction period, but also in the project operation period.

项目施工期，由于施工噪声、扬尘和人群活动等将干扰鸟类的正常生活、破坏鸟类的栖息觅食生境，对项目占地内现状鸟类的影响较为明显，可能致使鸟类逃生迁移而另觅生境。

During the construction period, construction noise, flying dust and crowd activities will interfere with the normal life of birds and destroy their habitats and foraging environment, which will cause an obvious impact on the current birds in the project area and may further cause birds to escape and migrate.

现状区域地带主要是荒草地，营运期项目用地自然生态资源与环境属性将发生根本性、大面积范围的更替和改变，一定程度上增加项目所在区域中野生鸟类生存的环境压力。

The current area is mainly wasteland. During the operation period, the natural ecological resources and environmental attributes of the project land will be fundamentally replaced and changed in a large area, thus increasing the environmental pressure of wild bird survival in the project area.

根据拟建项目厂址所在区域的生态环境现状调查及拟建项目建设对生态环境的影响分析结果，厂区范围内现状以荒草地为主，项目的建设造成的水土流失影响，以及对农业土地资源、土壤、景观、植被、动物的影响不大。

According to the survey of ecological environment status in the proposed project area and the analysis of the impact analysis of proposed project construction on the ecological environment, the current plant area is mainly wasteland, the impact of water and soil loss caused by the project construction, as well as the impact on agricultural land resources, soil, landscape, vegetation, and animals, are little.

5.6 小结

5.6 Conclusion

施工期对环境的主要污染影响为扬尘和噪声影响，对生态环境的影响主要表现在土地占用、开挖对地表植被的破坏，并造成局部水土流失。但是这些影响都是暂时的、短暂的，随着施工期结束，将随之消失。施工过程在严格做好环评提出的各项环保措施之后，并在施工结束之时，对裸露地面及时覆土绿化，施工造成的影响将得到有效的控制。

Major pollution impacts on the environment during the construction period are the ones by flying dust and noise. The impact on ecological environment is mainly reflected in land occupation, damage to surface vegetation by excavation, and local water and soil loss. But these impacts are temporary and short-lived, and will disappear as the construction period ends. After environmental protection measures proposed by the EIA are properly implemented during the construction and the impact on the bare ground is timely earthed up and afforested upon completion, the impact of construction will be effectively controlled.

6 运营期环境影响预测与评价

6 Environmental Impact Prediction and Assessment for Operation Period

6.1 项目取水对九龙江北溪的影响分析

6.1 Analysis of Water Intake Impact by the Project on North Creek of Jiulong River

6.1.1 九龙江北溪供给能力

6.1.1 Water Supply Capacity of North Creek of Jiulong River

根据《漳州市中心城区给水专项规划》：

In accordance with *Special Plan for Water Supply in Central City of Zhangzhou*:

（1）九龙江北溪

(1) North Creek of Jiulong River

P=95%保证率：现状在北溪下游河段取水流量为 24.1m^3/s（P=95%保证率不考虑河道外内林引水渠生态用水，下同），其中农业用水 2.82m^3/s，向厦门供水 14m^3/s，生活和工业用水 7.29m^3/s。现状条件下，扣除河道内生态基流 14.9m^3/s 后，北溪剩余可供利用流量为 17.3m^3/s，约占北溪枯水期可供利用流量的 41.8%。近期（2020 年）规划在北溪下游河段取水流量为 31.9m^3/s，其中农业用水 2.66m^3/s，向厦门供水 14m^3/s，生活和工业用水 15.27m^3/s。近期北溪剩余可供利用流量为 9.47m^3/s，约占北溪枯水期可供利用流量的 22.9%。远期（2030 年）规划在北溪下游河段取水流量合计 41.1m^3/s，其中农业用水 2.49m^3/s，向厦门供水 14m^3/s，生活和工业用水 24.61m^3/s，可供取水量为 213 万 m^3/s。

P=95% guarantee rate: the current water intake flow in the downstream river reach of North Creek is 24.1m^3/s (without taking into account the ecological water use of the inner forest canal outside the river course, similarly hereinafter), of which the agricultural water use is 2.82m^3/s, water supply to Xiamen City is 14m^3/s and domestic and industrial water is 7.29m^3/s. Under current conditions, the remaining available flow rate of North Creek is 17.3m3/s after deducting the ecological base flow of 14.9m3/s in the river course, roughly accounting for 41.8% of the available flow in the North Creek during dry season. The planned water intake flow in near term (in 2020) in the downstream river reach of North Creek is 31.9m^3/s, of which the agricultural water use is 2.66m^3/s, water supply to Xiamen City is 14m^3/s and domestic and industrial water is 15.27m^3/s. The remaining available flow rate of North Creek in near term is 9.47m^3/s, roughly accounting for 22.9% of the available flow in the North Creek during dry season. The planned water intake flow in long term (in 2030) in the downstream river reach of North Creek totals 41.1m^3/s, of which the agricultural water use is 2.49m^3/s, water supply to Xiamen City is 14m^3/s and domestic and industrial water is 24.61m^3/s with available water intake flow of 2.13 million m^3/s .

（2）北溪引水（联盛纸业、福欣特钢除外）

(2) Headrace of North Creek (except for Liansheng Paper and Fuxin Special Steel)

九龙江北溪引水工程主要灌溉厦门、漳州两地的 41.4 万亩农田和供厦门漳州的生活、工业用水。

Headrace works at North Creek of Jiulong River mainly irrigate 414,000 mu of farmland in Xiamen and Zhangzhou and supply domestic and industrial water in both cities

北引左干渠从郭洲拦河闸上游 3km 处、江东桥上游左岸进水闸引水，渠首段为总干渠，设计流量为 22m^3/s，至普西分水闸后，分 6m^3/s 给低干渠（其中漳州台商投资区分 4m^3/s，海沧分 2m^3/s），余下 16m^3/s 给高干渠，高干渠中途分水 4m^3/s 给漳州台商投资区，至龙屿闸后剩 12m^3/s 进入厦门市境内。

Left trunk canal of North Creek headrace works intakes water from 3km upsteam of barrage in Guozhou and the intake gate at left bank upstream of Jiangdong Bridge. The headwork section is main trunk canal with design flow of 22m^3/s, of which 6m^3/s is distributed to low trunk canal by 6m^3/s when the canal runs to the diversion gate in Puxi (including 4m^3/s distributed to Zhangzhou Taiwanese Investment Zone and

$2m^3/s$ distributed to Haicang) and the remaining $16m^3/s$ is distributed to high trunk canal including $4m^3/s$ distributed to Zhangzhou Taiwanese Investment Zone via the high trunk canal and $12m^3/s$ distributed to Xiamen City when the canal runs to the gate in Longyu.

综上所述，北引左干渠供应漳州台商投资区的流量总计 $8m^3/s$。

To sum up, left trunk canal of North Creek headrace works supplies a total of $8m^3/s$ to Zhangzhou Taiwanese Investment Zone.

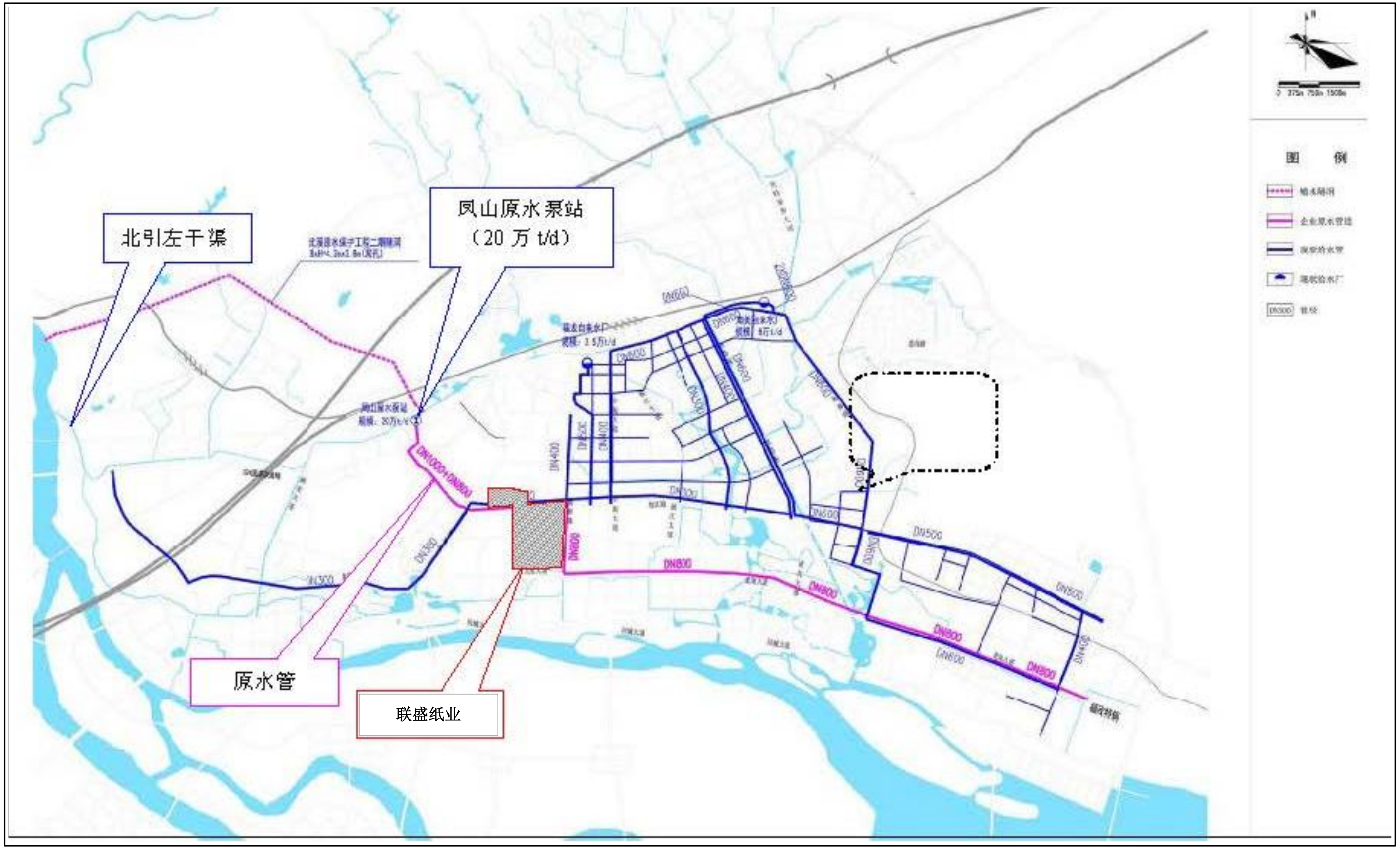
表 6.1-1 北引左干渠水量分配表

Table 6.1-1 Water Distribution List of Left trunk canal of North Creek Headrace Works

名称 Designation	设计总流量m^3/s Total design flow m^3/s	台商投资区分配流量 Flow distributed to Zhangzhou Taiwanese Investment Zone	
		m^3/s	万m^3/d ten thousand m^3/d
高干渠 High trunk canal	16	4	34.56
低干渠 Low trunk canal	6	4	34.56
合计 Total	22	8	69.12

注：联盛纸业、福欣特钢除外

Note: except for Liansheng Paper and Fuxin Special Steel


北引左干渠
凤山原水泵站
（20 万 t/d）
原水管
联盛纸业
图 例
DN800
DN500

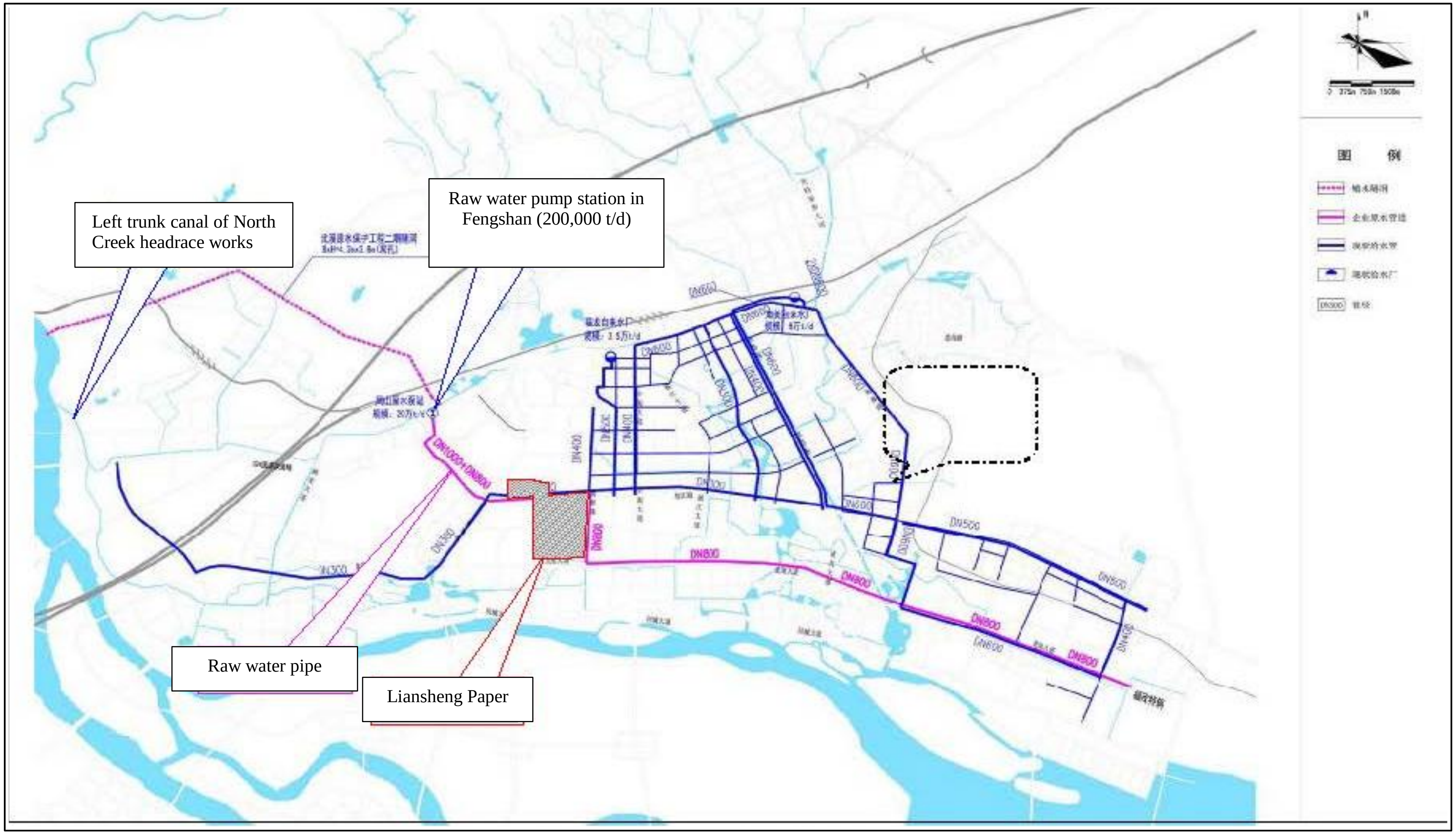


图 6.1-1 九龙江北溪供水现状图

Figure 6.1-1 Current Water Supply Conditions at North Creek of Jiulong River

（3）联盛纸业、福欣特钢企业用水大户供水

(3) Water supply to such major water users as Liansheng Paper and Fuxin Special Steel

直接从北引左干渠直接引原水，通过凤山原水泵站（供水规模 20 万 m^3/d）取水后，设专用原水管沿着角江路—角泰路—龙池大道输送至福欣特钢、联盛纸业。福欣特钢专用原水管供水规模为 5 万 m^3/d，管径为 DN800；联盛纸业专用原水管供水规模为 15 万 m^3/d，管径为 DN1100。

Raw water is directly sourced from left trunk canal of North Creek headrace works. Upon water intake via raw water pump station in Fengshan (with water supply scale of 200,000 m^3/d), dedicated raw water pipes will be provided along Jiaojiang Road-Jiaotai Road-Longchi Avenue to deliver water to Liansheng Paper and Fuxin Special Steel. The dedicated raw water pipe for Liansheng Paper and Fuxin Special Steel has a water supply scale of 50,000 m^3/d and 150,000 m^3/d and pipe diameter of DN800 and DN800 respectively.

6.1.2 取水影响分析

6.1.2 Analaysis for Impacts of Water Intake

九龙江北溪水资源较为丰富，下游河段可供取水量为 213 万 m^3/d。根据九龙江北溪水资源配置方案，联盛纸业、福欣特钢企业用水大户直接从北引左干渠直接引原水，通过凤山原水泵站（供水规模 20 万 m^3/d）取水后，设专用原水管沿着角江路—角泰路—龙池大道输送至福欣特钢、联盛纸业。

North Creek of Jiulong River is rich in water resources, and the water volume available for water intake in the downstream reaches is 2.13 million m^3/d. According to water resource allocation schemes for North Creek of Jiulong River, the two major water users, Liansheng Paper and Fuxin Special Steel, directly intake water from left trunk canal of North Creek headrace works. Upon water intake via raw water pump station in Fengshan (with water supply scale of 200,000 m3/d), dedicated raw water pipes will be provided along Jiaojiang Road-Jiaotai Road-Longchi Avenue to deliver water to Liansheng Paper and Fuxin Special Steel.

联盛纸业专用原水管供水规模为 15 万 m^3/d，拟建项目制浆造纸生产线用水 1 .6864 万 m^3/d，投产后全厂生产线用水总量为 8.21 万 m^3/d，供水水源的可供水量大于需水要求，水资源供需可实现平衡。

The water supply scale of the original raw water pipe of Liansheng Paper is 150,000 m^3/d. The water used for the pulping and papermaking production line of the proposed project is 16,864 m^3/d. After putting into service, the total water consumption of production lines in the whole plant is 82,100 m^3/d. The water supply can be larger than the water demand, so that the water supply and demand can be balanced.

综上分析，九龙江北溪水资源较为丰富，规划实施后九龙江北溪水源的可供水量大于拟建项目需水要求，对九龙江北溪的水资源影响较小，九龙江北溪的水资源可以承载力拟建项目的实施。

To sum up, the water resources at North Creek of Jiulong River are relatively abundant. After the implementation of the plan, the water supply capacity of these water resources is greater than the water requirement of the proposed project with less impact thereupon such that the water resources can bear implementation of proposed project.

6.2 海域环境影响预测与评价

6.2 Environmental Impact Forecast and Assessment for Sea Area

6.2.1 废水排放去向

6.2.1 Destination of Wastewater Discharge

目前经厂区内污水处理站处理达标后的排水经专用污水管网排入九龙江北港出海口（排放口坐标：24°29'1.40"N、117°52'0.40"E），待排海管道建设完成后，厂区污水处理站处理达标后纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

Presently, upon up-to-standard treatment by sewage treatment station in plant area, wastewater is drained into North Port at estuary of Jiulong River via dedicated sewage pipes (coordinate of the drain outlet: 24°29'1.40"N、117°52'0.40"E). Once marine discharge pipes are completed, wastewater in the plant will be incorporated into the tailwater marine discharge pipes of Jiaomei Sewage Treatment Plant (250,000 t/d) upon up-to-standard treatment by the sewage treatment station in the plant for uniform discharge to deep sea.

根据漳州台商投资区管理委员会的建设规划，角美污水处理厂的排海管道建设正在进行之中，拟建项目产生废水通过厂内污水处理厂处理达标后，可全部接入角美污水处理厂的尾水排海管道深海排放。

According to the construction plan of the Zhangzhou Taiwanese Investment Zone Management Committee, the construction of the drainage pipeline of Jiaomei Wastewater Treatment Plant is underway. Wastewater generated by proposed project can all be incorporated into the tailwater marine discharge pipes of Jiaomei Sewage Treatment Plant upon up-to-standard treatment by the sewage treatment plant in the plant for uniform discharge to deep sea.

项目废水排放走向详见图 6.2-28。

Destination of wastewater discharged from the project is detailed in Figure 6.2-28.

6.2.2 水动力—水质数学模型建立

6.2.2 Set-up of Hydrodynamic-Water Quality Mathematical Model

6.2.2.1 水动力水质数学模型简介

6.2.2.1 General Description of Hydrodynamic-Water Quality Mathematical Model

1、水动力数学模型

1. Hydrodynamic mathematical model

采用平面二维的浅水方程和连续方程，提供相应的潮波运动边界条件和初始条件，对目标海域的水动力进行模拟：

The planar two-dimensional shallow water equation and continuous equation are used to provide the corresponding tidal wave boundary conditions and initial conditions to simulate the hydrodynamics of the target sea area:

质量守恒方程

Mass conservation equation

$$\frac{\partial z}{\partial t}+\frac{\partial U(h+z)}{\partial x}+\frac{\partial V(h+z)}{\partial y}=0 \qquad (1)$$

动量方程

Momentum equation

$$\frac{\partial U}{\partial t}+U\frac{\partial U}{\partial x}+V\frac{\partial U}{\partial y}-fV+g\frac{\partial z}{\partial x}+\frac{\tau_{bX}}{\rho(h+z)}=A_x\left(\frac{\partial^2 U}{\partial x^2}+\frac{\partial^2 U}{\partial y^2}\right) \qquad (2)$$

$$\frac{\partial V}{\partial t}+U\frac{\partial V}{\partial x}+V\frac{\partial V}{\partial y}+fU+g\frac{\partial z}{\partial y}+\frac{\tau_{by}}{\rho(h+z)}=A_y\left(\frac{\partial^2 V}{\partial x^2}+\frac{\partial^2 V}{\partial y^2}\right) \qquad (3)$$

式中：

Where,

z　潮位，m；

z　tide level, m;

U,V x,y 方向上的垂向平均流速分量，m/s；

U,V vertical components of average velocity along *x and y* axis, m/s;

h　水深，m；

h　Water depth, m;

z　水位，m；

z　Water level, m;

t　时间，s；

t　Time, s;

c　谢才系数，$c=\frac{1}{n}H^{\frac{1}{6}}$，$n$ 为糙率系数，$H=h+z$，即总水深；

c　Chezy coefficient, $c=\frac{1}{n}H^{\frac{1}{6}}$, n is roughness factor, $H=h+z$ i.e., total water depth;

f　科氏力系数，$f=2w\sin\phi$，w 为地转角速度，φ 为纬度；

f Coriolis force coefficient, $f = 2w\sin\phi$, w is geostrophic angular speed, φ is latitude;

g 重力加速度，9.8 m/s^2；

g gravity acceleration, 9.8 m/s^2;

$\tau_{bx}\,\tau_{by}$ x，y 方向底床阻力，$(\tau_{bx},\tau_{by}) = \dfrac{\rho g(U,V)\sqrt{U^2+V^2}}{c^2}$；

$\tau_{bx}\,\tau_{by}$ bed resistance along *x and y* axis, $(\tau_{bx},\tau_{by}) = \dfrac{\rho g(U,V)\sqrt{U^2+V^2}}{c^2}$;

$A_x\,A_y$ 涡动粘滞系数，m^2/s。

$A_x\,A_y$ eddy viscosity coefficient, m^2/s.

有了以上条件，即可用一定的离散格式求出方程的解。求解上述方程的数值方法很多，较为流行的有 ADI 法、破开算子法、直接差分法、特征线法和有限元法等。本模型使用基于三角形网格剖分计算域的有限元法来对方程进行离散，该方法具有可方便地拟合复杂的岸线条件、网格布设灵活、局部加密方便和适应性强等特点。对于九龙江河口这样一个具有复杂海底地形、存在滩涂且分布不均匀、岸线弯曲不规则、河口内外分布大小不等的多个岛屿和潮差很大等特点的河口区域使用本模型来进行数值模拟研究是非常适合的。本模型同时使用动步长技术，根据 CFL 条件来实现时间步长的自动设置，可显著提高计算效率。

With the above conditions, the solution of the equation can be obtained in a certain discrete format. There are many numerical methods for solving the above equations. The most popular ones are ADI method, break open operator method, direct difference method, characteristic line method and finite element method. This model uses the finite element method based on the triangle mesh to calculate the domain to discretize the equation. The method has the characteristics of easily fitting complex shoreline conditions, flexible grid layout, convenient local encryption and high adaptability. Use of this model for numerical simulation studies is quite suitable for such an estuary area as estuary of Jiulong River which is featured by complex seabed topography, uneven tidal flats, irregular coastline lines, multiple islands with different estranges inside and outside the estuary, and large tidal ranges. This model uses the dynamic step size technology at the same time, and realizes the automatic setting of the time step according to the CFL condition, which can significantly improve the calculation efficiency.

2、水质数学模型

2. Water Quality Mathematical Model

工程区域附近潮强流急、垂向掺混充分，可假定污染物浓度场对流场没有影响，从而可简化为分别独立求解垂向平均二维流动的流速场和浓度场。计算中忽略污染物在水中的物理、化学、生物降解，仅考虑污染物受水流作用的输移和扩散过程。因此控制方程采用平面二维保守物质的扩散输移方程：

The tides in the vicinity of the project area are urgent and the vertical mixing is sufficient. It can be assumed that the pollutant concentration field has no influence on the flow field, which can be simplified to separately solve the vertical and average flow fields and concentration fields of the two-dimensional flow. The physical, chemical, and biological degradation of pollutants in water are neglected in the calculation, only taking into account transport and diffusion processes of pollutants affected by water flow. Therefore, the governing equation is the diffusion transport equation of planar two-dimensional conserved matter:

$$\frac{\partial C}{\partial t}+U\frac{\partial C}{\partial x}+V\frac{\partial C}{\partial y}=E_x\frac{\partial^2 C}{\partial x^2}+E_y\frac{\partial^2 C}{\partial y^2}+F \qquad (4)$$

其中：C：污染物浓度；

Where, C - pollutant concentration;

、：、方向的扩散系数，m^2/s；

, : diffusion coefficient along and axis, m^2/s;

F：污染物排放源强，mg/s。

F - Source intensity of pollutant emission, mg/s.

3、定解条件

3. Definite condition

上述方程的定解条件为：

Definite condition of above equation is:

初始条件：

Initial condition:

陆边界条件：，即法向流速为 0

Land boundary condition: , that is, normal velocity is 0

水边界条件：

Water boundary condition:

其中：为陆边界法线方向的速度分量；

Where, is the velocity component along normal direction of land boundary;

为水边界上的潮位值。

is tide level value at water boundary.

无临时测站的外海水边界利用全球潮汐模型（FES2012）求得，该模型分辨率为 1/16°，提取其中的 11 个分潮推算天文潮位，包含八个主要分潮 M_2、S_2、K_1、O_1、N_2、P_1、K_2、Q_1，以及三个浅水分潮 M_4、M_6 和 M_{S4}，可构造出外海开边界处真实的天文潮过程：

The outer seawater boundary without temporary stations is obtained by using the global tide model (FES2012). The resolution of the model is 1/16°, of which eleven partial tides of the tides are extracted to calculate the astronomical tide level, including eight main partial tides M_2, S_2, K_1, $O_{1,}$ N_2, P_1, K_2, Q_1, and three shallow partial tides M_4, M_6 and MS_4, so as to construct a real astronomical process at the open boundary of the open sea:

（5）

式中，为边界处的潮位，为边界处静压水位，*i* 等于 1 至 11，分别对应上述十一个分潮，、分别为分潮在边界处的振幅和迟角，为分潮的角频率。

Where, is tide level at boundary; is static pressure water level; *i* equals to 1 to 11, corresponding to above eleven partial tides; , is respectively the amplitude and epoch of the partial tide at the boundary; is angular frequency of partial tide.

6.2.2.2 计算范围及网格布置

6.2.2.2 Calculation Range and Grid Layout

模型计算范围西起九龙江河口，东至台湾海峡中部，北至泉州，南至东山，计算范围包括了整个厦门湾、围头湾和九龙江河口区域。模型横向宽度约 150 km，纵向长度约 160 km。网格布置充分利用了三角形网格的优点，按照关键水域网格密、其它水域网格疏的原则进行布置。计算域内的网格布设考虑了水流、地形梯度的差异，对排污管附近的计算网格作进一步加密，保证工程前后流场模拟精度。模型共布设 88008 个单元与 46195 个结点，最小网格尺寸为 20 m。模型范围及网格布置见图 6.2-1，工程区周边排污口附近局部网格布置见图 6.2-2。

Calculation of the model ranges from Jiulong River estuary in the west to the central Taiwan Strait in the east, Quanzhou in the north, and Dongshan in the south, covering the whole Xiamen Bay, Weitou Bay and estuary area of Jiulong Rive. The model has a latitudinal width of approx. 150 km and longitudinal length of approx. 160 km. The grid layout makes full use of the advantages of the triangular mesh with grid arranged in accordance with the principle of dense grid in key water areas while sparse grid in other water areas. The grid layout in the calculation area takes into account the difference between the water flow and the terrain gradient, and further encrypts the calculation grid near the sewage pipe to ensure the flow field simulation accuracy before and after the project. The model is arranged with a total of 88,008 units and 46,195 nodes with a minimum grid size of 20 m. Model range and grid layout are as shown in Figure 6.2-1. Local grid layout nearby the drain outlets surrounding project area is as shown in Figure 6.2-2.

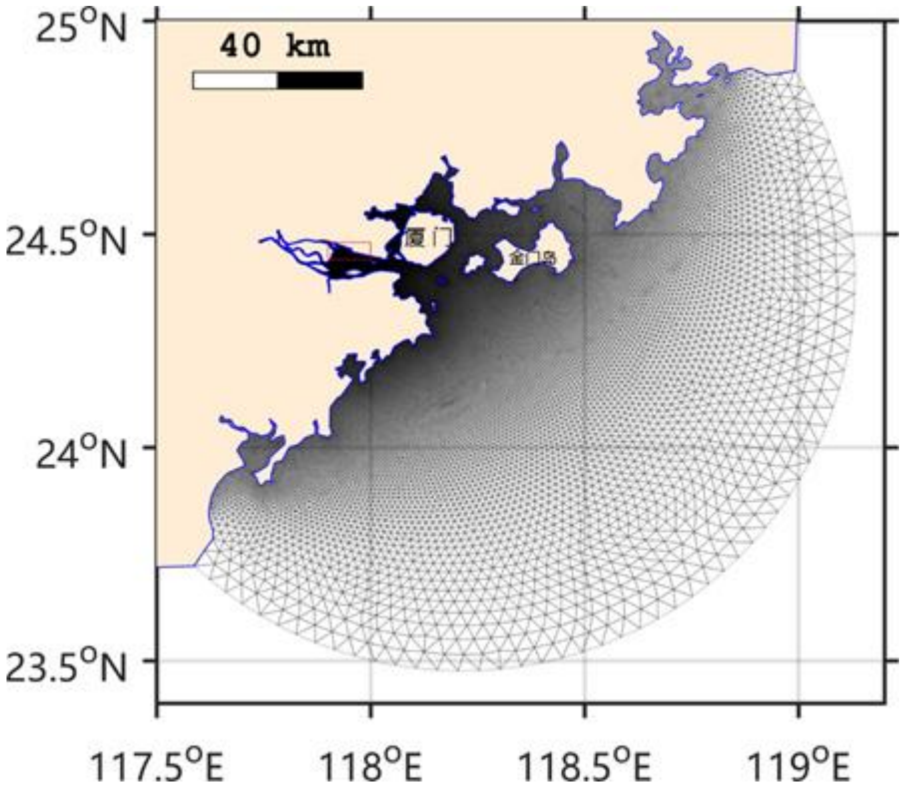


图 6.2-1 计算范围及网格布置

Figure 6.2-1 Calculation Range and Grid Layout

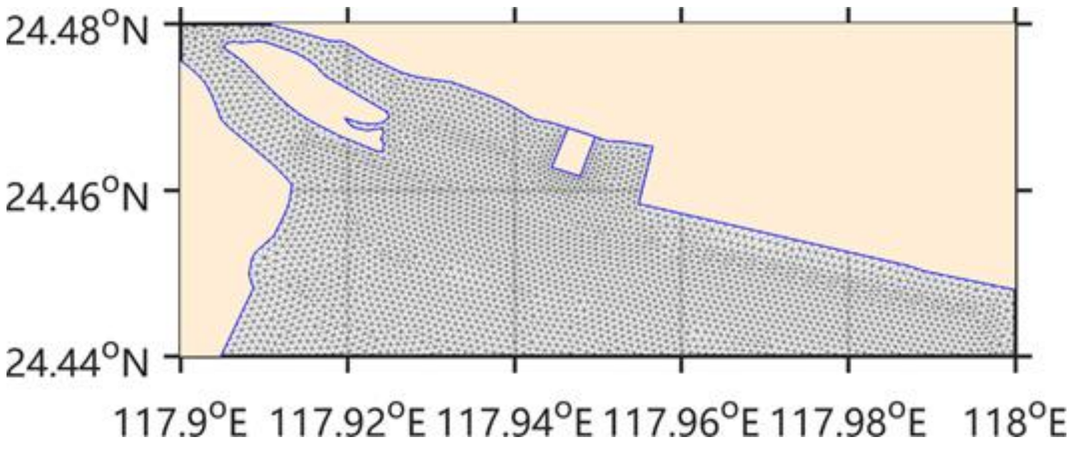


图 6.2-2 工程区布局网格布置

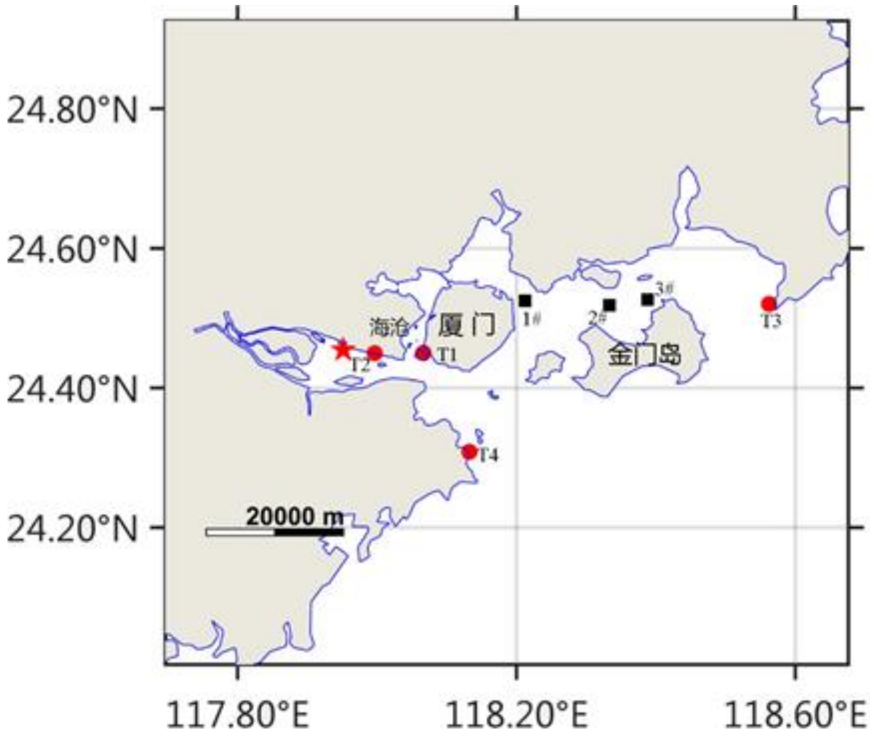
Figure 6.2-2 Local Grid Layout in Project Area

6.2.2.3 模型验证

6.2.2.3 Model Verification

采用 2013 年 9 月实测的大潮、中潮和小潮水文资料对潮流数学模型进行验证。水文测点见图 6.2-3，潮位及潮流验证结果见图 6.2-4~图 6.2-9。由验证结果可知，潮位和流速及流向过程得到很好的验证，精度满足有关规范要求，模型采用的物理参数和计算参数基本合理，计算方法可靠，能够模拟工程海域附近的潮汐潮流运动特性。

The mathematical model is verified using actual measured hydrologic data of spring, medium and neap tides in September of 2013. See Figure 6.2-3 for hydrological measurement points. See Figure 6.2-4 - Figure 6.2-9 for tide level and tidal verification results. It can be seen from the verification results that tide level, flow velocity and flow direction process are well verified and the accuracy meets the requirements of the relevant specifications. The physical parameters and calculation parameters adopted by the model are basically reasonable and the calculation method is reliable, allowing the tidal and tidal flow motion characteristics near the sea area of project to be simulated.



备注：红色圆圈为潮位测站，黑色方框为潮流测站，红色五角星为工程区位置示意

Note: the red circles are the tide level station. The black boxes are the power station and the red pentagram is the schematic location of project area.

图 6.2-3 水文测点位置示意图

Figure 6.2-3 Schematic Location Map of Hydrological Measurement Points.

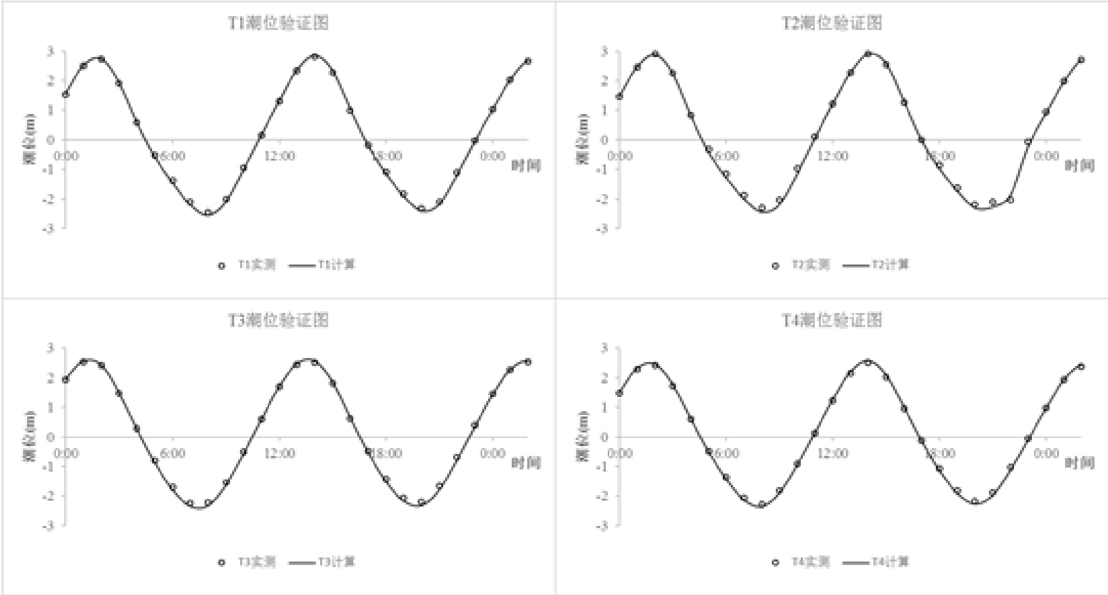


图 6.2-4 大潮潮位验证图

Figure 6.2-4 Verification Diagram of Spring Tide Level

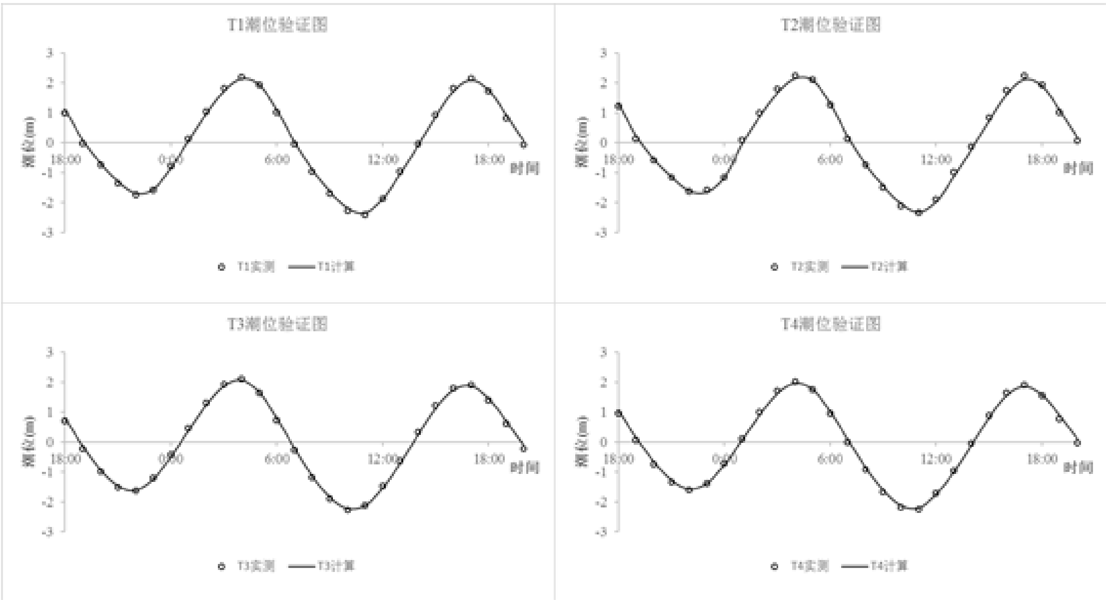


图 6.2-5 中潮潮位验证图

Figure 6.2-5 Verification Diagram of Medium Tide Level

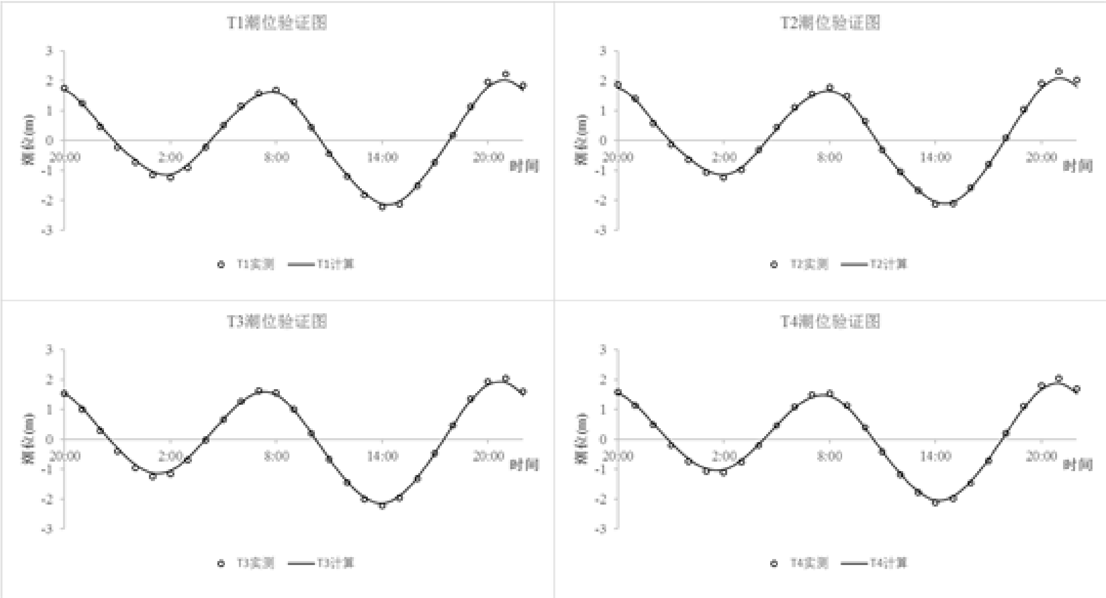


图 6.2-6 中潮潮位验证图

Figure 6.2-6 Verification Diagram of Medium Tide Level

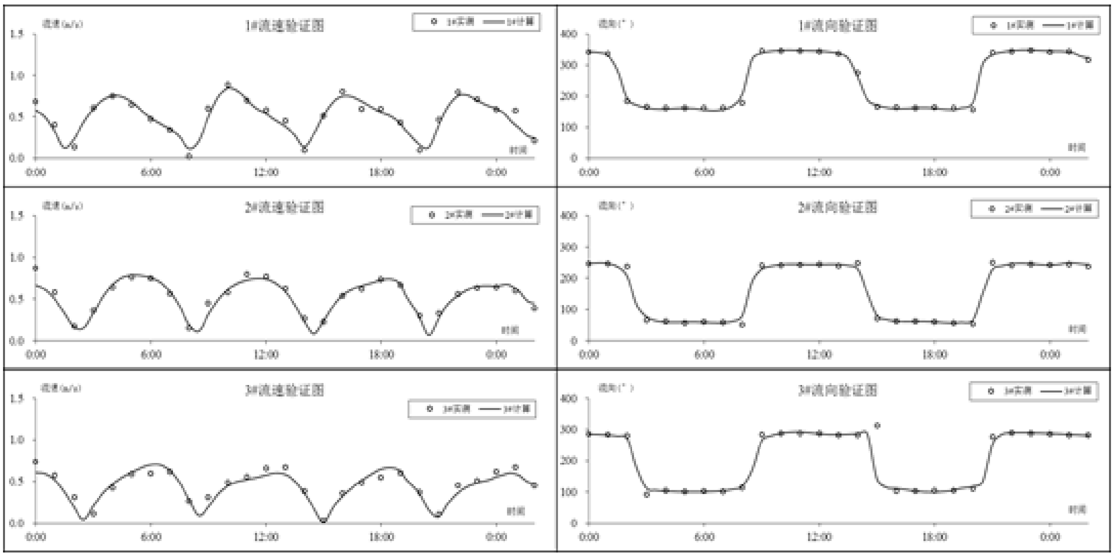


图 6.2-7 大潮潮流验证图

Figure 6.2-7 Verification Diagram of Spring Tide Flow

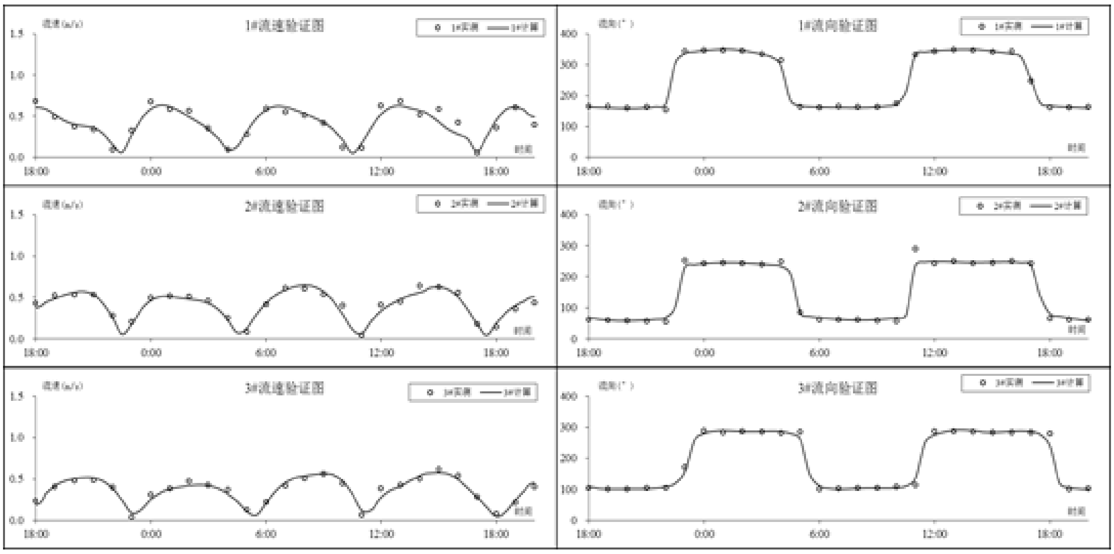


图 6.2-8 中潮潮流验证图

Figure 6.2-8 Verification Diagram of Medium Tide Flow

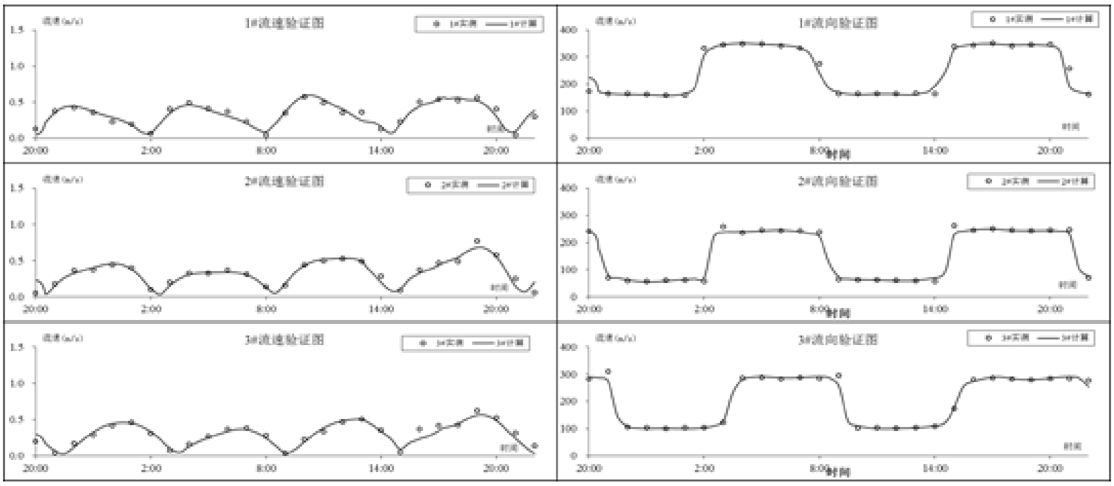


图 6.2-9 小潮潮流验证图

Figure 6.2-9 Verification Diagram of Neap Tide Flow

6.2.2.4 工程区流场分析

6.2.2.4 Flowfield Analysis of Project Area

图 6.2-10、图 6.2-11 所示为大范围涨、落急流场图。工程区位于九龙江河口，影响本水域的涨、落潮流路由大致如下：涨急时刻，外海潮流进入厦门湾内，一支从大金门岛东侧水道进入围头湾，而后向西流，与从大金门岛西南侧北向的潮流汇合，流入同安湾；另外一支从大金门岛西南侧往西北方向流动，分为两部分，一部分进入九龙江河口，另一部分流入厦门西海域。流速最大值出现在九龙江口附近海域，涨急流速可达 1.5 m/s。落急时刻，九龙江河口区、厦门西海域、同

安湾、围头湾海水均流向外海方向，在厦门岛南侧，九龙江河口及厦门西海域向外海方向的流与同安湾南下的流汇合向南流，大金门岛南侧海域流向为南偏西。

Figure 6.2-10 and 6.2-11 show schematics of wide-range flood and ebb current field. The project area is located at the estuary of Jiulong River. Routes of the flood and ebb current affecting water area of this project are as follows: in case of flood current, the outer sea tide enters Xiamen Bay. A branch thereof enters the Waitou Bay from the east side of Dajinmen Island, then flows westward to merge with the northward trend from the southwest side of Dajinmen Island, and flows into Tongan Bay. The other branch flows from the southwest side of Dajinmen Island to the northwest, which is divided into two parts with one part entering the estuary of Jiulong River and the other flowing into the west sea area of Xiamen. The maximum flow rate appears in the sea area near the estuary with a flood current velocity of up to 1.5 m/s. In case of ebb current, sea water in estuary area of Jiulong River, west sea area of Xiamen, Tongan Bay and Waitou Bay all flow to the outer sea. On the south side of Xiamen Island, the current at the estuary and and that in west sea area of Xiamen flowing towards outer sea merge with the current in Tongan Bay flowing southwards to flow to the south. In sea area to the south of Dajinmen Island, the current flows to south by west.

图 6.2-12、图 6.2-13 所示为小范围涨、落急流场示意图。从图中可以看出，工程区位于九龙江河口，受岸线及等深线的影响，涨落潮流基本呈往复流。

Figure 6.2-12 and 6.2-13 show schematics of small-range flood and ebb current field. As can be seen from the figures, the project area is located at the estuary of Jiulong River. Affected by the shoreline and the isobath, the flood and ebb current is basically reciprocating.

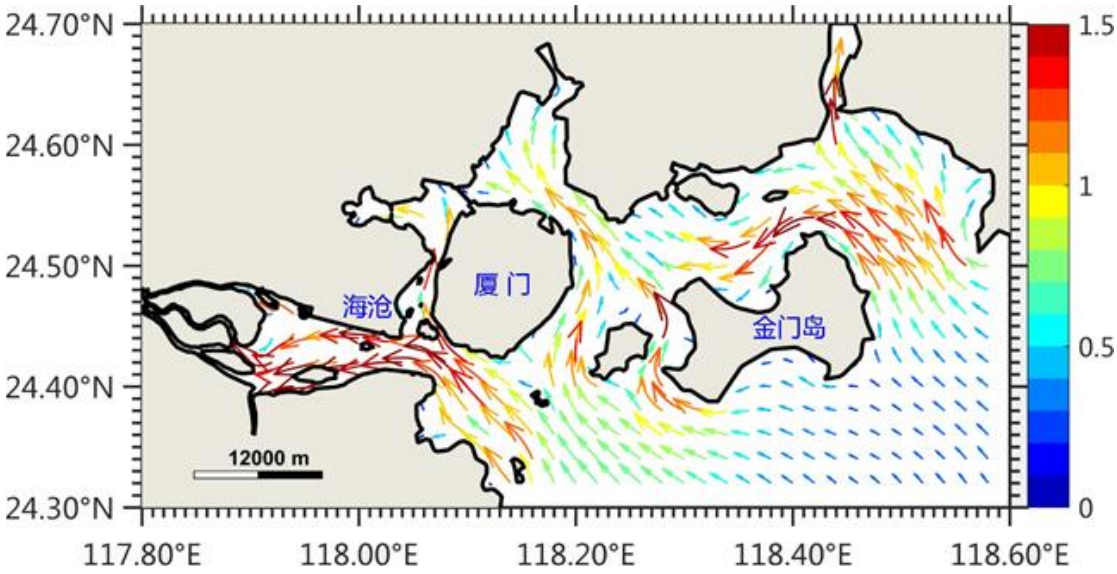


图 6.2-10 大范围涨急流场（单位：m/s）

Fogire 6.2-10 Wide-range Flood Current Field (in m/s)

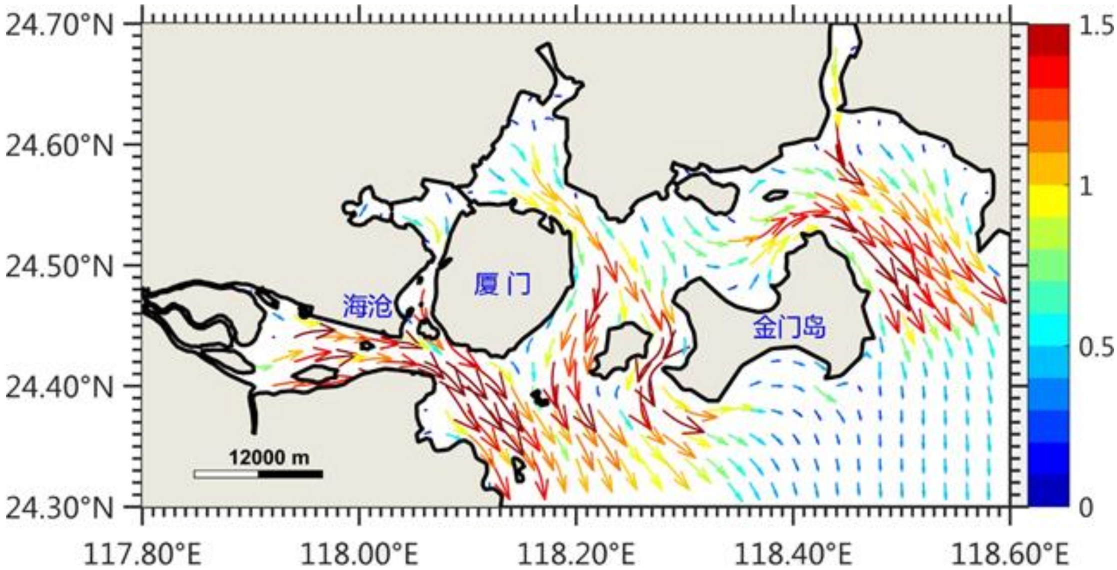


图 6.2-11 大范围落急流场（单位：m/s）

Fogire 6.2-11 Wide-range Ebb Current Field (in m/s)

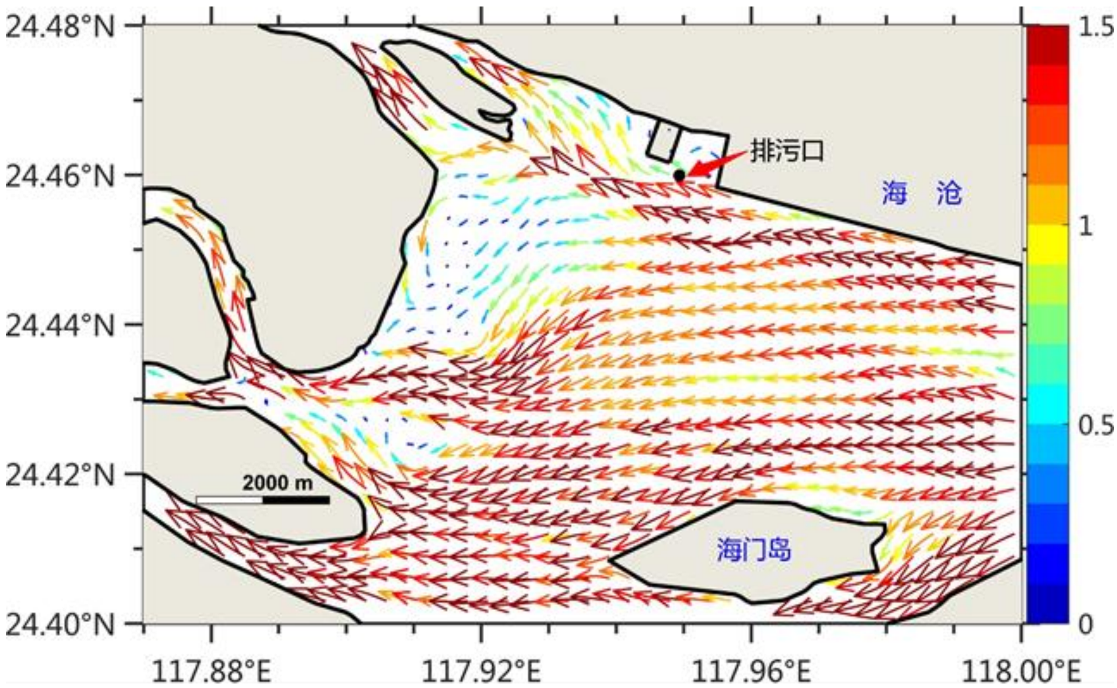


图 6.2-12 小范围涨急流场（单位：m/s）

Fogire 6.2-12 Small-range Flood Current Field (in m/s)

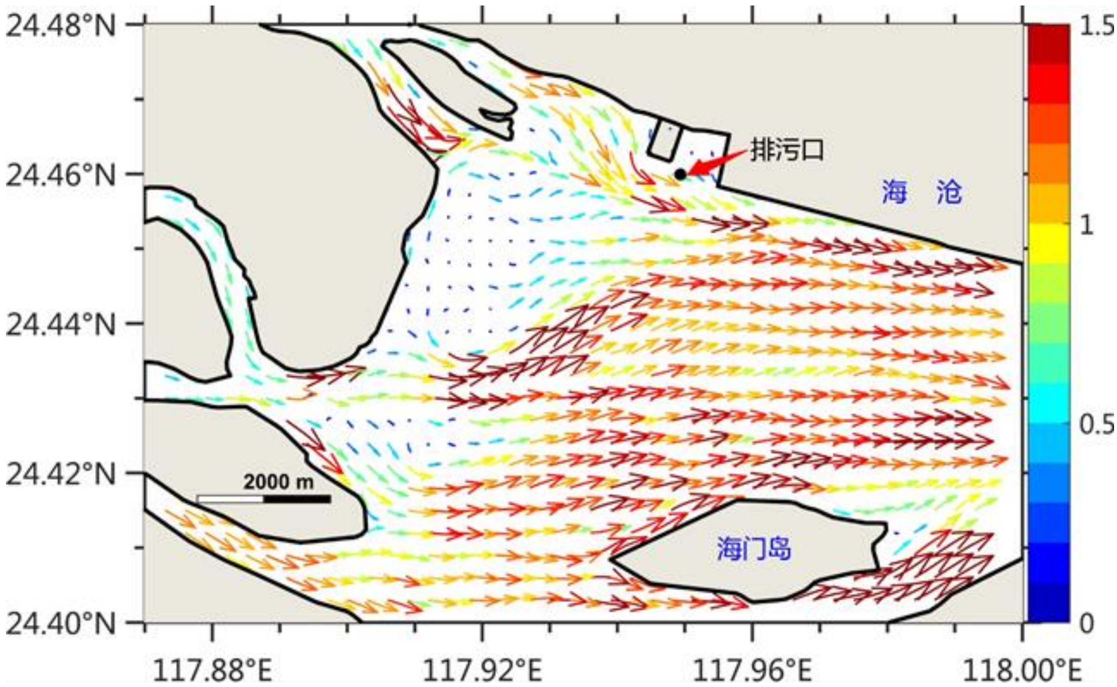


图 6.2-13 小范围落急流场（单位：m/s）

Fogire 6.2-13 Small-range Ebb Current Field (in m/s)

6.2.3 污染物排放对周边环境影响分析

6.2.3 Analysis for Impact of Pollutants on Surrounding Environment

6.2.3.1 计算条件

6.2.3.1 Calculation Condition

1、设计潮型

1. Design tide model

分析大潮、小潮流场基本特点，一般而言，大潮期间工程海域的水动力条件最强，有利于污染物稀释扩散；而小潮期间水动力条件最弱，不利于污染物稀释扩散。因此分别选用大潮、小潮作为计算潮型来计算分析污染物在两者情况下的扩散情况。分别选取典型大潮、小潮期作为排放的起始时间进行污染物分布计算。

By analyzing basic characteristics of flow fields of spring and neap tide, the hydrodynamic conditions of the project area in case of spring tide are the strongest in general and thus conducive to the dilution and diffusion of pollutants whilst the hydrodynamic conditions in case of neap tide are the weakest and thus not conducive to the same. As such, spring and neap tides are respectively used as calculation tide models to calculate the diffusion of pollutants in both cases. Typical spring and neap tide periods are respectively selected as the starting time of emission to calculate the pollutant distribution.

2、模型参数选取

2. Selection of Model Parameters

（1）降解系数

(1) Degradation coefficient

为保守起见，计算中忽略污染物在水中的物理、化学、生物降解，仅考虑污染物受水流作用的输移和扩散过程。由于污染物的降解作用，污染物的实际影响范围会比预测的范围更小。

For conservative purpose, physical, chemical, and biological degradation of pollutants in water are neglected in the calculation, only taking into account transport and diffusion processes of pollutants affected by water flow. With degradation effect of pollutants, actual range of pollutants' impact will be smaller than predicted range.

（2）水平涡动粘滞系数

(2) Horizontal eddy viscosity coefficient

采用考虑亚尺度网格效应的 Smagorinsky (1963) 公式计算水平涡粘系数，表达式如下：

The horizontal eddy viscosity coefficient is calculated using the Smagorinsky (1963) formula that considers the sub-scale grid effect. The expression is as follows:

$$A = c_s{}^2 l^2 \sqrt{2S_{ij}S_{ij}}$$

式中：C_S为常数，l 为特征混合长度，由 $S_{ij} = \frac{1}{2}\left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i}\right)$，（$i$，$j$=1，2），即水平方向上的潮流流速计算得到。

Where, C_S is a constant and l is is the characteristic mixing length, which is obstained by $S_{ij} = \frac{1}{2}\left(\frac{\partial u_i}{\partial x_j} + \frac{\partial u_j}{\partial x_i}\right)$, ($i$, j=1, 2), i.e. the tidal velocity along horizontal direction.

3、排污口及周边工程情况

3. Condition of drain outlets and surrounding project

根据《龙海市城市及企业污水处理厂尾水排海工程项目环评报告书》，选取其 5#排污口作为排污口的位置。排污口的经纬度位置为（117°56'57.63" N，24°27'35.70" E），临近厦漳大桥，具体如图 6.2-14 所示。其位置位于角美作业区 1#泊位前沿东侧的滩面槽沟内，水深为厦门理基以下 13.6 m，充分利用海沧作业区前沿水深较大掺混作用较强的优点，弥补现状下本海域水深不足的缺陷。

In accordance with *EIA Report for the Tail Water Marine Discharge Project of Municipal and Corporate Wastewater Treatment Plants of Longhai City*, the #5 drain outlet is selected as the location of the sewage drain outlet. Latitude and longitude coordinates of the drain outlet is (117°56'57.63" N, 24°27'35.70" E), which is adjacent to the Xiamen-Zhangzhou Bridge, as shown in Figure 6.2-14. It is located in the beach trough on the east side of front edge of the #1 berth in Jiaomei operation area.

The water depth is 13.6 m below the theoretical depth datum of Xiamen in order to make full use of the advantages of strong blending in the front of the Haicang operation area to make up such defect of this sea area as insufficient water depth under current situation.

排污口以西北为海沧港区的角美作业区 1#、2#泊位，以东北为海沧作业区 20#~22#泊位。根据厦门港总体规划修编中的海沧港区（角美作业区和海沧作业区）的港口、航道规划，结合工程区港区、航道建设现状，设置工况场景为海沧作业区 20#~22#泊位已建成、角美作业区 1#、2#泊位已形成围堰的场景。设置航道已疏浚至 1#、2#泊位港区前沿，其中，19#泊位以东航道宽 250m 底高程-14 m；以西航道宽 170m，底高程-10.4 m。

Lie to the northwest and northeast of the drain outlet are respectively #1 and #2 berth in Jiaomei operation area of Haicang Bonded Port Area and #20 - #22 berth in Haicang operation area. According to the port and waterway planning of Haicang Bonded Port Area (Jiaomei and Haicang operation area) in the revision to overall planning of Xiamen Port, based on current construction condition of the port area and waterway in the project area, the working condition scenario is set as the scenario where #20 - #22 berth in Haicang operation area have been completed and #1 and #2 berth in Jiaomei operation area have formed a cofferdam. The waterway is set as to be dredged to the front edge of #1 and #2 berth, of which the waterway to the east of #19 berth has a width of 250m and bottom elevation of -14m while the waterway to the west has a width of 170m and bottom elevation of -10.4m.

图 6.2-14 排污口附近海域卫星图

Figure 6.2-14 Satellite Map of Sea Area near the Drain Outlet

4、排污源强情况

4. Source Intensity of Pollutant Emission

本次污染物影响分析评价两种污染物，即化学需氧量（COD）和氨氮的排污分布情况，设计正常排放和事故排放两种场景，两种场景下的排放源强情况如表 6.2-1 所示。其中，COD_{Cr} 和 COD_{Mn} 分别表示以重铬酸钾法和碱性高锰酸钾法测定的化学需氧量数值，在陆域环境以及污染源排放时以 COD_{Cr} 表达；在海水中则 COD_{Mn} 表达。本研究中，通过查阅相关资料，确定 COD_{Cr} 和 COD_{Mn} 的换算比值为 1:0.416。在两种场景下，均按总排污量 13 万 t/d 进行计算，其中拟建项目的污染物排放量有所不同，其他各单位的排放污水量和污染物总量均保持不变，以模拟联盛纸业项目发生事故时的排污影响情况。在模型计算期间，污染物随着潮流流场发生对流输运和扩散输运，其浓度随着时间和空间发生连续变化。根据污染物每个时刻的浓度分布，取排放期间的浓度最大值，最终形成最大影响包络图和包络面积。

Two pollutants, namely the chemical oxygen demand (COD) and ammonia nitrogen discharge distribution, are analyzed and assessed herein and such two scenarios as normal and accident emission are designed. The emission source intensity under the two scenarios is shown in Table 6.2-1. COD_{Cr} and COD_{Mn} respectively represent chemical oxygen demand values determined by potassium dichromate method and alkaline potassium permanganate method, expressed by COD_{Cr} in land environment and pollution source emission and by COD_{Mn} in seawater. For the purpose of this study, the conversion ratio of COD_{Cr} to COD_{Mn} is determined to be 1:0.416 by consulting relevant data. In both scenarios, calculations are carried out as per total discharge capacity of 130,000 t/d. The pollutant emissions of the proposed project are different whilst wastewater discharge and total pollutants of other entities remain unchanged so as to simulate the impact of pollutant emission in the event of an accident in Liansheng Paper's project. During model calculation, the pollutants undergo convection and diffusion transport with the tidal flow field and concentrations thereof change continuously with time and space. According to the concentration distribution of the pollutants at each moment, the maximum concentration value during emission is taken so as to finally form the maximum impact envelope map and envelope area.

表 6.2-1 两种场景下排放源强情况

Figure 6.2-1 Emission Source Intensity under Two Scenarios

场景 Scenario	日均排放量 Daily emission	联盛纸业 Liansheng Paper Industry	漳州市角美城市污水处理厂 Jiaomei Municipal Sewage Treatment Plant of Zhangzhou City	龙池污水处理厂 Longchi Sewage Treatment Plant	其他排污单位 Other pollutant emission entities	总计 Total
正常排放 Normal emission	污水量（$\times10^4$t/d） Sewage flow ($\times10^4$t/d)	5.6844	4.8	1	1.5156	**13**
	COD_{Cr}（kg/d） COD_{Cr} (kg/d)	4430	2880	600	1515.6	**9425.6**
	氨氮（kg/d） Ammonia nitrogen (kg/d)	110	384	80	227.34	**801.34**
事故排放 Accidental emission	污水量（$\times10^4$t/d） Sewage flow ($\times10^4$t/d)	5.6844	4.8	1	1.5156	**13**

	COD_{Cr}（kg/d） COD_{Cr} (kg/d)	164710	2880	600	1515.6	**169705.6**
	氨氮（kg/d） Ammonia nitrogen (kg/d)	854	384	80	227.34	**1545.34**

备注：通过查阅相关资料，确定CODCr和CODMn的换算比值为1:0.416。

Note: the conversion ratio of CODCr to CODMn is determined to be 1:0.416 by consulting relevant data.

5、海域污染物本底值和评价标准

5. Background value and evaluation criteria of sea area pollutants

海域水环境本底值参考《厦门港海沧港区 22#-24#泊位工程环境影响报告书》和《漳州市角美城市污水处理厂及配套管网工程环境影响报告书》等相关材料，COD 选取大小潮期间的平均值 1.24 mg/L 作为本底浓度；氨氮则由于临近海域的无机氮浓度均已超过标准的规定，后文仅分析污染物的增量分布。

The water environment background value of the sea area refers to *Environmental Impact Report for the 22#-24# Berth Project in Haicang Port Area of Xiamen Port*, *Environmental Impact Report for the Jiaomei Municipal Sewage Treatment Plant and Associated Pipe Network Project of Zhangzhou City* and other related data. Average value 1.24 mg/L during the tidal period is selected as the background concentration of COD; as for ammonia nitrogen, since only the incremental distribution of pollutants is analyzed hereinafter as the concentration of inorganic nitrogen in the adjacent sea area has exceeded the standard.

根据《福建省近岸海域环境功能区划（修编）》，如图 6.2-15，项目排污海域为“九龙江口角美四类区”，环境功能区划为港口、一般工业用水区、纳污功能，编号为 FJ113-D-III，执行《海水水质标准》（GB3097-1997）三类标准；排污口西南 2km 远、九龙江北港与中港汇流处，为“九龙江口甘文一类区（FJ116-A-I）”，属自然保护区，执行一类水质标准。其他排污口附近海域，大多数归属于“漳州九龙江口二类区（FJ119-B-II）”，环境功能区划为红树林保护、养殖、旅游、新鲜海水供应等，执行二类水质标准。评价污染物的指标要求如表 6.2-2 所示。

In accordance with the *Environmental Functional Zoning of Coastal Waters of Fujian Province (Revision)*, as shown in Figure 6.2-15, sea area where sewage drain outlet the project is located is "Jiaomei Class IV Zone at estuary of Jiulong River", of which function zoning is a port, a general industrial water area and sewage containment. It is numbered FJ113-D-III and water quality thereof shall be in accordance with Grade III seawater quality standards in *Sea Water Quality Standard* (GB3097-1997); the sea area 2km southwest to the drain outlet and at converge between North Port and Central Port of Jiulong River is "Ganwen Class I Zone at estuary of Jiulong River". It is a natural reserve and water quality thereof shall be in accordance with Grade I water quality standard. Other sea areas nearby the drain outlet are mostly "Zhangzhou Class II Zone at estuary of Jiulong River (FJ119-B-II)", of which functin zoning is mangrove protection, aquaculture, tourism and fresh seawater supply, etc. Water quality thereof shall be in accordance with Grade III water quality standards. The indicator requirements for assessing pollutants are shown in Table 6.2-2.

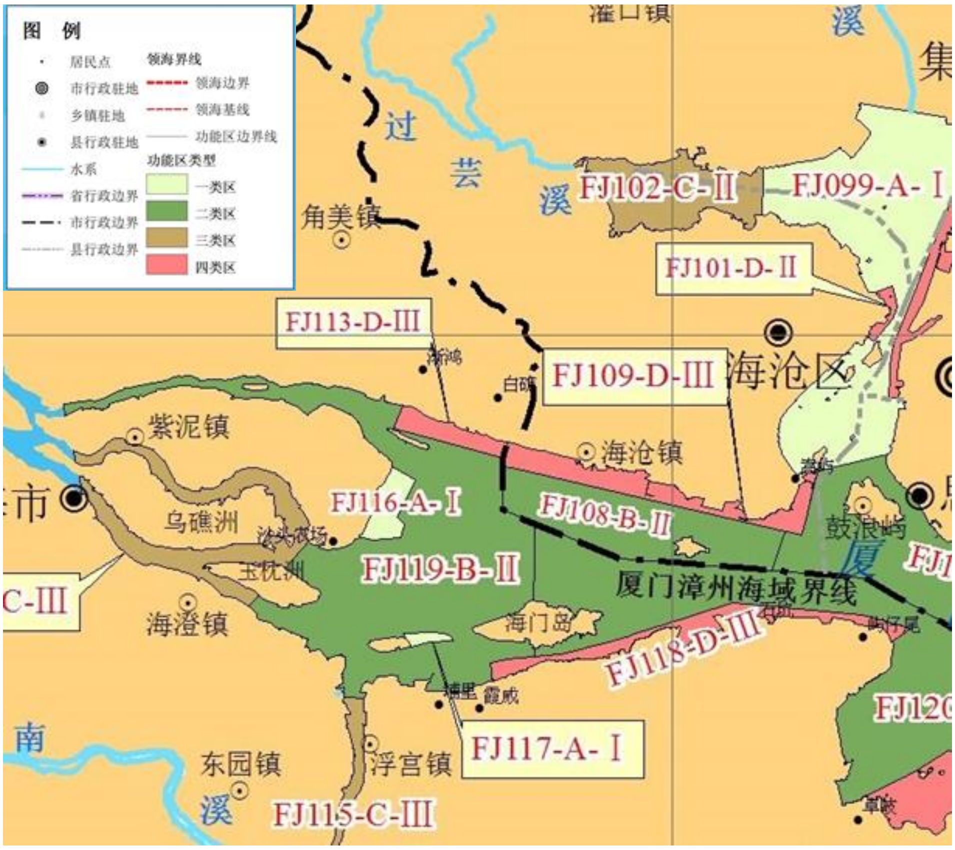


图 6.2-15 福建省近岸海域环境功能区划（截取九龙江口附近海域）

Figure 6.2-15 Environmental Function Zoning Map of Coastal Sea Areas for Fujian Province (Intercepting Sea Area nearby Estuary of Jiulong River)

表 6.2-2 《海水水质标准》（GB3097-1997）中对相关污染物的规定

Table 6.2-2 Provisions on Relevant Pollutants in the *Sea Water Quality Standards* (GB3097-1997)

污染物 Pollutant	COD_{Mn}	无机氮 Inorganic nitrogen
第三类海水水质标准(mg/L） Grade IIIsea water quality standards (mg/L)	≤4.0	≤0.4
第二类海水水质标准(mg/L） Grade IIsea water quality standards (mg/L)	≤3.0	≤0.3
第一类海水水质标准(mg/L） Grade Isea water quality standards (mg/L)	≤2.0	≤0.2

6.2.3.2 计算结果分析

6.2.3.2 Calculation Results Analysis

下面结合水质标准和海洋环境功能区划，对两种污染物的排放影响进行预测和分析。

Emission impacts of two pollutants are predicted and analyzed below based on water quality environment and function zoning of marine environment.

1、COD_{Mn}影响分析

1. COD_{Mn} impact analysis

表 6.2-3 所示为 COD_{Mn} 在两个排放场景下的浓度增量包络面积的统计值。图 6.2-16~图 6.2-19 为 COD_{Mn} 在各场景下浓度增量包络分布图。由表 6.2-3 中的浓度增量包络范围统计值可以看出，污染物排放量与包络范围密切相关，主要受到潮流形态的控制。在小潮条件下，由于水动力条件较弱、潮位较低，包络面积均大于大潮的包络面积，小潮条件下约是大潮条件下包络范围的 2 倍以上。结合图 6.2-12 和图 6.2-13 中的潮流形态，分析污染物分布规律可以发现，在大潮条件下，污染物主要贴岸分布，涨潮时贴岸沿直道坪以北进入九龙江北港，落潮时贴海沧码头沿岸向下游迁移。而在小潮条件下，涨潮时则是由直道坪南北两侧分别进入九龙江北港，落潮时的迁移距离也较远。在 0.5 mg/L 浓度增量包络线最远可达排污口下游约 2.5 km 处（图 6.2-19）。叠加本底 COD 浓度之后，排污口临近的大部分海域仍然满足 2.0 mg/L 的一类水质标准，特别是附近的红树林保

护区和白鹭保护区均未受到影响。这说明在正常排放场景下，排放的 COD 对附近海域影响较小。

-Table 6.2-3 shows the statistical value of the concentration increment envelope area of COD_{Mn} in two emission scenarios. --Figure 6.2-16~ 6.2-19 shows the distribution of concentration increment envelopes of COD_{Mn} in each scenario. It can be seen from the statistics of the envelope range of concentration increment in Table 6.2-3 that the pollutant emissions are closely related to the envelope range and are mainly controlled by the tidal pattern. Under neap tide conditions, due to weak hydrodynamic conditions and low tide level, envelope areas all are larger than those of spring tide. Under neap tide conditions, the envelope range is more than twice the envelope range under spring tide conditions. Based on tidal pattern in Figure 6.2-12 and Figure 6.2-13, as can be seen from analysis of the distribution of pollutants that under spring tide conditions, the pollutants are mainly distributed against sea shore. In case of flood tide, pollutants will enter into North Port of Jiulong River against sea shore along north side of Zhidaoping. In case of ebb tide, they will transport downstream against sea shore along Haicang Port. Under neap conditions, in case of flood tide, pollutants will enter into North Port of Jiulong River respectively from north and south side of Zhidaoping. In case of ebb tide, they will transport in longer. The envelope of the 0.5 mg/L concentration increase is as far as 2.5 km downstream of the drain (Figure 6.2-19). After superimposing the background COD concentration, most of the waters adjacent to the sewage outlet still meet the first-class water quality standard of 2.0 mg/L, especially the nearby mangrove reserve and egret protection area are not affected. This shows that in the normal emission scenario, the COD emitted has less impact on the nearby sea area,

而在事故排放场景下，排污的影响范围则远大于正常排放场景。如图 6.2-20 和图 6.2-21 所示，污染物不仅贴岸分布，还南向扩散直至进入九龙江南港，下游进入鼓浪屿西侧海域。附近的敏感区域（红树林保护区甘文片和鸡屿白鹭保护区，图中洋红色方框所划区域）均受到不同程度的影响，在小潮条件影响较大的情况下，红树林保护区甘文片的 COD 浓度增量可达 4 mg/L。因此，拟建项目管理方

应加强排污监管，严格执行安全生产措施，尽量防止事故发生。

Nevertheless, in case of accidental emission scenario, emitted pollutants have impact much larger than the normal emission scenario. As shown in Figure 6.2-20 and Figure 6.2-21, the pollutants are not only distributed against the shore, but also spread southward until they enter the South Port of Jiulong River and enter the sea area to the west of Gulangyu. The sensitive areas nearby (the mangrove preserved area of Ganwen and the Jiyu Egret Reserve, the area marked by the magenta box in the picture) are affected to varying degrees. In case of more significant impact under neap tide conditions, COD concentration increment of Ganwen area in mangrove reserve can reach up to 4 mg/L. Therefore, the proposed project managing party shall strengthen the pollution emission supervision and strictly implement the safe production measures so as to minimize accidents.

表 6.2-3 COD_{Mn} 浓度增量包络面积统计表

Table 6.2-3 Statistics of the Concentration Increment Envelope Area of COD_{Mn}

浓度增量（mg/L） Concentration increment (mg/L)	正常排放（km²） Normal emission (km²)		事故排放（km²） Accidental emission (km²)	
	大潮 Spring tide	小潮 Neap tide	大潮 Spring tide	小潮 Neap tide
2.0	0.76	1.92	81.28	73.18
2.5	0.22	0.60	54.04	54.04
3.0	0.09	0.35	43.79	45.22
3.5	0.06	0.14	37.60	38.34
4.0	0.04	0.07	29.66	32.19
4.5	0.02	0.05	19.39	27.51
5.0	0.02	0.04	11.51	22.06

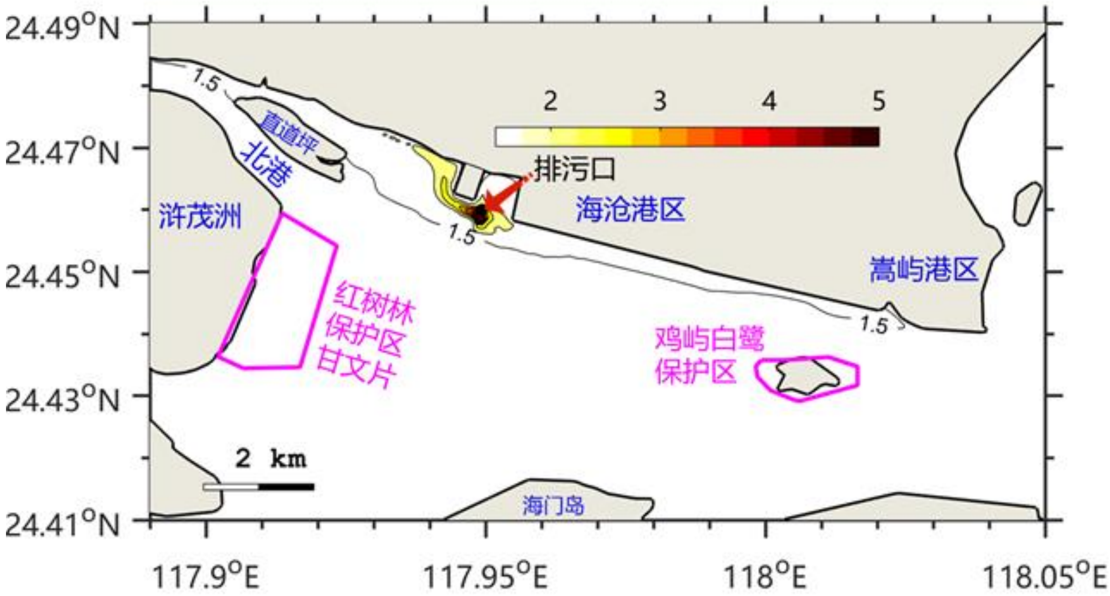


图 6.2-16 COD_{Mn} 大潮正常排放场景下本底+增量浓度包络图（单位：mg/L）

Figure 6.2-16 Background + Incremental Concentration Envelope Diagram for COD_{Mn} under Spring Tide in Normal Emission Scenarios (in mg/L)

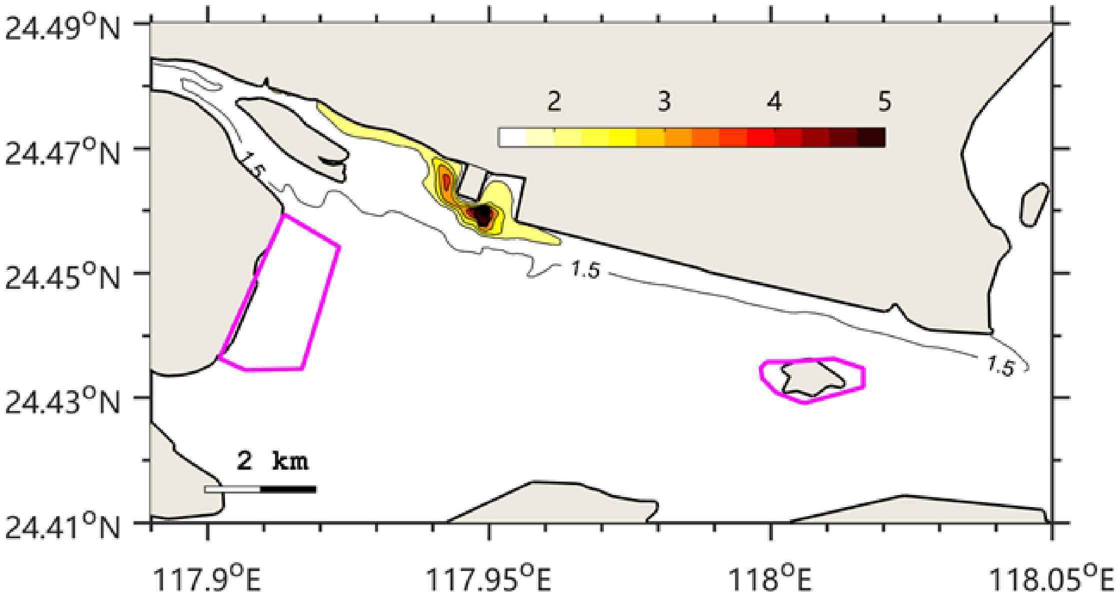


图 6.2-17 COD_{Mn} 小潮正常排放场景下本底+增量浓度包络图（单位：mg/L）

Figure 6.2-17 Background + Incremental Concentration Envelope Diagram for COD_{Mn} under Neap Tide in Normal Emission Scenarios (in mg/L)

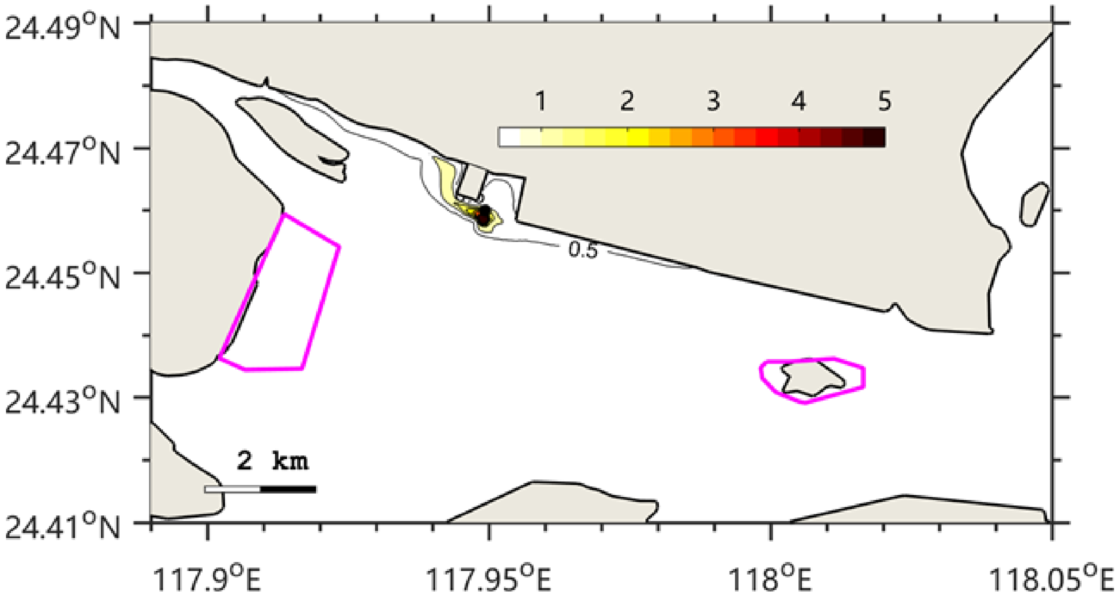


图 6.2-18 COD_{Mn} 大潮正常排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-18 Background + Incremental Concentration Envelope Diagram for COD_{Mn} under Spring Tide in Normal Emission Scenarios (in mg/L)

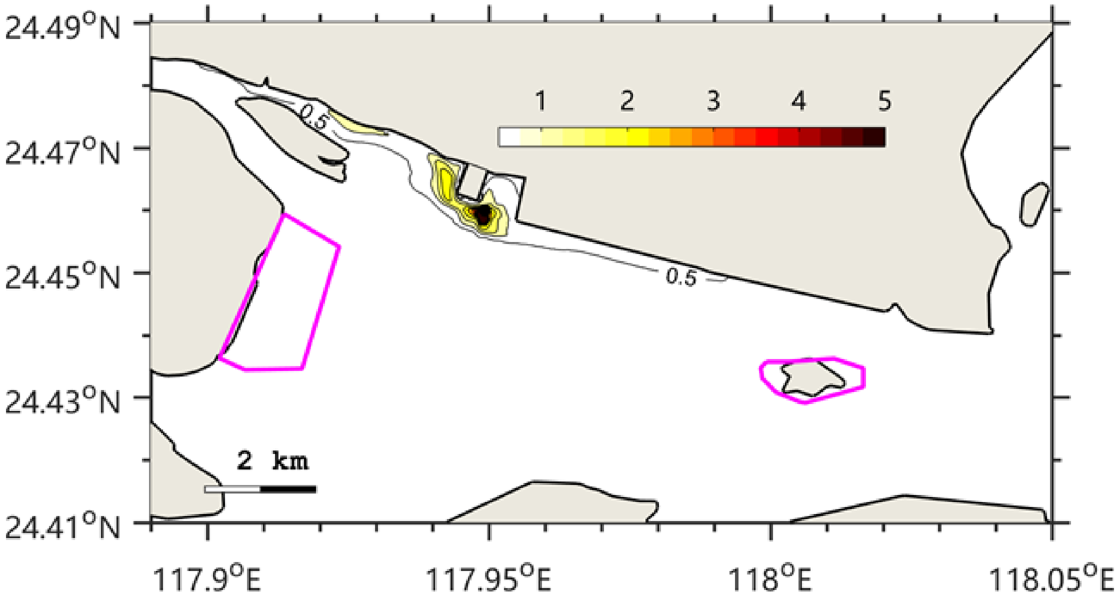


图 6.2-19 COD_{Mn} 小潮正常排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-19 Background + Incremental Concentration Envelope Diagram for COD_{Mn} under Neap Tide in Normal Emission Scenarios (in mg/L)

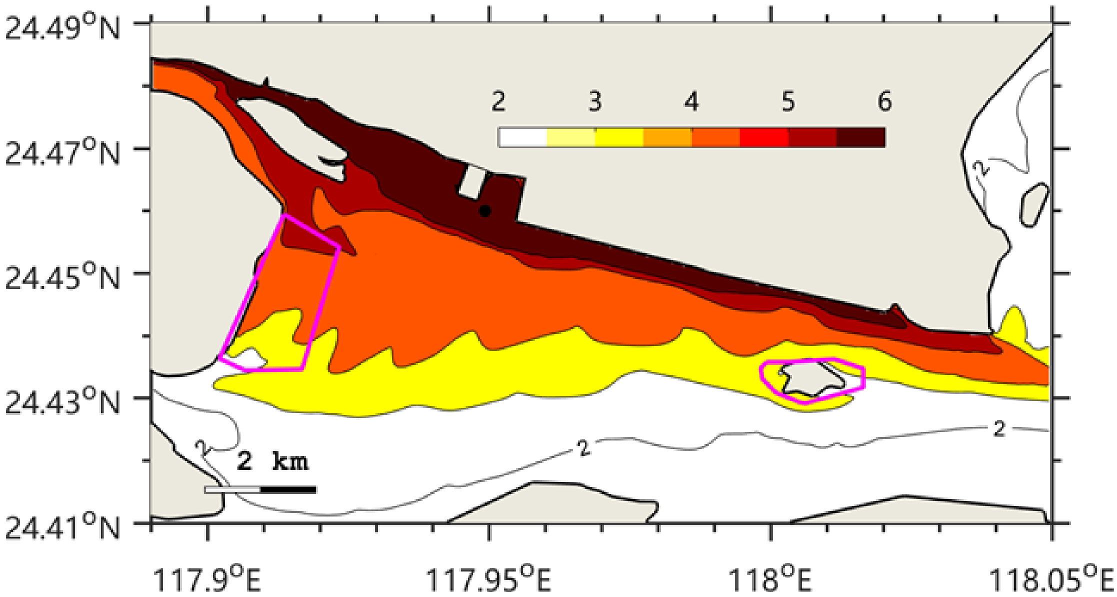


图 6.2-20 COD_{Mn} 大潮事故排放场景下本底+增量浓度包络图（单位：mg/L）

Figure 6.2-20 Background + Incremental Concentration Envelope Diagram for COD_{Mn} under Spring Tide in Accidental Emission Scenarios (in mg/L)

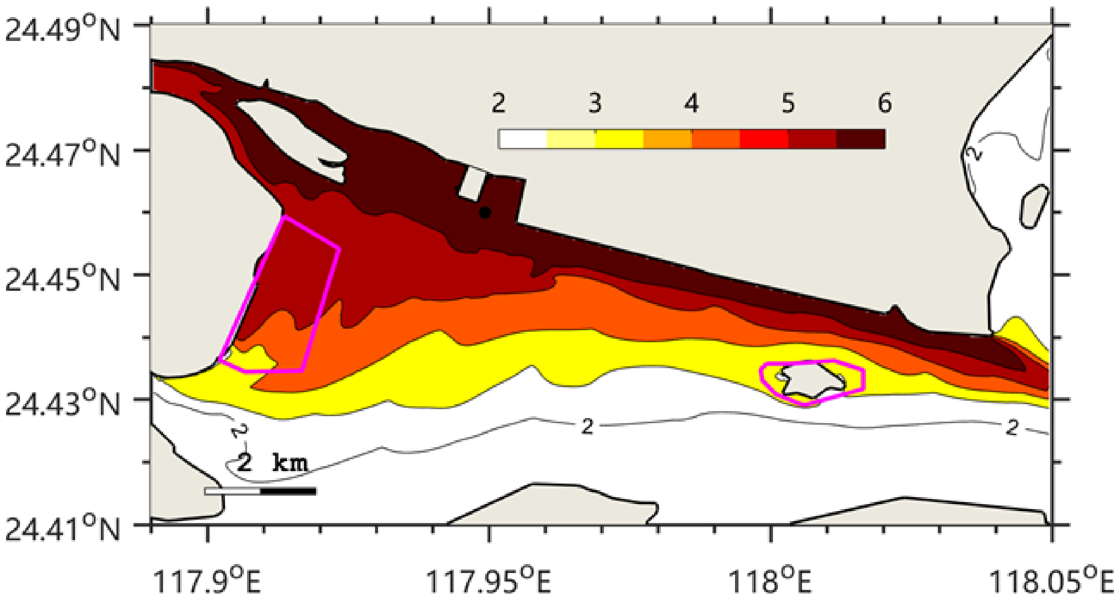


图 6.2-21 COD_{Mn} 小潮事故排放场景下本底+增量浓度包络图（单位：mg/L）

Figure 6.2-21 Background + Incremental Concentration Envelope Diagram for COD_{Mn} under Neap Tide in Accidental Emission Scenarios (in mg/L)

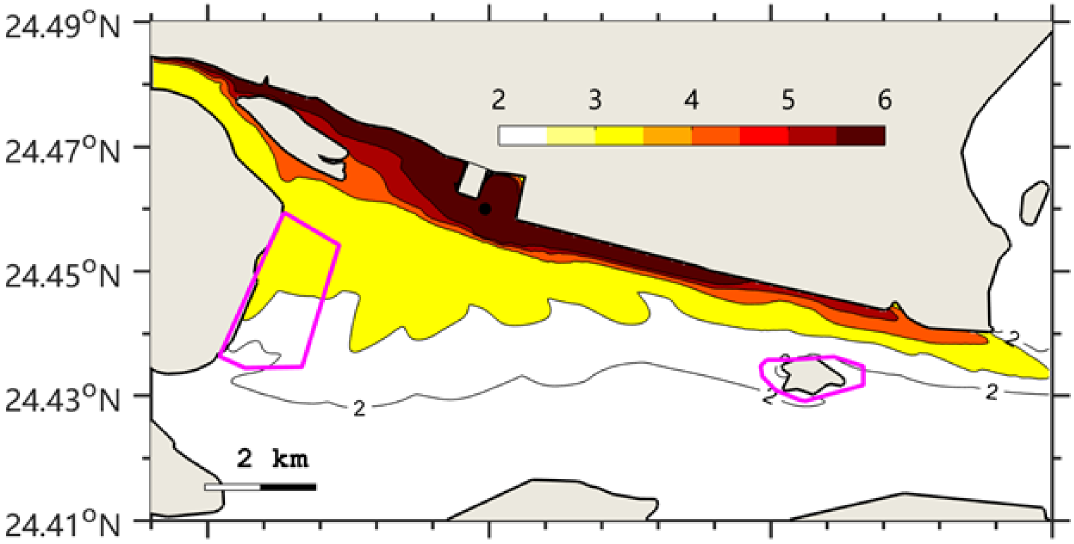


图 6.2-22 COD_{Mn} 大潮事故排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-22 Incremental Concentration Envelope Diagram for COD_{Mn} under Spring Tide in Accidental Emission Scenarios (in mg/L)

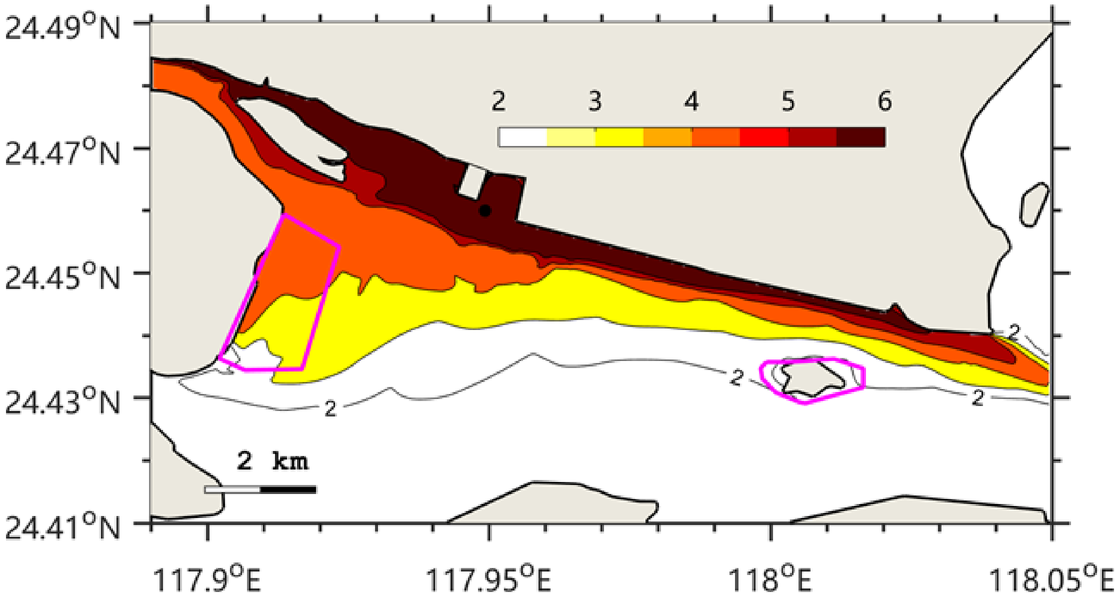


图 6.2-23 COD_{Mn} 小潮事故排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-23 Incremental Concentration Envelope Diagram for COD_{Mn} under Neap Tide in Accidental Emission Scenarios (in mg/L)

2、氨氮影响分析

2. Analysis for impacts of ammonia nitrogen

表 6.2-4 所示为氨氮在两个场景下浓度增量包络面积的统计值。查阅相关资料，在九龙江口海区均存在富营养化问题，无机氮浓度已超过海水水质标准的规定的 0.3 mg/L （二类水质），因此此处仅展示增量图，如图 6.2-24 至图 6.2-27

所示。排污的氨氮分布与 COD 呈现类似的规律，在正常排放和事故排放条件下，主要都贴岸分布。在正常排放条件下，0.1 mg/L 浓度增量的范围在大、小潮条件下分别为 2.61、3.74 km^2，最远约达排污口上下游的 2 km 远处。对敏感区域未造成显著影响。在事故排放条件下，0.1 mg/L 浓度增量范围大大增加，达 6.92 km^2（大潮）和 12.16 km^2（小潮），最远可达下游约 10 km 远。

Table 6.2-4 shows the statistical value of the concentration increment envelope area of ammonia nitrogen in two scenarios. According to relevant information, there is an eutrophication problem in the Jiujiang Estuary Sea area. The inorganic nitrogen concentration has exceeded the standard of 0.3 mg/L (the second type of water quality) specified by the seawater quality standard. Therefore, only the incremental map is shown here, as shown in Figure 6.2--24 to 6.2-27. The distribution of ammonia nitrogen emission is similar to that of COD. Under normal and accidental emission conditions, it is mainly distributed on the shore. In case of normal emission, the area of concentration increment of 0.1 mg/L is respectively 2.61 km^2 and 3.74 km2 under spring and neap tide conditions, as far as about 2 km upstream and downstream of the sewage drain outlet, with no significant impact on sensitive areas. In case of accidental emission, the area of concentration increment of 0.1 mg/L significantly increases to respectively 6.92 km^2 (spring neap) and 12.16 km2 (neap tide), as far as about 10 km downstream of the sewage drain outlet

表 6.2-4 氨氮浓度增量包络面积统计表

Table 6.2-4 Statistics of the Concentration Increment Envelope Area of Ammonia Nitrogen

浓度增量（mg/L）Concentration increment (mg/L)	正常排放（km^2）Normal emission (km^2)		事故排放（km^2）Accidental emission (km2)	
	大潮 Spring tide	小潮 Neap tide	大潮 Spring tide	小潮 Neap tide
0.40	0.08	0.25	0.41	0.97
0.35	0.10	0.36	0.55	1.42
0.30	0.15	0.48	0.76	1.92
0.25	0.23	0.63	1.23	2.79
0.20	0.45	1.06	2.45	3.63
0.15	0.86	2.03	3.57	5.17
0.10	2.61	3.74	6.92	12.16

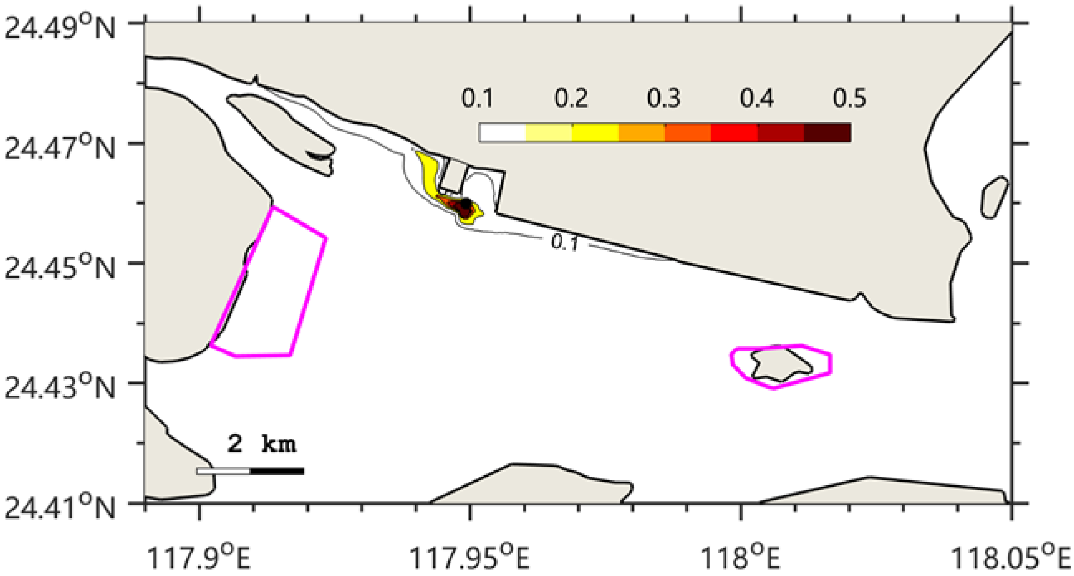


图 6.2-24 氨氮大潮正常排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-24 Background + Incremental Concentration Envelope Diagram for Ammonia Nitrogen under Spring Tide in Normal Emission Scenarios (in mg/L)

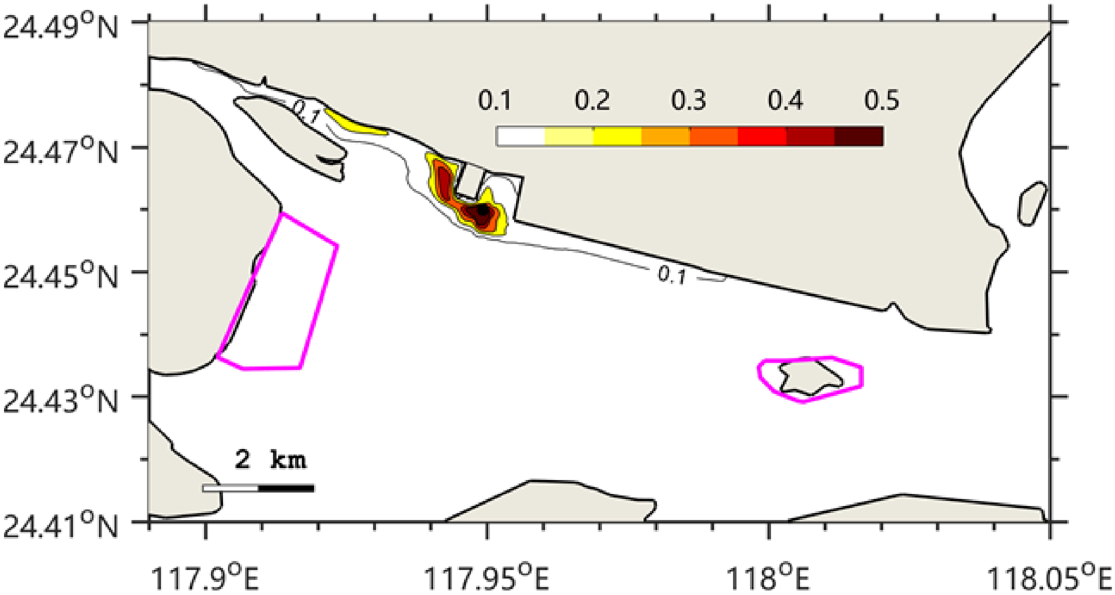


图 6.2-25 氨氮小潮正常排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-25 Background + Incremental Concentration Envelope Diagram for Ammonia Nitrogen under Neap Tide in Normal Emission Scenarios (in mg/L)

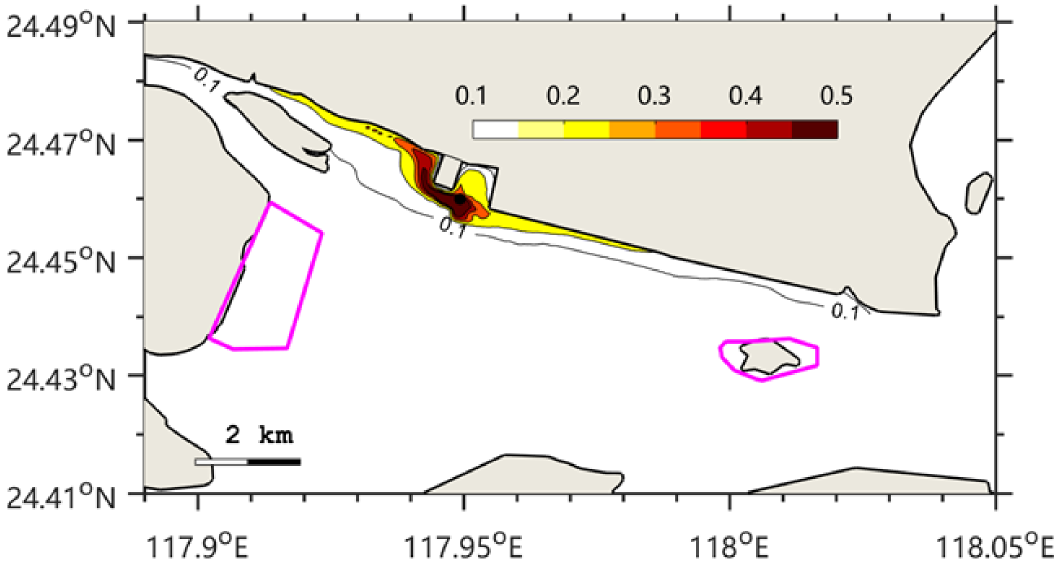


图 6.2-26 氨氮大潮事故排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-26 Background + Incremental Concentration Envelope Diagram for Ammonia Nitrogen under Spring Tide in Accidental Emission Scenarios (in mg/L)

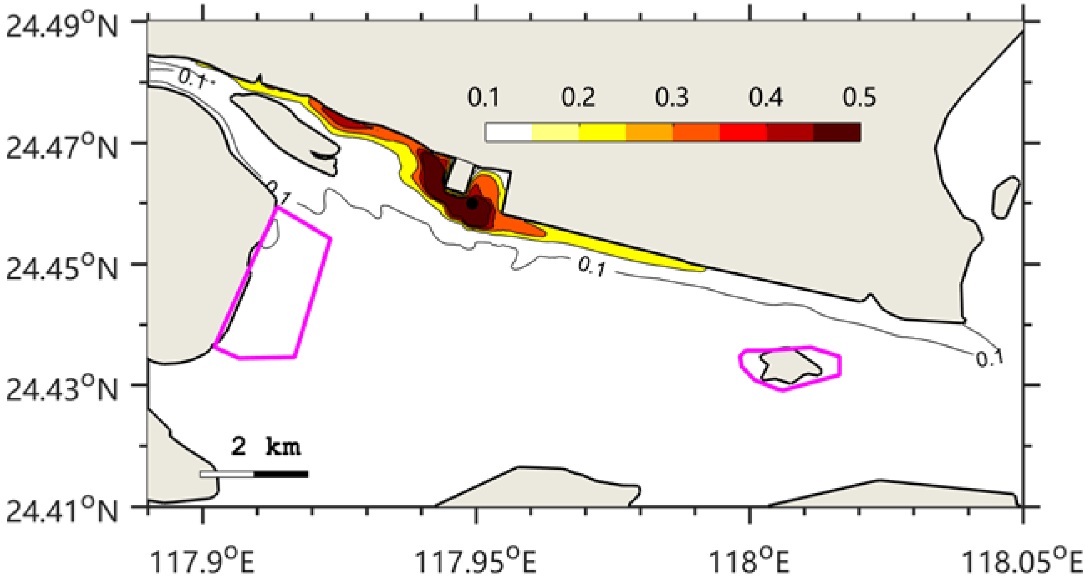


图 6.2-27 氨氮小潮事故排放场景下增量浓度包络图（单位：mg/L）

Figure 6.2-27 Background + Incremental Concentration Envelope Diagram for Ammonia Nitrogen under Neap Tide in Accidental Emission Scenarios (in mg/L)

3、小结

3 Summary

从以上预测分析可以看出，在正常排污的条件下，排污口主要影响附近贴岸的水体，而对九龙江口中心河道区域影响较小，对周边敏感区域的影响也有限，其中在小潮期间的影响略大于大潮期间。值得一提的是，由于海沧港区的泊位工

程对航道的疏浚作业，使得排污口附近海域的水动力条件得到改善，污染物分布扩散范围相对减小。可以预期，随着航道的进一步疏浚，拟建项目排污的影响范围，特别是对角美#1~2 泊位以西的九龙江北港的影响将更加减小。而在事故排放条件下，排污对于周边海域的影响范围和程度都急剧加大。对于拟建项目，生产线等生产运行系统若发生泄漏事故，一般都将该异常废水排至厂内事故池，事故经处理后，该废水逐步调节回抽到污水处理站处理达标后排放。总体而言，在保证安全生产、不发生排污事故的情况下，拟建项目的排污对附近海域环境影响较小。

It can be seen from the above prediction and analysis that under the condition of normal sewage discharge, the sewage outlet mainly affects the nearby water body, but has little influence on the central river channel area of Jiulong River Estuary and has limited impact on the surrounding sensitive areas with the impact during neap tide slightly greater than that during spring tide It is worth mentioning that due to the dredging operation of the berth project in Haicang Port Area, the hydrodynamic conditions in the sea near the sewage outlet are improved, and the distribution of pollutants is relatively reduced. It can be expected that with the further dredging of the navigation channel, the impact of the proposed project's sewage discharge, especially the impact on the North Port of Jiulong River to the west of the Jiaomei #1~2 berth will be further reduced. In case of accidental emission, both range and extent of pollutant emission’s impact on surrounding sea areas will dramatically increase. For the proposed project, if there is a leakage accident in the production and operation system of the production line, the abnormal wastewater is generally discharged to the accident pool in the plant. After the accident is treated, the wastewater is gradually adjusted back to the sewage treatment station for treatment and discharged. In general, in the case of ensuring safe production and no discharge accidents, the pollutant discharge of the proposed project will have less impact on the surrounding sea environment.

6.2.4 环境影响分析

6.2.4 Environmental Impact Analysis

通过参考《联盛纸业（龙海）有限公司年产 200 万吨高档包装板纸工程环境影响报告书》（批复文件为漳环审[2010]25 号）海域环境影响评价结论可知：

By referencing conclusions to sea area environmental impact in*Official Reply on EIA Report for High-grade Cardboard Paper Project of Liansheng Paper Industry (Longhai) Co., Ltd with Annual Production of 2 mtpa* (ZHS [2010] No. 25), it can be seen that:

角美排污预留区现有论证排污规模为 25 万 m^3/d，漳州市海洋功能区划已经在白礁港口区预设了“白礁排污预留区”，具体坐标是：117.936 °E，24.463 °N。因此本项目污水处理达到《制浆造纸工业水污染物排放标准（GB3544-2008）》后，用专用管道接入漳州台商投资区污水处理厂的尾水排海管道内，最后统一在角美排污预留区进行深海排放，在水量和水质上均是可行的。

The existing scale of sewage disposal in the Jiaomei sewage reserve area is 250,000 m3/d. The marine functional zoning of Ganzhou City has already preset the “White Reef Sewage Reserve Area” in the Baijiao Port Area, of which specific coordinates are: 117.936 °E, 24.463. Therefore, after the sewage treatment of this project is up to the *Emission Standards for Water Pollutants in the Pulp and Paper Industry* (GB3544-2008), the special pipeline is used to access the tailwater discharge pipeline of the Jiaomei Wastewater Treatment Plant, and finally unified in the Jiaomei sewage discharge. Deep sea discharge in the remaining areas is also feasible in terms of water volume and water quality.

排海管建成后拟收纳角美城市污水处理厂 4.8 万 t/d 的排水、本厂现有工程 4.423 万 t/d 的排水、龙池污水处理厂 1 万 t/d 的排水、其他排污单位 2 万 t/d 的排水，剩余接纳能力为 12.777 万 t/d。

Upon completion of the sea-going pipeline, it is planned to accommodate 48,000 t/d of drainage from Jiaomei City Wastewater Treatment Plant, 44.23 million t/d of existing works of the plant, 10,000 t/d of drainage from Longchi Wastewater

Treatment Plant, and other sewage disposal units. 20,000 t/d of drainage, the remaining acceptance capacity is 127,770 t/d

根据以上评价结论，拟建项目废水排放量为 12614m^3/d，约占接纳能力 12.777 万 t/d 的 9.87%，远低于排污预留区的排污规模的剩余接纳能力，即拟建项目建成后废水全部排入角美排污预留区是可行的，对整体海域环境影响不大。

According to the above evaluation conclusions, the wastewater discharge of the proposed project is 12,614 m3/d, which accounts for 9.87% of the acceptance capacity of 127,770 t/d, which is far lower than the remaining acceptance capacity of the sewage discharge area, that is, after the proposed project is completed. It is feasible to discharge all the wastewater into the corner-sewage reserve area, and it has little impact on the overall sea area environment.

综上，拟建项目建成后废水与现有工程废水混合，经厂区污水处理站处理达标后，用专用管道接入角美污水处理厂的尾水排海管道内，最后统一在角美排污预留区进行深海排放，在水量和水质上也均是可行的。台商投资区管委会完成深海排放专用管道的建设并投入使用后，拟建项目建成后产生的废水将统一进入漳州台商投资区污水处理厂的尾水排海管道内深海排放。

To sum up, upon completion of the proposed project, the wastewater is mixed with the existing engineering wastewater. After the treatment at the plant sewage treatment station reaches the standard, the special pipeline is used to access the tailwater discharge pipeline of the Jiaomei Wastewater Treatment Plant, and finally unified in the Jiaomei sewage discharge. Deep sea discharge in the remaining areas is also feasible in terms of water volume and water quality. After the Zhangzhou Taiwanese Investment Zone Management Committee completes the construction of the deep-sea discharge special pipeline and puts it into use, the wastewater generated after the completion of the proposed project will be uniformly discharged into the deep-sea discharge of the tailwater discharge pipeline of the sewage treatment plant of the Taizhou Investment Zone in Zhangzhou.

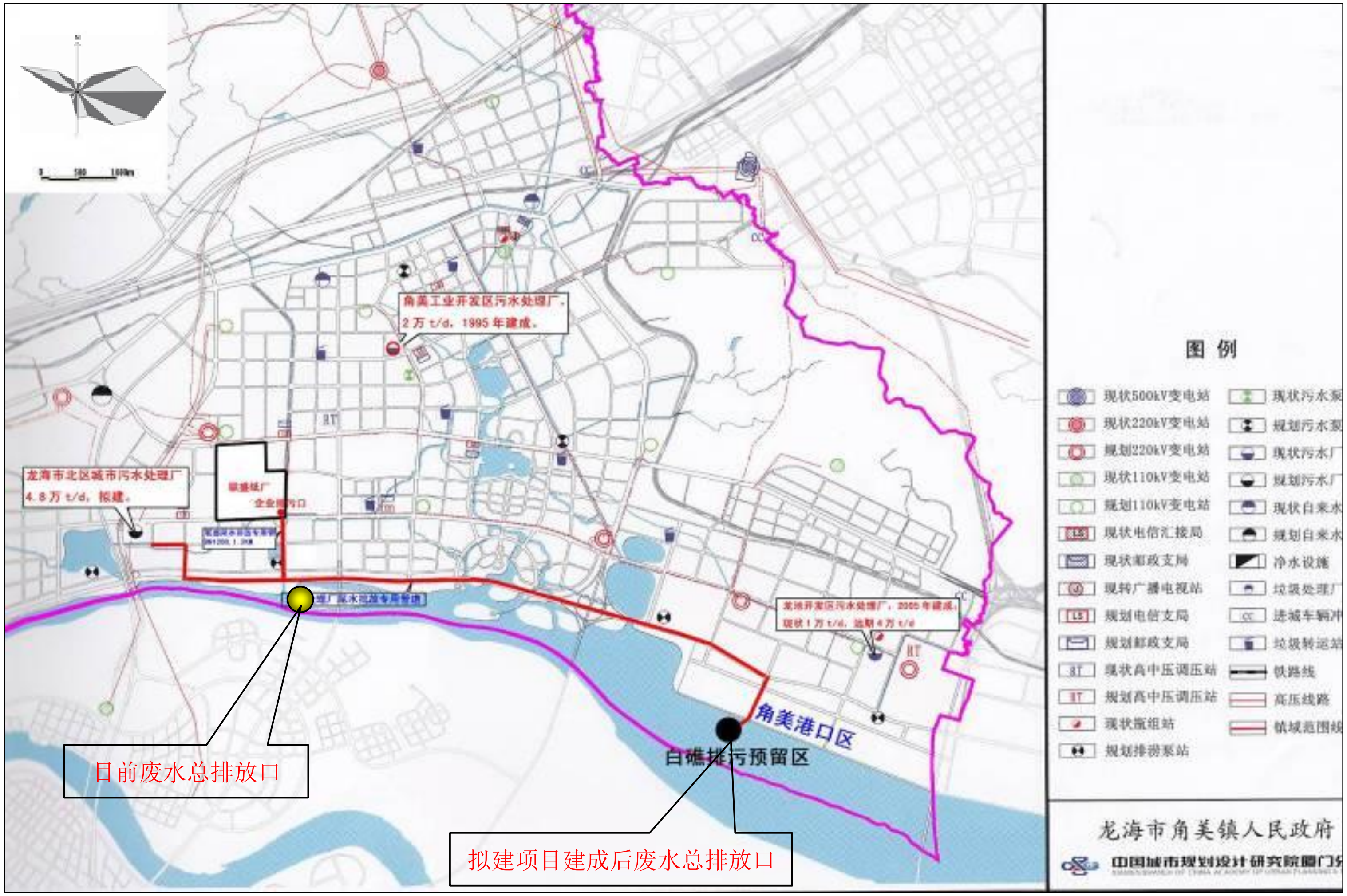
对于拟建项目，生产线等生产运行系统若发生泄漏事故，一般都将该异常废水排至厂内事故池，事故经处理后，该废水逐步调节回抽到污水处理站处理达标

后排放。

For the proposed project, if there is a leakage accident in the production and operation system of the production line, the abnormal wastewater is generally discharged to the accident pool in the factory. After the accident is treated, the wastewater is gradually adjusted back to the sewage treatment station for treatment and discharged.

目前，污水事故池的容积为 12000m^3，拟建项目建成后，至少还可以容纳 4.8h 事故水量，若 4.8h 内污水处理站事故未能排除，应立即停止生产，待污水处理设施修理完毕且将事故池中的废水处理完毕后方可开机。

At present, the volume of the sewage emergency basin is 12000m3. Upon completion of the proposed project, it can accommodate at least 4.8h of water in accident. If the accident at the sewage treatment station cannot be eliminated within 4.8h, the production shall be suspended immediately, and the basin shall not be put back into service until sewage treatment facilities have been repaired and wastewater therein has been completely treated.


角美工业开发区污水处理厂，
2 万 t/d，1995 年建成。
龙海市北区城市污水处理厂
4.8 万 t/d，拟建。
角美港口区
白礁排污预留区
目前废水总排放口
拟建项目建成后废水总排放口
图 例
现状500kV变电站
现状220kV变电站
规划220kV变电站
现状110kV变电站
规划110kV变电站
现状电信汇接局
现状邮政支局
规划电信支局
规划邮政支局
现状高中压调压站
规划高中压调压站
规划排涝泵站
现状污水泵
规划污水泵
现状污水厂
规划污水厂
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净水设施
铁路线
高压线路
龙海市角美镇人民政府

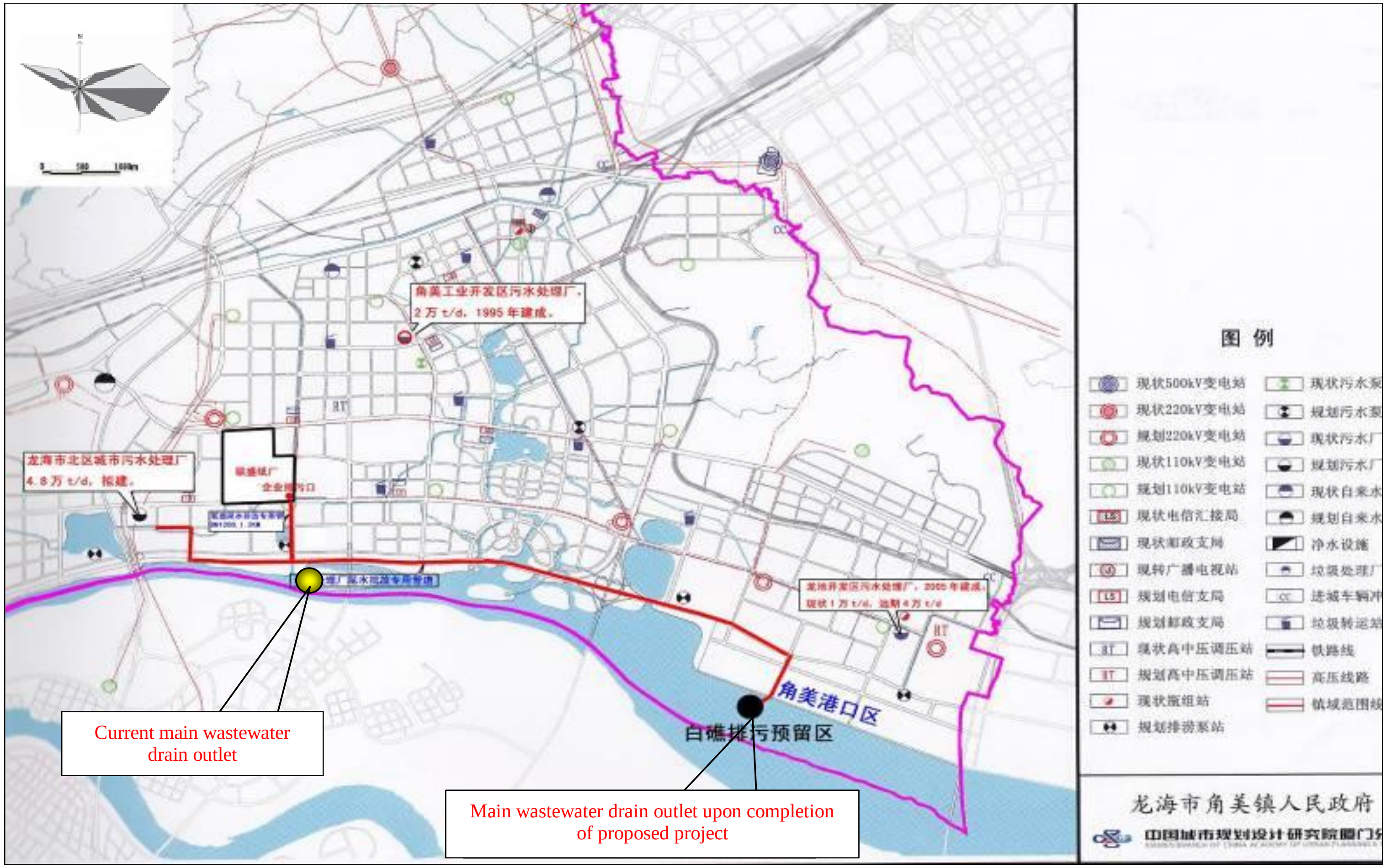


图 6.2-28 项目废水排放走向示意图

Figure 6.2-28 Destination Schematics of Wastewater Discharged from the Project

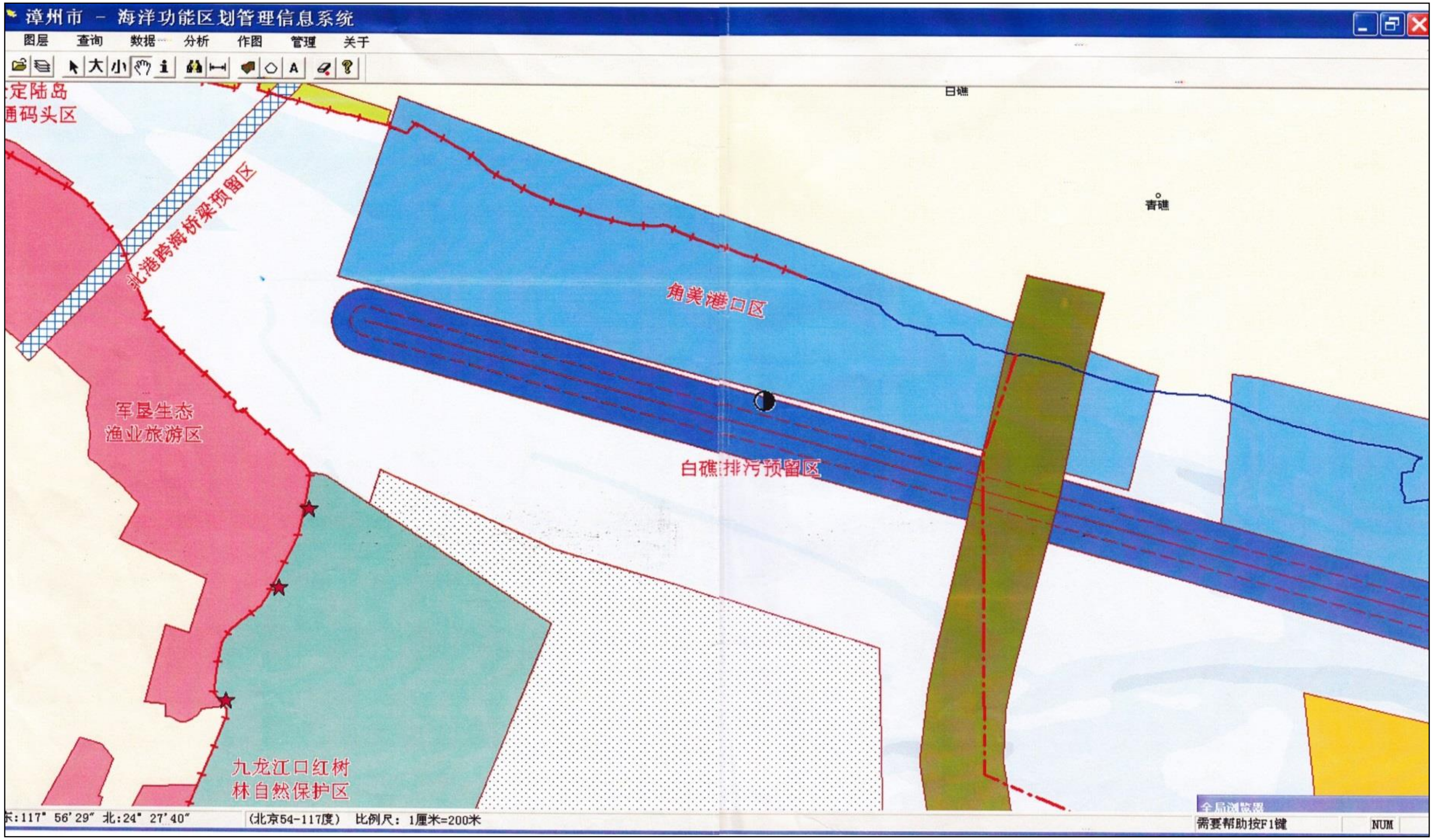


图 6.2-29 白礁排污预留区示意图

Figure 6.2-29 Schematics of White Reef Sewage Reserve Area

6.3 地下水环境影响分析

6.3 Analysis for Underground Water Environmental Impact

6.3.1 影响途径

6.3.1 Means of Impact

（1）正常状况

(1) Normal condition

正常状况下，各生产环节按照设计参数运行，地下水可能的污染来源为各管线、水池等跑冒滴漏。

Under normal condition, various production links are operating as per design parameters so that possible pollution sources of underground water will be evaporating, emitting, dripping or leaking of various pipelines and water basins.

本项目已经根据相关防渗设计规范采取严格的防渗、防溢流、防泄漏、防腐蚀等措施，一般情况下污水不会渗漏和进入地下，对地下水不会造成污染。

The project has adopted strict anti-seepage, anti-overflow, anti-leakage and anti-corrosion measures according to the relevant anti-seepage design specifications. Under normal circumstances, the sewage will not leak and enter the underground, and will not cause pollution to groundwater.

（2）非正常状况

(2) Abnormal condition

非正常状况是指：建设项目的工艺设备或地下水环境保护措施因系统老化、腐蚀等原因不能正常运行或保护效果达不到设计要求时的运行状况。

The abnormal condition refers to the operation condition of the construction equipment or the groundwater environmental protection measures that cannot be operated normally due to aging, corrosion, etc., or the protection effect does not meet the design requirements.

本项目潜在地下水污染源为污水处理厂。

In this project, potential pollution source of underground water will be sewage treatment plant.

本次评价考虑污水处理厂 COD 对地下水环境的影响。

As such, impact of COD from the sewage treatment plant on underground water environment is taken into account in this assessment.

6.3.2 情景设置

6.3.2 Setting of Scenarios

根据项目特点，结合工程分析的相关资料，选取污水处理厂在非正常状况下特征污染物渗漏量较大的场景进行预测评价，有代表性的场景如下：

Depending upon the characteristics of the project, based on relevant data of engineering analysis, the scenarios of the sewage treatment plant with large leakage of characteristic pollutants under abnormal conditions are selected for prediction and assessment. The representative scenarios are as follows:

非正常状况下，污水处理厂泄漏，同时防渗层腐蚀，对地下水造成影响；

Under abnormal conditions, the sewage treatment plant leaks, and at the same time, the anti-seepage layer corrodes and affects the groundwater.

污水处理设施池浸润面积为 $1000m^2$，根据《给水排水构筑物工程施工及验收规范》（GB 50141-2008），钢筋混凝土结构水池渗水量不的得超过 2L/（m^2d），非正常状况按照正常状况的 10 倍考虑，则非正常状况下，污水处理单元渗水量=10*单位面积单位时间最大渗水量*浸润面积=10×2L/（m^2d）×$1000m^2$=$20m^3$，此状况发生 30 天后被发现。

The infiltration area of the sewage treatment facility pool is 1000m2. According to the “Code for Construction and Acceptance of Water Supply and Drainage Structures” (GB 50141-2008), the water seepage of the reinforced concrete structure pool does not exceed 2L/(m2d), and the abnormal conditions are in accordance with normal conditions. 10 times consideration, under abnormal conditions, the sewage treatment unit seepage volume = 10 * unit area per unit time maximum water seepage * infiltration area = 10 × 2L / (m2d) × 1000m2 = 20m3, this situation was discovered after 30 days

该情景下主要污染物为 COD（浓度为 2700mg/L，本次评价考虑最大部里条

件，高锰酸盐指数数值上与 COD 相等）。

The main pollutant in this scenario is COD (concentration is 2700mg / L, this evaluation considers the maximum part of the conditions, the permanganate index value is equal to COD)

6.3.3 预测模型

6.3.3 Prediction Model

本次预测选取 USGS（美国地质调查局）相关模型（Eliezer J.Wexler，1992，Analytical solutions for one-，two-，and three-dimensional solute transport in groundwater systems with uniform flow，p.8）。

Relevant model of USGS (United States Geological Survey) is selected for this prediction (Eliezer J.Wexler, 1992, Analytical solutions for one-, two-, and three-dimensional solute transport in groundwater systems with uniform flow, p.8）

$$C(x,t)=\begin{cases} \frac{Co}{2}\left\{erfc\left[\frac{x-ut}{2\sqrt{D_L t}}\right]+e^{\frac{ux}{D_L}}erfc(\left[\frac{x+ut}{2\sqrt{D_L t}}\right]\right\} & t\le T1 \\ \frac{Co}{2}\left\{erfc\left[\frac{x-ut}{2\sqrt{D_L t}}\right]+e^{\frac{ux}{D_L}}erfc(\left[\frac{x+ut}{2\sqrt{D_L t}}\right]\right\} & \\ +\frac{(C1-Co)}{2}\left\{erfc\left[\frac{x-u(t-T1)}{2\sqrt{D_L(t-T1)}}\right]+e^{\frac{ux}{D_L}}erfc\left[\frac{x+u(t-T1)}{2\sqrt{D_L(t-T1)}}\right]\right\} & t>T1 \end{cases}$$

参数含义详见表 6.3-1。

Definitions of parameters are detailed in Table 6.3-1.

表 6.3-1 模型参数含义表

Table 6.3-1 Definitions of Parameters of the Model

序号 Seq no.	参数 Parameters	含义 Definition	单位 Unit
1	x	距渗漏点的距离 Distance from leak point	m
2	t	时间 Time	d
3	C	t时刻x处的特征因子浓度 Characteristic factor concentration in x at t	mg/L

4	Co	特征因子初始浓度 Initial concentration of characteristic factor	mg/L
5	u	水流速度 Water flow velocity	m/d
6	DL	纵向弥散系数 Longitudinal diffusion coefficient	m^2/d
7	erfc（）	余误差函数 Complementary error function	
8	T1	物料持续渗漏时间（或渗漏浓度变化的时间节点） Material continuous leakage time (or time node of leakage concentration change)	d
9	C1	t＞T1之后，物料渗漏停止，因此，C1=0 After t>T1, material leakage ceases and therefore C1=0	

该模型是根据《环境影响评价技术导则 地下水环境》（HJ610-2016）附录D中D2公式的变形，该公式在满足一维半无限长多孔介质柱体，一端为定浓度边界条件，同时利用分步参数模式的方式模拟出持续泄漏和泄漏停止两种情况溶质运移的情况。

The model is a variant of the D2 formula in Appendix D of the Technical Guidelines for Environmental Impact Assessment Underground Water Environment (HJ610-2016). The formula satisfies the one-dimensional semi-infinitely long porous media cylinder, and one end is a constant concentration boundary condition. At the same time, the stepwise parameter mode is used to simulate the solute transport in the case of continuous leakage and cease of leakage.

模型应用条件：

Application conditions for the model:

介质：均质，各向同性，一半无限长多孔介质，柱体（溶质没有迁移到柱体的端口）。

Medium: homogeneous, isotropic, half infinitely long porous medium, cylinder (the solute has yet to transport to the port of the column)

流场：沿柱体均匀等速一维流，实际流速为常数。

Flow field: one-dimensional flow with uniform constant velocity along the cylinder, of which the actual velocity is constant.

初始状态：无目标污染物浓度。

Initial condition: no target pollutant concentration.

边界条件：在柱体的左侧注入溶质，注入溶质为定浓度（第一类边界条件），当 t＜T1 时注入过程为持续注入，当 t≥T1 时无注入过程。

Boundary conditions: the solute is injected into the left side of the cylinder with a constant concentration (the first type of boundary condition). When t<T1, the injection process is continuous; when t≥T1, there is no injection process.

迁移条件：溶质沿柱体一维迁移。

Transport condition: the solute transports along the cylinder in one-dimensional manner.

（1）预测参数的选取

(1) Selection of prediction parameters

根据项目所在区域地质与水文地质条件，预测参数如下：

Depending upon the geological and hydrogeological conditions of the project area, the prediction parameters are as follows:

1）水平渗透系数 K。

1) Horizontal permeability coefficient K.

K 水平渗透系数取经验值为 5×10^{-4}cm/s，即 0.432m/d；

K horizontal permeability coefficient is taken as the empirical value of 5×10^{-4} cm/s, which is 0.432 m/d;

2）项目所在区域水力坡度

3) Hydraulic gradient in the project area

水力坡度 I 为 0.614%，根据最高水位钻孔 zk30 水位高程为 14.02m，最低水位高程钻孔 zk55 水位高程为 12.67m，两个钻孔直线距离 220m；

The hydraulic gradient I is 0.614%. Water level elevation of the highest and lowest water level drill hole zk30 and zk55 is 14.02m and 12.67m respectively, between which the linaer distance is 220m.

3）有效孔隙度

3) Effective porosity

有效孔隙度 n_e 取经验参数为 0.465；

Effective porosity n_e is taken as the empirical parameter of 0.465;

4）弥散度 αL=10；

4) Dispersion αL=10;

纵向弥散度 αL 可以由确定。下图 6.3-1 为根据世界范围内所收集到的百余个水质模型中所计算出的孔隙介质的纵向弥散度 αL 及有关资料与参数作出的 lgαL—lgLs。基准尺度 Ls 是指研究区大小的度量，一般用溶质运移到观测孔的最大距离表示。本项目从保守角度考虑 Ls 选 1000m，则弥散度 αL=10。

The longitudinal dispersion αL can be determined by. Figure 6.3-1 below shows lgαL—lgLs based on the longitudinal dispersion αL of the porous medium and related data and parameters calculated from more than 100 water quality models collected worldwide. The reference scale Ls refers to the measure of the size of the study area, generally expressed as the maximum distance of solute transport up to the observation hole. If Ls is selected as 1000m from a conservative perspective in this project, then the dispersion degree αL=10.

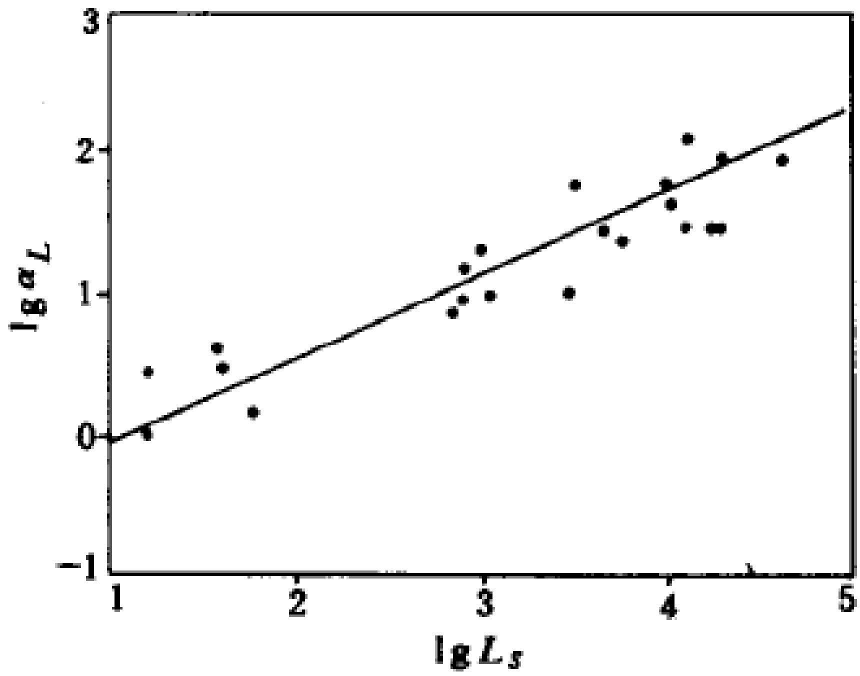


图 6.3-1 孔隙介质数值模型的 lgαL—lgLs 关系

Figure 6.3-1 lgαL—lgLs Relation of the Numerical Model of Porous Medium

（2）预测结果与评价

(2) Prediction results and assessment

污水处理厂下游 1 米处，各污染物浓度与非正常状况发生后时间的情况进行预测，在采用上述预测模型及参数情况下，预测结果详见表 6.3-2。

At the 1 m downstream of the sewage treatment plant, the concentration of each pollutant and the duration upon the occurrence of abnormal conditions are predicted. Under the above prediction model and parameters, the prediction results are shown in Table 6.3-2.

表 6.3-2 下游 1 米处污染物浓度变化情况

Table 6.3-2 Change Conditions of Pollutant Concentration at 1m Downstream

非正常状况发生后 Durations upon the occurrence of abnormal conditions 时间（d） (d)	高锰酸盐指数（mg/L） Permanganate index (mg/L)	非正常状况发生后时间（d） Durations upon the occurrence of abnormal conditions (d)	高锰酸盐指数（mg/L） Permanganate index (mg/L)
10	990.33	610	6.32
110	103.87	710	4.94
210	35.25	810	3.98
310	18.78	910	3.29
410	11.99	1010	2.77
510	8.44		

由预测结果可知，当泄漏状况发生时，第 1010 天时，泄漏点下游 1 米范围内出现地下水高锰酸盐指数不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求的情况。

According to the prediction results, when the leakage condition occurs, on the 10th day, the groundwater permanganate index within 1 m downstream of the leakage point cannot meet the requirements of Grade III water quality standards in the *Groundwater Quality Standard* (GB/T14848-2017).

经预测，污水处理厂下游厂界处（200 米处），非正常状况发生后，不会出现各类污染物不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求的情况。

It is predicted that at the (200 meters) downstream battery limit of the sewage treatment plant, the condition where various pollutants cannot meet the requirements of Grade III water quality standards in the Groundwater Quality Standard (GB/T14848-2017) will not be available upon the occurrence of abnormal conditions.

根据导则要求，需要对非正常状况发生后 100d、1000d 进行预测，非正常状况发生后 100d 预测结果详见下表 6.3-3。

In accordance the requirements of the guidelines, it is necessary to predict the conditions 100d and 1000d upon the occurrence of abnormal conditions. The predicted results 100d upon the occurrence of abnormal conditions are shown in Table 6.3-3 below.

表 6.3-3 非正常状况发生后 100d 污染物浓度变化情况

Table 6.3-3 Change Conditions of Pollutant Concentration 100 d upon the occurrence of Abnormal Conditions

地下水流向下游距离（m） Distance of underground water flow towards downstream (m)	高锰酸盐指数（mg/L） Permanganate index (mg/L)	地下水流向下游距离（m） Distance of underground water flow towards downstream (m)	高锰酸盐指数（mg/L） Permanganate index (mg/L)
1	122.68	7	94.53
2	220.11	8	52.59
3	266.61	9	26.18
4	258.64	10	11.73
5	212.18	11	4.75
6	150.98	12	1.75

非正常状况发生后 100d，下游 11m 范围内，地下水高锰酸盐指数不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求。

In 100d upon the occurrence of abnormal conditions, the groundwater permanganate index within 11 m downstream of the leakage point cannot meet the requirements of Grade III water quality standards in the *Groundwater Quality Standard* (GB/T14848-2017).

非正常状况发生后 1000d 预测结果详见下表 6.3-4。

The predicted results 1000d upon the occurrence of abnormal conditions are shown in Table 6.3-4 below.

表 6.3-4 非正常状况发生后 1000d 污染物浓度变化情况

Table 6.3-4 Change Conditions of Pollutant Concentration 1000 d upon the occurrence of Abnormal Conditions

地下水流向下游距离（m） Distance of underground water flow towards downstream (m)	高锰酸盐指数（mg/L） Permanganate index (mg/L)	地下水流向下游距离（m） Distance of underground water flow towards downstream (m)	高锰酸盐指数（mg/L） Permanganate index (mg/L)
5	15.45	25	14.54
10	28.42	30	6.59
15	31.38	35	2.33
20	24.66	40	0.64

非正常状况发生后 1000d，下游 40m 范围内，地下水高锰酸盐指数不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求。

In 1000d upon the occurrence of abnormal conditions, the groundwater permanganate index within 40m downstream of the leakage point cannot meet the requirements of Grade III water quality standards in the *Groundwater Quality Standard* (GB/T14848-2017).

由上述预测结果可知，项目正常状况下，采取了严格的防渗措施，不会对地下水环境造成影响；非正常状况下，在小范围内会出现高锰酸盐指数超标的情况，但超标范围未超出厂界。故此，本项目的建设从地下水环境影响的角度可以接受。

As revealed by the above prediction results, under normal conditions, strict anti-seepage measures will be adopted in the project, which will not affect the groundwater environment; under abnormal conditions, the permanganate index may exceed the standard within a limited area which is not beyond battery limit of the plant. In view of this, the construction of this project is acceptable from the perspective of groundwater environmental impact.

6.4 声环境影响预测分析

6.4 Acoustic Environmental Impact Prediction and Analysis

6.4.1 噪声源强

6.4.1 Noise source intensity

拟建项目噪声源强详见表 3.6-3。

The noise source intensity of the proposed project is detailed in Table 3.6-3.

6.4.2 预测点位

6.4.2 Prediction points location

预测点为项目各厂界及评价范围内的敏感点。

Predication points are the sensitive points within battery limits and scope of assessment.

6.4.3 预测模式与结果分析

6.4.3 Prediction Mode and Results Analysis

噪声在传播过程中受到多种因素的干扰，使其产生衰减，根据建设项目噪声源和环境特征，预测过程中对于屏障衰减只考虑厂房等维护结构造成的传声损失，对空气吸收和其它附加衰减忽略不计。预测模型采用点声源处于半自由空间的几何发散模型。

The noise is interfered by various factors during the propagation process, causing it to attenuate. Depending upon the noise source and environmental characteristics of the construction project, the sound attenuation caused by the maintenance structure of the plant is considered for the barrier attenuation during the prediction process, and the air absorption and other additional attenuation are neglected. The prediction model is a geometric divergence model in which the point source is in a semi-free space.

（1）计算出某个室内靠近维护结构处的倍频带声压级：

(1) The octave band sound pressure level at a certain indoor close to the maintenance structure is calculated:

式中：$L_{oct,1}$ 为某个室内声源在靠近维护结构处产生的倍频带声压级；

Where, $L_{oct,1}$ is the octave band sound pressure level generated by an indoor sound source near the maintenance structure;

L_{woct} 为某个声源的倍频带声功率级；

L_{woct} is the octave band sound power level of a sound source;

r_1 为室内某个声源与靠近维护结构处的距离；

r_1 is the distance between a sound source in the room and the maintenance structure;

R 为房间常数；

R is the room constant;

Q 为方向因子。

Q is the direction factor.

（2）计算出所有室内声源在靠近维护结构处产生的总倍频带声压级

(2) The total octave band sound pressure level generated by all indoor sound sources near the maintenance structure is calculated

（3）房屋隔声量的计算

(3) Calculation of the sound insulation of a room

本工程中的噪声源布置在室内。分布于生产环节中的不同车间，各生产车间的建筑结构基本一样，考虑车间的墙体均为 240mm 单砖墙，其透声系数为 10^{-5}，墙体上所开的门为一般单层门，其透声系数取值为 10^{-2}，所开的窗为密封较好的单层玻璃窗，其透声系数取值为 10^{-3}。考虑墙体大小不同则所设门窗的数量也相应增减，取门窗面积占墙体面积的约 10%来计算，则隔声量可通过求取平均透声系数与平均隔声量得到：

Noise sources are arranged indoors in this project. The construction structure of each production workshop is basically the same in different workshops distributed accross the production process. Considering that the wall of the workshop is 240mm single brick wall, the sound transmission coefficient is 10-5, the door opened on the wall is a general single-layer door, the sound transmission coefficient is 10-2, and the opened window is A well-sealed single-layer glazing has a sound transmission coefficient of 10-3. Considering the number of doors and windows increase or decrease accordingly with change of wall sizes, the area of the door and window is calculated as about 10% of the wall area. The sound insulation can be obtained by obtaining the average sound transmission coefficient and the average sound insulation amount:

式中：—组合墙的平均透声系数；

Where, - average acoustical transmission coefficient of composite wall;

τ_i—第 i 种隔声材料的透声系数；

τ_i - acoustical transmission coefficient of the ith sound insulation material

S_i—第 i 种隔声材料所占据的面积；

S_i - area occupied by the ith type of sound insulation material

S—组合墙总面积；

S - the total area of the combined wall;

—组合墙的平均隔声量，dB。

- The average sound insulation of the composite wall, dB.

计算结果：$_{车间}$＝10.7dB≈11dB，$_{工棚}$＝5dB。

Calculation results: $_{workshop\ 车}$＝10.7dB≈11dB, $_{workshed}$＝5dB.

（4）噪声衰减量的计算

(4) Calculation of noise attenuation

根据建设项目地形条件分析，噪声在传播过程中的衰减量计算方法主要考虑扩散衰减、大气吸收衰减、各屏障引起的衰减及地面效应引起的额外衰减等因素。

According to the topographic condition analysis of the construction project, the calculation method of the attenuation of noise in the propagation process mainly considers the factors such as diffusion attenuation, atmospheric absorption attenuation, attenuation caused by each barrier and additional attenuation caused by ground effect, etc.

其中，扩散衰减量是的主要部分，可按下式计算：

Among them, the amount of diffusion attenuation is the main part, which can be calculated as follows:

$$\triangle Lp_1=20Lgd_2/d_1(dB)$$

式中：d_1—声源参考距离，m；

Where, D1 - the sound source reference distance, m;

d_2—预测点与声源之间的距离，m。

D2 - the distance between the predicted point and the sound source, m.

为大气吸收衰减量：

is atmospheric absorption attenuation:

$$\triangle Lp_2=m\ d/100$$

式中：d—声源到受声点距离，m；

Where, d - the distance from the sound source to the sound receiving point, m;

m—空气中声音衰减系数，dB（A）/100，取 0.27dB（A）/100m。

m - the sound attenuation coefficient in air, dB(A)/100, which is taken as 0.27dB(A)/100m.

$\triangle Lp_3$为屏障衰减，计算由于屏障增加的声波绕射路径差，然后计算菲涅耳系数 N，再利用绕射衰减计算图，即可查出衰减量。对于本项目，屏障主要指建筑物和围墙。建筑物的衰减量：

$\triangle Lp3$ is the barrier attenuation, calculate the difference of the acoustic diffraction path due to the increase of the barrier, then calculate the Fresnel coefficient N, and then use the diffraction attenuation calculation map to find the attenuation. For this project, the barrier mainly refers to buildings and fences. Attenuation of buildings:

$$\triangle Lp_3=\pm 2/\lambda \cdot \sigma$$

式中：λ—入射声波波长；

Where, λ - the wavelength of the incident sound wave;

σ—声波绕射路径差。

σ - sound wave diffraction path difference.

为地面吸收引起的衰减，可通过查地面吸收衰减图计算。

is the attenuation caused by ground absorption and is obtainable by checking the ground absorption attenuation map.

（5）预测结果分析

(5) Prediction results analysis

预测点等效声级的计算结果见表 6.4-1。

The calculation results of the equivalent sound level of the prediction point are shown in Table 6.4-1.

表 6.4-1 预测点等效声级的计算结果 单位：dB(A)

表 6.4-1 Calculation Results of the Equivalent Sound Level of the Prediction Point in dB(A)

预测点编号 Number of prediction points	噪声本底值 Noise background value	贡献值 Contributi	噪声预测值 Noise predicated value	标准值 Standard value	超标量 Out-of-standard value

		昼间 Night	夜间 Day	on value	昼间 Night	夜间 Day	昼间 Night	夜间 Day	昼间 Night	夜间 Day
北厂区 North plant area	北厂界 North battery limit	63	54	0	/	/	65	55	0	0
	东厂界 East battery limit	59	49	0	/	/	65	55	0	0
	西厂界 West battery limit	60	51	0	/	/	65	55	0	0
	南厂界 South battery limit	59	49	0	/	/	70	55	0	0
南厂区 South plant area	北厂界 North battery limit	55	53	26.4	/	/	70	55	0	0
	东厂界 East battery limit	54	51	27.2	/	/	65	55	0	0
	西厂界 West battery limit	52	49	29.6	/	/	65	55	0	0
	南厂界 South battery limit	54	52	25.8	/	/	65	55	0	0
敏感点 Sensitive points	沙坂村 Shaban Village	56.4	49.4	0	56.4	49.4	60	50	0	0
	蔡店村 Caidian Village	58.4	48.4	0	58.4	48.4	60	50	0	0

	埔尾村 Puwei Village	55.2	50.0	0	55.2	50.0	60	50	0	0
	丁厝村 Dingcuo Village	58.2	48.2	0	58.2	48.2	60	50	0	0

注：噪声本底值取监测最大值

Notes: noise background value is taken as maximum monitored value

由上述预测结果可知，本项目产生的噪声在厂界处贡献值在25.8~29.6dB(A)，均能满足《工业企业厂界环境噪声排放标准》（GB12348-2008）中的3类及4类标准限值要求；对于周边环境敏感点的噪声进行预测分析，拟建项目建成后与敏感点现状监测值叠加后，噪声预测值均能满足GB3096-2008《声环境质量标准》中2类标准限值要求。因此，本项目对项目所在地周边声环境质量影响不大。

It can be seen from the above prediction results that the noise generated by the project has a contribution value of 25.8~29.6dB(A) at the boundary of the project, which can meet both Cat. 3 and Cat. 4 standard limit requirements in *Environmental Noise Emission Standards for Industrial Enterprises' Boundaries* (GB12348-2008). For the prediction and analysis of the noise of sensitive points in the surrounding environment, after the proposed project is superimposed with the monitoring value of the sensitive point, the noise prediction value can meet the requirements of the Cat. standard limit requirements in GB3096-2008 *Acoustic Environmental Quality Standard*. Therefore, the project has little impact on the quality of the acoustic environment around the project site.

6.5 固体废物处理/处置措施

6.5 Solid Waste Treatment/Disposal Measures

拟建项目固体废物产生及处置情况见表 6.5-1。

Solid waste generation and disposal conditions of proposed project are as shown in Table 6.5-1.

表 6.5-1 拟建项目固体废物产生及处置情况一览表

Table 6.5-1 Solid Waste Generation and Disposal Conditions of Proposed Project

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	拟建项目 Proposed project	
			产生量（t/a）Generation flow (t/a)	处置方式 Disposal method
制浆造纸车间 Pulping and papermaking workshop	浆渣（木片、纤维束等）Pulp residue (wood chip, fibre bundle and so on)	一般固废 General solid waste	34155	送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置 Delivered to Zhangzhou Yisheng Environmental Protection Energy Co., Ltd for disposal by incineration
	铁丝、塑料等 Iron wire, plastic and so on	一般固废 General solid waste	25075	铁丝和塑料经收集后进入联盛纸业的年处理55万吨造纸废渣厂区进行清洗、筛分后铁丝出售给物资回收部门（铁丝等金属出售给漳州皖润物资回收有限公司；塑料等出售给福建友峰塑胶有限公司）After collecting the wire and plastic, they enter the Liansheng Paper's annual processing of 550,000 tons of papermaking waste slag plant area for cleaning and screening. The wire is sold to the material recycling department (the metal such as wire is sold to Zhangzhou Yurun Material Recovery Co., Ltd.; plastics, etc. are sold to Fujian Youfeng Plastic Co., Ltd.)

固废来源 Source of solid waste	固废种类 Category of solid waste	固废性质 Nature of solid waste	拟建项目 Proposed project	
			产生量（t/a） Generation flow (t/a)	处置方式 Disposal method
	砂石、污泥等 Sand, stone, sludge and so on	一般固废 General solid waste	15570	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
污水处理站 Sewage treatment station	污泥（含水率50%） Sludge (with water content of 50%)	一般固废 General solid waste	13586	送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置 Delivered to Zhangzhou Yisheng Environmental Protection Energy Co., Ltd for disposal by incineration
给水处理站 Water treatment station	污泥（含水率80%） Sludge (with water content of 80%)	一般固废 General solid waste	729.6	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
办公生活区 Office and living quarter	生活垃圾 Domestic waste	一般固废 General solid waste	165.24	环卫部门清运处理 Cleaning and transportation for disposal by sanitation authorities
生产车间 Production workshop	废润滑油 Waste lube oil （危废类别HW08） (classification of hazardous waste: HW08)	危险废物 Hazardous waste	3	暂存于危废仓库，委托给漳州联办环保产业有限公司进行处置 Tentatively stored in hazardous waste warehouse to be commissioned to Zhangzhou Joint Office Environmental Protection Industry Co., Ltd for disposal
合计 Total			89283.84	

项目产生的固体废物主要有造纸车间一般固体废物（浆渣、塑料、铁丝、砂石、污泥等）、污水处理站污泥、给水处理站污泥、员工生活垃圾、废润滑油。

The solid waste generated in the projects consist of, among others, solid waste in the papermaking workshop (including, inter alia, pulp residues, plastics, iron wires, sand & stone, and sludge), sludge of sewage treatment station, domestic wastes from employees and waste lube oil.

其中，浆渣与污水处理站污泥收集后送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置，共计 47741t/a。漳州市益盛环保能源有限公司垃圾发电（造纸废渣）工程设计焚烧处理能力为 1450t/d，目前实际处理量为 1250t/d，剩余处理能力为 200t/d，拟建工程浆渣与污水处理站污泥产生量为 47741t/a（144.7t/d），因此，漳州市益盛环保能源有限公司垃圾发电（造纸废渣）工程有能力接收拟建工程的浆渣与污水处理站污泥。

Pulp residues and sludge of sewage treatment station, totaling 47741t/a, will be delivered to the waste-to-energy project of Zhangzhou Yisheng Environmental Protection Energy Co., Ltd for disposal by incineration after being collected. Waste-to-energy (papermaking waste) project of Zhangzhou Yisheng Environmental Protection Energy Co., Ltd. has a design incineration capacity of 1450t/d whilst current actual processing capacity thereof is 1250t/d and the remaining processing capacity is 200t/d. Proposed project's pulp residue generations and sludge production generations by sewage treatment station totals 47,741t/a (144.7t/d). Therefore, the waste-to-energy (papermaking waste residue) project has the capability to receive the pulp residues from proposed project and the sludge from sewage treatment station.

造纸车间的铁丝塑料等经收集斗收集后运送至联盛纸业的年处理 55 万吨造纸废渣厂区进行清洗、筛分后铁丝出售给物资回收部门。目前该厂区实际废渣处理量为 1215t/d（41.31 万 t/a），剩余处理能力为 13.69 万 t/a，有能力接收本项目产生的 2.5075 万 t/a 的铁丝、塑料等。

After collecting the wires and plastics generated by papermaking workshop, they will be delivered to the Liansheng Paper's annual processing of 550,000 tons of papermaking waste slag plant area for cleaning and screening with wires sold to the material recycling department. At present, the actual waste residue treatment capacity of the plant is 1215t/d (41.31 million t/a), and the remaining treatment capacity is 136,900t/a. It has the capability to receive the iron wire and plastics of 250.75 million t/a produced by the project.

造纸车间产生的砂石、污泥等，给水处理站产生的污泥，以及生活垃圾均委托环卫部门清运处理。

Sandstone, sludge and the like produced by papermaking workshop, sludge produced by water treatment station and domestic waste are all commissioned to environmental protection authorities to clean and dispose of.

生产车间产生的废润滑油属于危险废物，拟建项目产生的危险废物依托厂区现有危险废物仓库暂存。厂区内现有危险废物仓库 3 间，仓库容积为 200m^2。项目危险废物储存间主体采用砖混结构，地面硬化并涂环氧树脂漆进行防腐防渗处理，设置导流沟、收集池，并于危险废物储存间门前危险废物标识上墙，并置于门前醒目的位置。

The waste lube oil produced in the production workshop belongs to hazardous waste. The hazardous waste generated from the proposed project is temporarily stored in the existing hazardous waste warehouse in the plant. Currently there are 3 hazardous waste warehouses in the plant with a volume of 200m^2. The main body of the project hazardous waste storage room is brick-concrete structure, hardened on the ground and coated with epoxy resin paint for anti-corrosion and anti-seepage treatment. Drainage ditches and collection tanks are set up, and the hazardous waste signs on the front of the hazardous waste storage room are placed on the wall and placed at conspicuous position in front of the door.

在做好以上措施的基础上，拟建项目产生的固体废物均能综合利用或合理处置，基本上不会周围环境造成明显的影响。

On the basis of the above measures, the solid waste generated by the proposed project can be comprehensively utilized or disposed of reasonably, and basically does not cause obvious impact on the surrounding environment.

6.6 生态环境影响分析

6.6 Ecological Environmental Impact Analysis

污水排海对纳污海域水生生物的影响主要有二个方面，一是废水中无毒有机物及 N、P 等营养型污染物对水生生物的生长产生促进作用，二是废水中可能存在的有毒有害污染物对水生生物生长起抑制作用。两者相互影响的结构使水产生物群落中耐污性种类的数量逐渐增多，而一些不耐污、清水性的种类减少或逐渐消失，使影响区域的水生生物群落结构由清水性向污水性群落演变，生物的多样性减少，群落趋向不稳定，最终演化结果可能会导致局部水域的富营养化。

There are two main effects on the aquatic organisms in the sewage waters. Firstly, non-toxic organic matter in wastewater and N, P and other nutrient-type pollutants promote the growth of aquatic organisms. Secondly, toxic and harmful pollutants in wastewater may inhibit the growth of aquatic organisms. The structure of mutual influence makes the numbers of pollution-tolerant species in the water-generating community gradually increase, while some types of non-soil-resistant and water-repellent species decrease or gradually disappear, and the aquatic community structure in the affected area evolves from clear water to sewage community. The diversity of living things is reduced, the community tends to be unstable, and the final evolution may lead to eutrophication of local waters.

（1）富营养化

(1) Eutrophication

海水富营养化主要是指水中的氮、磷、微量元素和其它营养物质进入水体后被藻类所吸收会促进其生长。在适宜的水温、气温和适宜的 N、P 浓度下，加上其它某些适宜因素，会造成某一种或几种藻类疯长，使水生生态结构受到破坏，发生赤潮，从而对海洋渔业及海洋生态系统带来巨大影响，导致养殖区鱼类、贝类死亡，造成当地海洋渔业资源衰退。

The eutrophication of seawater mainly means that nitrogen, phosphorus, trace elements and other nutrients in the water are absorbed by algae and promote their growth. Under appropriate water temperature, temperature and appropriate N and P concentrations, plus some other suitable factors, one or several algae will grow wild, causing damage to aquatic ecosystems and red tides, thus affecting marine fisheries and oceans. The ecosystem has a huge impact, leading to the death of fish and shellfish in the culture area, resulting in the decline of local marine fishery resources.

（2）有机污染物

(2) Organic pollutants

有机污染物包括无毒有机物和有毒有机物两类，无毒有机物进入水体后，在分解过程中需要消耗水体中的溶解氧，在局部高浓度区，若耗氧过程大于复氧过程，则水体中的溶解氧会下降，从而影响水体中鱼类和其它需氧生物的生长。有毒有机物主要是指一些对水生生物有直接毒害作用的有机化合物。

Organic pollutants include non-toxic organic substances and toxic organic substances. After the non-toxic organic substances enter the water body, they need to consume dissolved oxygen in the water body during the decomposition process. In the local high concentration area, if the oxygen consumption process is greater than the reoxygenation process, the water body is in the water body. The dissolved oxygen will decrease, affecting the growth of fish and other aerobic organisms in the water. Toxic organic matter mainly refers to some organic compounds that are directly toxic to aquatic organisms.

各种有机污染物不仅可影响水生微生物和动物生长发育，而且动物行为是长期适应环境的结果，故动物将对周围环境的变化产生会敏感反应，如产生回避、功能混乱、繁殖力下降等。另外生态系统是一个复杂的平衡系统，短期内的迅速变化将导致部分物种的消亡，从而改变生态系统的结构，如鱼类处于水生生态系统的顶层，污染导致某些鱼类品种的减少或消亡就可能导致下一级以及以下若干级食物链生产-消费的失衡，最终导致局部生态系统的重构，而这种重构有可能是十分不利的，导致当地渔业资源的逐步衰退。有机污染物的另一个危害就是食物链富集。有机物排入海域以后很可能被各级水生生物富集，最终在各种水产品中富集，人体食用此类水产品极易导致健康损害。

Various organic pollutants may not only affect aquatic microbes and animal growth and development, but animal behavior is the result of long-term adaptation to the environment, so animals will be sensitive to changes in the surrounding environment, such as avoidance, functional confusion, decreased fertility, etc. Apart from that, the ecosystem is a complex equilibrium system. Rapid changes in the short term will lead to the extinction of some species, thus changing the structure of the ecosystem. For example, fish are on the top of the aquatic ecosystem, and pollution leads to the decline or extinction of certain fish species. This may lead to an imbalance in the production and consumption of food chains at the next level and below, which ultimately leads to the reconstruction of local ecosystems, which may be very unfavorable, leading to a gradual decline in local fishery resources. Another hazard of organic pollutants is the enrichment of the food chain. After being discharged into the sea, organic matter is likely to be enriched by aquatic organisms at all levels, and eventually enriched in various aquatic products. The consumption of such aquatic products by human bodies can easily lead to health damage.

（3）对红树林的影响

(3) Impact on mangrove

从以往的研究看，有机污水排放引起的营养富集对红树林植物的生长不一定会造成负面影响，污水排放是否引起湿地土壤和植被的变化，很大程度上要视湿地原来的营养状况而定。国外研究资料表明，湿地系统具有非常高的生产力，因为它能过滤和捕获水体中的营养物质并将它们同化为植被的生物量，因而在接受城市污水后，湿地植被的生物量普遍显著提高，生长加快。红树林植物能忍耐极端的环境压力，包括高盐度、高温、水浸、不稳定的底泥以及干(有氧)—湿[有氧]环境的变动等等。因此专家认为污水排放引起的营养富集不会对红树林本身产生负面影响。实际上，在一定的范围内还可能有益，特别是在底泥营养水平较低的地区，污水营养的输入会对红树林植物的生长及红树林生态系统的生产力具有促进作用，但也有研究发现污水排放导致红树林植物叶片的光合作用、叶绿素浓度、酶活力等的破坏，而且大量污水有机碳的输入还会破坏红树林底泥的本已承受着严重缺氧压力的不稳定的氧化—还原电势的平衡。尽管红树林对海水水质有较强的净化作用，仍应严格控制污水排放以最大程度减轻对红树林影响。

According to previous studies, nutrient enrichment caused by organic wastewater discharge does not necessarily have a negative impact on the growth of mangrove plants. Whether sewage discharge causes changes in wetland soil and vegetation depends largely on the original nutritional status of the wetland. Foreign research data show that the wetland system has very high productivity because it can filter and capture the nutrients in the water and assimilate them into the biomass of the vegetation. Therefore, the biomass of the wetland vegetation is generally significantly increased after receiving the urban sewage. Mangrove plants can endure extreme environmental stresses, including high salinity, high temperatures, flooding, unstable sediments, and dry (aerobic)-wet [aerobic] environmental changes, etc. Given that, experts believe that the nutrient enrichment caused by sewage discharge will not have a negative impact on the mangrove itself. In fact, it may be beneficial in the scope of the regulation, especially in areas with low nutrient levels in the sediment, the input of sewage nutrients will promote the growth of mangrove plants and the productivity of mangrove ecosystems, but also research. It was found that sewage discharge caused the destruction of photosynthesis, chlorophyll concentration and enzyme activity of mangrove plant leaves, and the input of a large amount of sewage organic carbon would destroy the unstable oxidation of mangrove sediments which had been subjected to severe anoxic pressure. Restore the balance of the potential. Although mangroves have a strong purifying effect on seawater quality, sewage discharge shall be strictly controlled to minimize the impact on mangroves.

综上所述，拟建项目的实施对区域陆域、水域生态等造成一定程度的影响，但其影响有限。通过落实各项污染治理措施，拟建项目的实施对区域生态环境的影响在可接受范围内。

To sum up, the implementation of the proposed project will have a certain degree of impact on the regional land and water ecology, but its impact is limited. Through the implementation of various pollution control measures, the impact of the implementation of the proposed project on the regional ecological environment is within an acceptable range.

6.7 退役期环境影响评价

6.7 EIA for Decommissioning Period

项目退役期各生产线均停止生产，所以不会因生产而产生额外的废气、废水、设备噪声及固体废物。但由于退役期需要对各生产、公用及辅助设备、设施进行清空、拆除、清洗、变卖等，对废水处理站的构筑物需进行清空、清理等作业，因此，在退役过程中仍会有一定量的污染物产生。

During its decommissioning period, all production lines of the project are shut down, so no additional waste gas, waste water, equipment noise and solid waste will be generated due to production. Despite that, due to the need to empty, dismantle, clean, sell, etc. the production, public and auxiliary equipment and facilities during the decommissioning period, buildings/structures of the wastewater treatment station needs to be emptied, cleaned, etc, so that a certain amount of contaminants will still be produced in the course of decommissioning.

厂区退役后，如果用地性质发生变更，应遵循“关于切实做好企业搬迁过程中环境污染防治工作的通知”(环办[2004]47 号)中要求：“所有产生危险废物的工业企业、实验室和生产经营危险废物的单位，在结束原有生产经营活动，改变原土地使用性质时，必须经具有省级以上质量认证资格的环境监测部门对原址土地进行监测分析，报送省级以上环境保护部门审查，并依据监测评价报告确定土壤功能修复实施方案”。按照《国务院办公厅关于印发近期土壤环境保护和综合治理工作安排的通知》国办发[2013]7 号要求，开展退役厂区土壤评估。

Upon decommissioning of the plant, in case of change in the nature of land use, such a requirement in *Circular on Effectively Preventing and Controlling Environmental Pollution during the Process of Enterprise Relocation* (huanban [2004] No. 47) shall be followed: “All industrial enterprises that produce hazardous waste, experiments For units and production and management of hazardous waste, when the original production and operation activities are completed and the original land use properties are changed, the environmental monitoring department with the provincial and above quality certification qualifications shall conduct monitoring and analysis of the original site and submit it to the provincial and above environment. The protection department reviews and determines the implementation plan for soil function restoration based on the monitoring evaluation report”. The soil assessment of the decommissioned plant area was carried out in accordance with the *Notice of the General Office of the State Council on Printing and Distributing the Work Arrangements for Soil Environmental Protection and Comprehensive Management in the Near Future* GBF [2013] No. 7.

厂区关闭后用地的环境问题评价应由建设单位另行委托相关单位开展专项监测评价，进而给出系统、全面的环境污染防治措施。本评价主要提出总体性要求和建议。在厂区的专项监测评价中，应对原址土壤进行环境影响分析，分析内容包括遗留在原址和地下的污染物种类、范围和土壤污染程度；原厂区地下管线和土壤、地下水污染现状等的评价。根据监测评价结果，结合老厂区规划调整新的用地性质，确定是否需要开展土壤生态修复，进而制定相应的环境污染防治措施和生态修复方案。建设单位在该评价报告的基础上，编制设备拆除方案、危险废物的处置方案，组织相关技术人员、专家论证方案合理性，确保老厂区设备拆除和污染防治方案有序、有效进行。

With regard to assessment of environmental problems of the land upon shutdown of the plant area, relevant organizations shall be separately commissioned by the construction company to carry out special monitoring and assessment so as to provide systematic and comprehensive measures for environmental pollution prevention and control. This assessment mainly proposes general requirements and recommendations. In the special monitoring and assessment of the plant area, the environmental impact analysis of the soil of existing site shall be carried out. The analysis includes the types, extents and soil pollution levels of the pollutants left in the existing site and underground; the evaluation of underground pipelines & soil and groundwater pollution status in the existing plant area. Depending upon the monitoring and assessment results, nature of land use of new plant shall be adjusted based on the planning of existing plant area to determine whether it is necessary to carry out soil ecological restoration, for the purpose of development of corresponding environmental pollution prevention measures and ecological restoration plan. On the basis of this assessment report, the construction unit shall prepare equipment demolition plan and disposal plan for hazardous waste and organize the rationality of relevant technical personnel and expert demonstration plan so as to allow the equipment demolition and pollution prevention & control plan of the existing plant area to be carried out in an orderly and effective manner.

6.7.1 退役期废气影响分析

6.7.1 Waste Gas Impact Analysis for Decommissioning Period

（1）项目退役初期，各个生产线均已停止生产，但在污水处理站内仍会挥发少量的恶臭气体。

(1) At early stage of the project decommissioning, all production lines have ceased production, but a small amount of malodorous gas will still be volatilized in the sewage treatment station.

（2）污染防治措施要求：在退役初期，各个生产线的设备未清空、拆除、清洗完毕前，不应擅自停止各废气治理措施的正常运行。待各个生产线的设备清空、拆除、清洗完毕，确认不再产生废气后，方可停运各废气治理措施。

(2) Requirements for pollution prevention and control measures: at early stage of decommissioning, various waste gas prevention and control measures shall not be arbitrarily ceased prior to emptying, dismantle and cleaning of the equipment of each production line without prior approval. They shall not be ceased until such emptying, dismantle and cleaning have been completed and the equipment has been approved to be free from generation of waste gas.

（3）环境影响分析：退役初期在各个生产线的设备清空、拆除、清洗过程中，不会产生超过运营期各类废气的排放量，因此在各废气治理措施正常运行的情况下，对周围环境的影响不会超过运营期的环境影响程度，在可接受的范围内。

(3) Environmental impact analysis: During the initial stage of decommissioning, during the process of emptying, dismantling and cleaning the equipment in each production line, it will not generate emissions exceeding the various types of exhaust

gas during the operation period. Therefore, in the case of normal operation of various exhaust gas treatment measures, the surrounding environment. The impact will not exceed the environmental impact of the operation period, within acceptable limits

6.7.2 退役期废水影响分析

6.7.2 Wastewater Impact Analysis for Decommissioning Period

（1）废水污染源

(1) Wastewater pollution source

退役后，各个生产线的均不在生产，无生产废水排放，在退役初期，仍有少量的员工生活污水，退役前未及时处理的生产废水。

Upon decommissioning, each production line is not out of service, with no discharge of production wastewater. At the early stage of decommissioning, there is still a small amount of employee domestic sewage, and production wastewater that has not been treated in time prior to decommissioning.

（2）污染防治措施要求

(2) Requirements for pollution control & prevention measures

存在少量生产废水、员工生活污水等仍采用现有的污水处理站处理至达标后排放，若少量污水无法处理，应委托其他企业污水处理达标后排放。在全部人员撤离项目区域前，将化粪池、污水处理站进行清掏。

A small amount of production wastewater, employee domestic sewage, etc. are still treated by the existing sewage treatment station until the standard is reached. If a small amount of sewage cannot be treated, it should be entrusted to other enterprises to discharge the sewage after reaching the standard. Septic tanks and sewage treatment stations will be cleared before all personnel are demobilized from the project area.

（3）环境影响分析

(3) Environmental impact analysis

按照上述退役期废水污染防治方案，在退役期后生活污水、生产处理均可以得到合理的处置。退役期后期只需少量人员进行拆迁等，不会超过运营期的废水

排放量，对周围地表水环境的影响在可接受的范围内。

According to the above-mentioned decommissioning wastewater pollution prevention and control plan, the domestic wastewater upon the decommissioning period and the production treatment can be reasonably disposed of. Only a small number of personnel will be required to carry out demolition during the post-retirement period, which will not exceed the wastewater discharge during the operation period, and the impact on the surrounding surface water environment is within an acceptable range.

项目在运营过程对污水管网、污水处理池等进行防渗等措施，运营过程的废水渗入地下的量甚微，在退役后现场已不再产生废水，对遗留的废水进行妥善处理后，不会有废水再渗入地下水，对地下水的影响甚微。

During the operation process, the project will prevent seepage from sewage pipe network and sewage treatment tank. The amount of wastewater in the operation process will be infiltrated into the ground. After the decommissioning, no waste water will be generated on the site. After the remaining wastewater is properly disposed, there will be wastewater re-infiltrating into the groundwater, with little impact on groundwater.

6.7.3 退役期噪声影响分析

6.7.3 Noise Impact Analysis for Decommissioning Period

（1）噪声污染源

(1) Noise pollution source

退役期噪声主要来自各设备设施拆除过程产生的噪声。

The decommissioning noise mainly comes from the noise generated by the demolition process of various equipment facilities.

（2）污染防治措施要求

(2) Requirements of pollution control & prevention measures

设备设施拆除过程一般用时较短，在拆除后，将不会再产生噪声。评价要求建设单位在退役期设备设施拆除时，尽可能在白天进行，避免夜间进行拆除作业。

The equipment removal process is generally short-lived, and no noise will be generated after the removal. The assessment requires the construction company carry out the demolition during the decommissioning period as much as possible during the day to avoid demolition at night.

（3）环境影响分析

(3) Environmental impact analysis

只要在拆除过程加强管理，禁止高抛高丢，尽量轻拿轻放等，退役期设备设施拆除噪声不会对敏感目标产生不利影响。拆除过程用时较短，拆除后，不再有噪声产生。

As long as the management is strengthened during the demolition process, it is prohibited to throw high and throw high, and try to handle it lightly. The demolition of equipment during decommissioning will not adversely affect sensitive targets. The removal process takes a short time, and no noise will be generated after the removal.

6.7.4 退役期固废影响分析

6.7.4 Solid Waste Impact Analysis for Decommissioning Period

（1）固体废物污染源

(1) Solid waste pollution source

退役期产生的固废主要有：各个生产线的原辅材料、废弃包装材料、污水处理站污泥、以及各类报废的设备设施等。

The solid waste generated during the decommissioning period mainly includes: raw and auxiliary materials of various production lines, waste packaging materials, sludge from sewage treatment stations, and various equipments & facilities for discarding.

（2）处理处置要求

(2) Treatment and disposal requirements

污水处理站污泥等委托环卫部门清运，各个生产线的原辅材料采取相应的回收利用或综合利用措施。废弃包装材料出售给物资回收公司；各类报废的设备设施应尽可能回收利用或综合利用。严禁将退役期产生的固体废物随意排放。

Sludge produced by water treatment station and so on are to be commissioned to environmental protection authorities to clean and dispose of while relevant recycling or comprehensive utilization measures are to be taken for raw & auxiliary materials of various production lines. Waste packaging materials are to be sold to the material recycling department; various discarded equipment and facilities shall be recycled or comprehensively utilized to as far as possible. Arbitrary discharge of solid wastes generated during the decommissioning period is strictly prohibited.

由于项目原辅材料贮存间地面均已进行水泥硬化，退役后对现场未使用的各个生产线的原辅材料等进行妥善处理，因此对现有场地的影响较小，对土壤的影响较小。

Since the ground has been hardened by the cement in the storage area of the raw and auxiliary materials of the project, upon decommissioning, the raw & auxiliary materials of the various production lines not used at the site are to be properly treated, so the impacts on both existing site and soil are limited.

（3）环境影响分析

(3) Environmental impact analysis

在采取上述措施的情况下，项目退役期产生的各类固体废物均可以得到综合利用或妥善处置，不排入外环境。因此，在退役期应加强管理，做好固体废物的回收利用及处理处置工作，退役期固体废物不会对周围环境造成不利影响。

All types of solid waste generated during the decommissioning period of the project can be comprehensively utilized or disposed of properly with above measures being taken so as not to be discharged into the external environment. As such, during the decommissioning period, management shall be enhanced and the solid waste shall be recycled, treated and disposed of properly such that the solid waste during the decommissioning period will not adversely affect the surrounding environment.

7 环境保护措施及其可行性论证

7 Environmental Protection Measures and Feasibility Study

7.1 废水污染防治措施及其可行性分析

7.1 Wastewater Pollution Prevention Measures and Feasibility Analysis

7.1.1 废水特性分析

7.1.1 Wastewater characteristics analysis

拟建项目产生的各类废水产生源及主要污染物如下：

Various wastewater sources and main pollutants of the planned project are as follows:

（1）制浆造纸车间废水：主要是来自打浆、废纸处理和抄造等工段，湿纸幅压榨出的水分、辅料备制、浆料中添加的辅助化学品和助剂随着用于冲洗纸网上悬浮纤维的喷淋水流向网下，这些废水含有纤维碎屑、细小纤维、颜料、淀粉等，是低浓度有机废水，主要污染物是 COD、BOD_5、SS。

(1) Wastewater from pulping and papermaking workshop: mainly from workshop sections of beating, wastepaper processing and papermaking; water squeezed from wet paper pressing, auxiliary material preparation, auxiliary chemicals and agents added to pulps flow down the net with the spraying water washing fibers on paper net. The wastewater contains fiber debris, fine fibers, pigment and starch, and is organic wastewater with low concentration. Main pollutants are COD, BOD_5 and SS.

（2）职工生活污水：主要含 COD、BOD_5、氨氮等。

(2) Domestic sewage of workers: mainly including COD, BOD_5 and ammonia nitrogen, etc.

（3）给水处理站废水：制水过程中产生的废水主要来自沉淀池的排泥水和

滤池的反冲洗水，主要的污染物是 SS，废水中的 SS 浓度为 420mg/L（最高）。该股废水经沉淀处理后上清液直接排入市政雨水管网，含水率 80%的湿污泥经干化后进入垃圾填埋场。

(3) Wastewater from water supply processing station: the wastewater from water production is mainly from sludge water in sedimentation tank and backwash water in filter. Main pollutant is SS, and SS concentration in wastewater is 420mg/L (maximum). The supernatant liquor of the wastewater after sedimentation is directly drained to municipal rainwater pipeline network. The wet sludge with water content of 80% will be sent to refuse landfill after being dried.

7.1.2 废水处理达标可行性分析

7.1.2 Feasibility analysis on up-to-standard wastewater processing

7.1.2.1 污水处理站水量可行性分析

7.1.2.1 Feasibility analysis on water volume in sewage treatment station

拟建工程的废水进入厂内污水处理厂进行处理，目前厂内已经建成污水处理站处理规模 80000m^3/d，采用“预处理+厌氧（IC）+好氧+深度处理”处理工艺，现有工程建成后，全厂废水排放量为 44230m^3/d，剩余余量尚有 35770m^3/d，足够处理拟建项目 12614m^3/d 的废水量。

The wastewater of the planned project shall be drained to and processed in sewage treatment plant inside the project plant. Currently, the processing scale of sewage treatment plant which has been built in the project plant is 80000m^3/d. The treatment process of “pre-treatment + anaerobic (IC) + aerobic + deep treatment” is adopted. After the current project is completed, the wastewater displacement in the entire plant shall be 44230m^3/d, and idle processing ability is 35770m^3/d, sufficient for the 12614m^3/d wastewater of the planned project.

废水经过处理后满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 要求，经专用污水管网排入九龙江北港出海口（排放口坐标：24°29'1.40"N、117°52'0.40"E），待排海管道建设完成后，厂区污水处理站处理达标后纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

After treatment, the wastewater shall meet requirements in Table 1 of

DB35/1310-2013 Discharge standard of water pollutants for pulp and paper industry, and drained to the estuary of Jiulong River North Port through special sewage pipeline network (coordinate of discharge outlet: 24°29'1.40"N, 117°52'0.40"E). After the drainage pipeline is completed, the wastewater will be drained to deep sea uniformly through wastewater sea-oriented drainage pipeline (250,000t/d) of Jiaomei Sewage Treatment Plant after being treated in plant sewage treatment station and reaching standard.

同时拟建项目配置白水回收设备回收利用中段白水。造纸车间产生的多余白水经白水回收设备处理后分成 3 种不同的白水：超清白水、清白水、浊白水。超清白水经过滤后用于纸机网部高低压喷淋水，清白水用于浆料稀释调浓，浊白水一部分在白水回收设备循环回收，一部分送白水塔储存用于制浆工段作为工艺用水，确保制浆过程中除机械密封和设备冷却外不再使用清水。

The white water recovery equipment is configured in the planned project to recycle the white water generated in the middle workshop section. The excessive white water generated from papermaking workshop is divided into three kinds of white water after being treated by the white water recovery equipment, respectively super white water, filtrate white water and cloudy white water. After the super white water is filtered, it will be used as high/low voltage spraying water for net of paper machine; the filtrate white water is used to dilute and concentrate slurry; some cloudy white water is recycled by the white water recovery equipment, and some is sent to white water tower to store as processing water in pulping section so as to guarantee no clean water is used during the pulping process except for mechanical seal and equipment cooling.

7.1.2.2 水质达标可行性分析

7.1.2.2 Feasibility analysis on up-to-standard water quality

厂内污水处理站采用“预处理+厌氧（IC）+好氧+深度处理”处理工艺，废水经该工艺处理后，能满足废水达标排放要求。项目污水处理站处理工艺流程详见

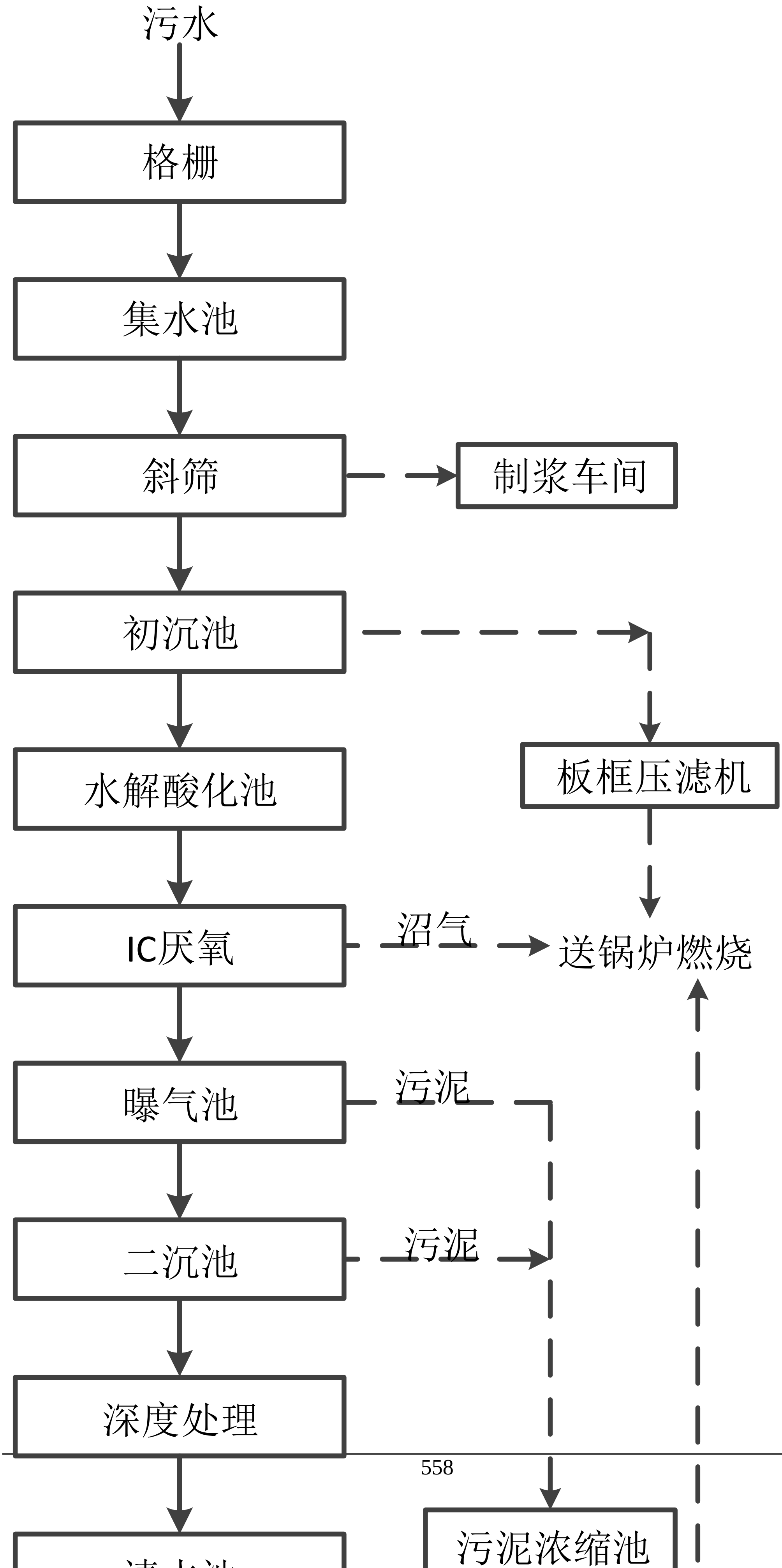

污水
格栅
集水池
斜筛
制浆车间
初沉池
板框压滤机
水解酸化池
IC厌氧
沼气
送锅炉燃烧
曝气池
污泥
二沉池
污泥
深度处理
污泥浓缩池

图 3.6-1。

The sewage treatment station in the plant adopts treatment process of “pre-treatment + anaerobic (IC) + aerobic + deep treatment” which allows the wastewater to meet the up-to-standard requirements of the wastewater after being treated. The treatment process flow of the sewage treatment station in the project can be seen in Fig. 3.6-1.

项目废水处理工艺主要由废水预处理、生化处理及污泥处理三大部分组成。需要净化的生产废水由车间排出，与经化粪池预处理的生活污水一并经由专用污水管道汇集后汇至污水处理站，污水处理站经过集水池收集后送入斜网过滤、初沉池回收浆渣、污泥，再经过生物反应池（包括水解酸化池、IC 厌氧、好氧曝气池）生化处理后，进入二沉池进行泥水分离，最终经过滤池泥水分离上清液进入清水池经监测达标后通过专用污水管外排。

The wastewater treatment process of the project is mainly comprised of wastewater pretreatment, biochemical treatment and sludge treatment. The production wastewater to be purified is drained from the workshop and sent to sewage treatment station through special sewage pipeline together with domestic sewage pretreated by septic tank; the water collected through catch basin is sent to inclined wire for filtering, to primary sedimentation tank for pulp residue and slurry recovery, and to secondary sedimentation tank for mud-water separation after being treated through biological reaction tank (including hydrolytic acidification pool, IC anaerobic and aerobic aeration pool). Finally supernatant liquor of mud-water separation in filter tank is sent to clean water, and drained through special sewage pipeline after reaching discharge standard under supervision.

（1）废水预处理

(1) Wastewater pretreatment

①纤维回收系统

① Fiber recovery system

用于收集废水中的纤维浆料。废水首先送入斜网过滤以回收其中的纤维，得到的回收纤维质量较好，可回用到生产车间去，达到节约纤维、降低成本的目的。

This system is used to collect fiber stuff in wastewater. The wastewater shall be firstly sent to the inclined wire to filter and recover the fibers. The fibers recovered are of good quality, and may be recycled to the production workshop so as to reach the purpose of fiber conservation and cost reduction.

②初沉池

② Primary sedimentation tank

废水经斜网过滤后仍含有一定量的悬浮物（SS），这些 SS 会对生物处理产生不利影响，初沉池采用幅流式沉淀池，经初沉物化处理后的澄清废水部分直接回用于生产车间，剩余部分进入后续生物处理系统。初沉池池底沉淀的污泥送到污泥池进行脱水处理。

After being filtered on the inclined wire, certain suspended matters (SS), which may generate adverse impact on biological treatment. The preliminary sedimentation tank is radial flow type. Some of the clarified wastewater after physic-chemical treatment in the preliminary sedimentation tank will be directly recycled to the production workshop, while some will be sent to subsequent biological treatment system. The sludge settled on the bottom of the tank shall be sent to the sludge sump to accept dehydration treatment.

（2）生化处理

(2) Biochemical treatment

①水解酸化池：废水中长链大分子纤维素及半纤维素的降解产物在水解酸化菌作用下被水解成小分子的有机酸，有利于废水在厌氧条件下的进一步降解。鉴于废水中缺氮、缺磷，需要在预酸化池中向废水中补充一定量的含有氮、磷的营养物质。

① Hydrolytic acidification pool: the degradation products of long-chain macromolecule cellulose and semi-cellulose in wastewater are hydrolyzed into small-molecular organic acid under the function of hydrolytic acidifier, which may help further degradation of the wastewater under anaerobic conditions. Due to nitrogen and phosphate deficiency in wastewater, it is necessary to make up certain nutrient substances with nitrogen and phosphate into the wastewater in pre-acidification pool.

②IC 厌氧

② IC anaerobic

厌氧处理由 4 台 IC 内循环厌氧反应器进行，单台 IC 反应器有效容积为 2945m^3（直径ϕ=12.5m，高 H=24m）。

Four sets of IC internal circulation anaerobic reactors are adopted for anaerobic treatment. The effective capacity of single IC reactor shall be 2945m^3 (ϕ=12.5m, H=24m).

厌氧反应主要将可生物降解性 COD 转化为沼气。整个生物厌氧反应过程可描述为：

The anaerobic reaction could mainly convert the biodegradable COD into biogas. The entire biological anaerobic reaction process can be described as:

COD→ CH_4↑+ CO_2↑+新生厌氧污泥。

COD→ CH_4↑+ CO_2↑+ new anaerobic sludge

厌氧过程中产生的沼气由风机送锅炉焚烧，回收率 100%。

The biogas generated during anaerobic process shall be sent to the boiler by blower for incineration, with recovery rate of 100%.

IC 反应器出水自流进入后续的好氧曝气池。

The effluent flow of IC reactor will enter the subsequent aerobic aeration pool.

③曝气池：一期好氧曝气池形式为环形曝气池，为氧化沟工艺的一种改良形式曝气池总有效容积为 52000m^3，曝气方式采用陕西科技大学与西安交通大学联合开发的、具有独立知识产权的新型高效供气式低压射流曝气工艺。二期曝气池总有效容积为 42500m^3，8 台 132kW 和 4 台 110kw 的表曝机提供所需要的供氧量。表曝机装有变频器，可根据实际需氧量调整转速，以节省能耗。

③ Aeration pool: the Phase I aerobic aeration pool is an annular pool, which is an improved form of oxidation ditch process. The total effective capacity of aeration pool is 52000m^3. The aeration method adopts the new efficient air-supply low-pressure jet flow aeration process jointly developed by Shaanxi University of Science and Technology and Xi’an Jiaotong University with independent intellectual property. The effective capacity of Phase II aeration pool is $42500m^3$, and eight 132kW and four 110kw surface aerators are used to supply oxygen required. The surface aerators are equipped with VFD, which may adjust speed according to actual oxygen demanded so as to save energy consumption.

在曝气池内，借助于好氧微生物的吸附、分解有机物的作用，使废水中的 COD、BOD_5 降低。曝气池中同样需要按比例投加含有氮、磷的营养物质以保证生物污泥中的好氧微生物能良好地生长繁殖，维持较高的生物活性。

Inside the aeration pool, the organic matter absorption and breakdown function of aerobic micro-organisms is used to reduce COD and BOD_5 in the wastewater. The nutrient substances with nitrogen and phosphate shall be added to the aeration tank according to certain proportion to guarantee favorable growth and breeding of aerobic micro-organism in biological sludge and maintain higher biological activity.

④二沉池：二沉池的作用是使处理后废水与活性污泥从混合液中分离开来，澄清废水从排水堰排出进入后续的超效浅层气浮机进行处理。沉降到二沉池底部的污泥采用刮泥机刮出排到回流污泥池，活性污泥用泵送到生物选择池与初沉池来的废水进行混合后进入曝气池，剩余部分污泥送到污泥浓缩池进行浓缩处理。采用幅流式沉淀池作为二沉池。

④ Secondary sedimentation tank: the role of this tank is to separate wastewater and active sludge after treatment from the mixed liquid. The clarified wastewater is drained from drainage weir into subsequent super-effective shallow air flotation machine. The sludge settled on the bottom of the secondary sedimentation tank will be scrapped with mud scraper and drained to returned sludge tank; the active sludge is pumped to bio-selecting tank, and entered into aeration tank after being mixed with the wastewater drained from the preliminary sedimentation tank; the residual sludge will be sent to sludge concentration pool for concentration. The radial flow sedimentation tank is adopted as secondary sedimentation tank.

⑤深度处理：为确保出水水质稳定达标排放，采用普通快滤池对二级生化处理后废水进一步处理，利用微混凝沉淀原理对废水中剩余的 SS 和 COD 进行过滤、捕捉、吸附处理，进一步优化出水水质，确保在来水水质波动及冬季气温较

低时系统出水稳定达标。

⑤ In-depth processing: in order to guarantee stable and up-to-standard discharge of effluent quality, the common rapid filter is adopted to carry out further treatment to wastewater under secondary biochemical treatment, and the coagulation sedimentation principle is used to filter, capture and absorb residual SS and COD in wastewater to further optimize effluent quality, and guarantee stable and up-to-standard effluent of the system under fluctuate water quality and low air temperature in winter.

（3）污泥处理系统

(3) Sludge treatment system

污泥脱水处理：污泥脱水处理是废水处理的重要组成部分。初沉池污泥、二沉池剩余污泥、终沉池污泥首先排至污泥池，然后采用污泥脱水机进行脱水处理。脱水后污泥饼送锅炉焚烧处置。

Sludge dehydration treatment: this treatment is an important part of wastewater treatment. The sludge in the preliminary sedimentation tank, residual sludge in the secondary sedimentation tank and final sedimentation tank shall be firstly drained to the sludge sump, and dehydrated with sludge dewatering equipment. The sludge cake after dehydration shall be sent to the boiler for incineration.

根据厂内在线监测情况及验收监测情况，现有工程污水处理站废水出水水质满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 制浆和造纸联合生产企业水污染物直接排放限值要求（即 COD80mg/L、SS30mg/L、$BOD_5$20mg/L）。现有污水处理站运行良好，污水处理工艺可行。

In accordance with in-plant online monitoring situations and acceptance monitoring situations, the effluent quality of wastewater from the sewage treatment station of current project meets Table 1 Water pollutant direct discharge limit of pulping and paper making manufacturers (i.e., COD80mg/L, SS30mg/L, $BOD_5$20mg/L) in DB35/1310-2013 *Discharge standard of water pollutants for pulp and paper industry*. The current sewage treatment station is operating in favorable conditions, and the sewage treatment process is feasible.

7.1.2.3　污水处理达标可行性分析

7.1.2.3 Feasibility analysis on up-to-standard sewage treatment

根据污水处理厂的处理进水浓度，拟建项目废水进入污水处理厂后不会对污水处理厂的进水浓度产生较大影响，按照目前的处理效率，对于 COD、BOD、SS 去除效率分别为 97.2%、98.6%、99.3%，具体见表 0-1。

In accordance with influent concentration of sewage treatment plant, the wastewater of the planned project will not generate great impact on influent concentration of the sewage treatment plant. As per current treatment efficiency, the removal efficiency of COD, BOD and SS is respectively 97.2%, 98.6% and 99.3%, specifically referring to Table 7.1-1.

表 0-1　拟建项目建成后出水达标可行性分析

Table 7.1-1 Feasibility analysis on up-to-standard effluent of the planned project

项目 Item	排水量（m^3/d） Displacement	COD（mg/L）	BOD（mg/L）	SS（mg/L）
拟建项目造纸车间（PM10） Papermaking workshop of the planned project (PM10)	12560	2900	1450	1400
拟建项目新增生活污水 Newly increased domestic sewage of planned project	54	300	200	200
现有工程废水 Wastewater of current project	44230	2900	1450	1400
混合后废水 Mixed wastewater	56844	2898	1449	1399
污水处理厂处理效率 Treatment efficiency of sewage treatment plant		97.3%	98.6%	99.3%
污水处理厂出水 Effluent of sewage treatment plant	56844	78	20	20
DB35/1310-2013	/	80	20	30
是否达标		是	是	是

Reach the standard or not	Yes	Yes	Yes

综上所述，拟建项目与现有工程废水混合后，经过污水处理厂处理后，能够满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 制浆和造纸联合生产企业各指标要求。

To sum up, after the wastewater of planned project and current project is mixed, the quality after treatment in the sewage treatment plan can meet various indexes of pulping and papermaking manufacturers in Table 1 of DB35/1310-2013 *Discharge standard of water pollutants for pulp and paper industry*.

7.1.2.4 非正常情况预防措施

7.1.2.4 Preventive measures for abnormal situations

污水处理站在正常情况下能达标排放，在非正常情况下处理效果会急剧下降甚至可能崩溃，应采取有效措施避免或减少非正常情况的发生，具体分析如下：

The sewage treatment station can reach up-to-standard discharge under normal circumstances, but the treatment effect under abnormal situations may slump and even break down. Effective measures shall be adopted to avoid or reduce abnormalities. Specific analysis is as follows:

（1）污水处理站非正常情况主要包括以下几种：

(1) Abnormal situations of the sewage treatment station contain the following types:

①生物处理受到有害物质冲击，如：酸、碱，以及生物反应池中供氧不足，微生物生长受到抑制，导致生物处理效率大幅度下降，甚至使系统崩溃；

① The biological treatment is impacted by harmonious substances, such as acid and alkali, oxygen supply in biological reaction tank is insufficient, and growth of micro-organism is restricted, leading to great drop of biological treatment efficiency and even system breakdown;

②废水水质、水量变化大，引起处理效率下降。

② The wastewater quality and volume is changed greatly, leading to lower treatment efficiency.

（2）预防措施

(2) Preventive measures

①尽量确保各车间排水水量、水质的稳定；

① Try to guarantee stable displacement and effluent quality in each workshop;

②利用事故池调节水量、水质，防止系统冲击，待正常后逐渐以小水量加入污水处理系统；

② Adjust water volume and quality with accident pool to prevent from system impact; gradually add into sewage treatment system with small water volume after returning to normal;

③在调节池设 pH 在线仪和 pH 调节系统，避免曝气池受到酸碱冲击；

③ Set pH online instrument and pH adjustment system in the adjusting tank to avoid impact of acid and alkali on aeration tank;

④在设计中，考虑事故池容积应足够大；

④ The capacity of accident pool shall be large enough in design;

⑤污水处理过程中当缺少 N、P 等营养物质时，需要在曝气池中进行投加，须严格控制加入微生物所需的 N 和 P 的量，防止大量的未被微生物吸收的 N 和 P 外排。

⑤ When nutrient substances such as N and P are lacked during sewage treatment process, it is necessary to add the nutrient substances to the aeration tank. The volume of N and P required by microorganism shall be added strictly to prevent from unabsorbed N and P discharge.

7.2 地下水环境污染控制措施可行性分析

7.2 Feasibility Analysis on Pollutant Control Measures for Underground Water Environment

7.2.1 源头控制措施

7.2.1 Source control measures

本项目废水进行合理的治理和综合利用，以先进工艺、管道、设备、污水储存，尽可能从源头上减少可能污染物产生；严格按照国家相关规范要求，对工艺、管道、设备、污水储存及处理构筑物采取相应的措施，以防止和降低可能污染物

的跑、冒、滴、漏，将渗滤液和废水泄漏的环境风险事故降低到最低程度；优化排水系统设计，渗滤液废水、地面冲洗废水、初期污染雨水等在厂址区内收集后通过管线送污水处理厂处理；管线铺设尽量采用“可视化”原则，即管道尽可能地上铺设，做到污染物“早发现、早处理”，以减少由于埋地管道泄漏而可能造成的地下水污染。

The wastewater in this project shall be reasonably treated and comprehensively utilized, and possible pollutants shall be reduced from the source through advanced process, pipeline, equipment and sewage storage; corresponding measures shall be adopted to process, pipeline, equipment, sewage storage and processing buildings and structures strictly pursuant to national regulations and requirements to prevent and reduce leakage of possible pollutants; the drainage system design shall be optimized to collect wastewater from percolate, ground washing and initial polluted rainwater on plant site, and sent to sewage treatment plant for treatment; the “visualized” principle is adopted for pipeline laying, i.e., the pipelines shall be paved above ground to make sure “find and treat pollutants earlier” so as to reduce underground water pollution caused by leakage of buried pipeline.

7.2.2 分区防控措施

7.2.2 Prevention and control measures by zoning

根据《石油化工工程防渗技术规范》（GB/T 50934-2013）等相关规范要求，结合目前施工过程中的可操作性和技术水平，针对不同的防渗区域采用典型防渗措施，在具体设计中应根据实际情况在满足防渗标准的前提下作必要的调整。

In accordance with requirements of relevant specifications such as *Technical code for seepage prevention in petrochemical engineering* (GB/T 50934-2013), and in combination with operability and technical level during current construction process, typical seepage measures are adopted in different seepage zones, and necessary adjustment shall be made when meeting seepage standard in specific design pursuant to actual situations.

（1）重点污染防治区

(1) Key pollution prevention zone

污水管网铺设防渗：污水管道尽量明渠明沟敷设，如采用地下管道，应加强地下管道及设施的固化和密封，采用防腐蚀、防爆材料，防止发生沉降引起渗漏。埋地管道防渗（厂区），需依次采用“中粗砂回填+长丝无纺土工布+2mm 厚 HDPE 土工膜+长丝无纺土工布+中砂垫层+原土夯实”的结构进行防渗。

Seepage shall be arranged to sewage pipeline network: the sewage pipeline shall be arranged in open channels and ditches; if underground pipeline is adopted, the reinforcement and sealing of underground pipeline and facilities shall be strengthened, and anti-corrosion and explosion-proof materials shall be adopted to prevent from leakage caused by sedimentation. The seepage of buried pipeline (in the plant zone) shall adopt the structure of “medium-coarse sand backfill + filament non-woven fabric + 2mm HDPE geo-membrane + filament non-woven fabric + medium sand cushion + original soil ramming”.

重点污染防治区防渗性能应与 6.0m 厚粘土层（渗透系数 1.0×10^{-7}cm/s）等效。

The seepage performance in key pollution prevention zone shall be equivalent to that of 6.0m clay stratum (seepage coefficient 1.0×10^{-7}cm/s).

（2）一般污染防治区

(2) Common pollution prevention zone

重点污染防治区以外的其它建筑区，在抗渗钢纤维混凝土面层中掺水泥基渗透结晶型防水剂，其下铺砌砂石基层，原土夯实，可达到防渗的目的。对于混凝土中间的伸缩缝和与实体基础的缝隙，通过填充柔性材料达到防渗的目的（渗透系数不大于 1.0×10^{-7}cm/s）。

In other building zones other than key pollution prevention zone, the cement-based capillary crystalline waterproof (CCCW) agent is added to anti-permeability steel fiber reinforced concrete pavement, and aggregate substrate is paved below and original soil is rammed to reach the purpose of seepage prevention. For joints between concrete and crack of solid foundation, the purpose of seepage prevention shall be reached by filling flexible materials (seepage coefficient is no larger than 1.0×10^{-7}cm/s).

总体来说，一般污染防治区防渗性能应与 1.5m 厚粘土层（渗透系数 1.0×10^{-7}cm/s）等效。

In general, the seepage performance in common pollution prevention zone shall be equivalent to that of 1.5m clay stratum (seepage coefficient 1.0×10^{-7}cm/s).

7.2.3 地下水环境监测与管理

7.2.3 Monitoring and management of underground water environment

（1）地下水监测计划

(1) Underground water monitoring plan

为了及时准确掌握厂址区及下游地下水环境质量状况和地下水体中污染物的动态变化，本项目拟建立完善的监测制度，配备先进的检测仪器和设备，以便及时发现并及时控制。

In order to accurately control dynamic changes of underground water environment quality and pollutants in underground water on the plant site and downstream area, this project plans to establish perfect monitoring system, and configure advanced detection instruments and equipment so as to find out and control problems in time.

目前尚没有针对建设项目地下水环境监测的法律法规或规程规范，本项目地下水环境监测主要参考《地下水环境监测技术规范》（HJ/T164－2004），结合评价区含水层系统和地下水径流系统特征，考虑潜在污染源、环境保护目标等因素，并结合模型模拟预测的结果来布置地下水监测点。

At present, there is no law, regulation or specification regarding underground water environment monitoring of the construction project. The underground water environment monitoring of the project shall mainly refer to *Technical specifications for environmental monitoring of groundwater* (HJ/T164-2004). The underground water monitoring points shall be arranged in combination with water-bearing system and underground water radial flow system characteristics in the evaluation zone, considering factors such as pollution source and environmental protection objective and according to results of model simulation prediction.

（2）地下水监测原则

(2) Principles of undergrounding water monitoring

地下水监测将遵循以下原则：

The underground water monitoring will abide by the following principles:

①加强重点污染防治区监测；

① Strengthen monitoring on key pollution prevention zone;

②以潜水含水层地下水监测为主；

② Mainly monitor the underground water in phreatic water aquifer;

③充分利用现有监测孔；

③ Make full use of current monitoring holes;

④水质监测项目参照《地下水质量标准》（GB/T14848－2017）相关要求和潜在污染源特征污染因子确定，各监测井可依据监测目的不同适当增加和减少监测项目。

④ The water quality monitoring item shall be confirmed according to *Standard for groundwater quality* (GB/T14848-2017) and potential pollutant source feature pollution factors; each monitoring well shall add and reduce monitoring items according to different monitoring purposes.

（3）监测井布置

(3) Monitoring well arrangement

依据地下水监测原则，结合水文地质条件，本项目在厂址区及外围布设地下水监测孔 3 眼。其中上游 1 口，污水处理设施下游最近处设置 1 口，污水处理厂下游最近处设置 1 口。

This project plans to arrange three monitoring holes for underground water on the plant zone and nearby area, in which one is upstream, one is nearest downstream of sewage treatment facilities and one is nearest downstream of sewage treatment plant.

（4）监测数据的管理

(4) Management of monitoring data

上述监测结果应按项目有关规定及时建立档案，并定期向厂安全环保部门汇

报，对于常规监测数据应该进行公开。如发现异常或发生事故，加密监测频次，改为每周监测一次，并分析污染原因，确定泄漏污染源，及时采取应急措施。

Aforesaid monitoring results shall be filed in time in accordance with relevant regulations of the project, and reported to the safety and environmental protection department of the plant regularly. The conventional monitoring data shall be disclosed. In case of abnormalities or accidents, the monitoring frequency shall be intensified, i.e., once every week. The pollution causes shall be analyzed to confirm leakage pollution source and adopt emergent measures in time.

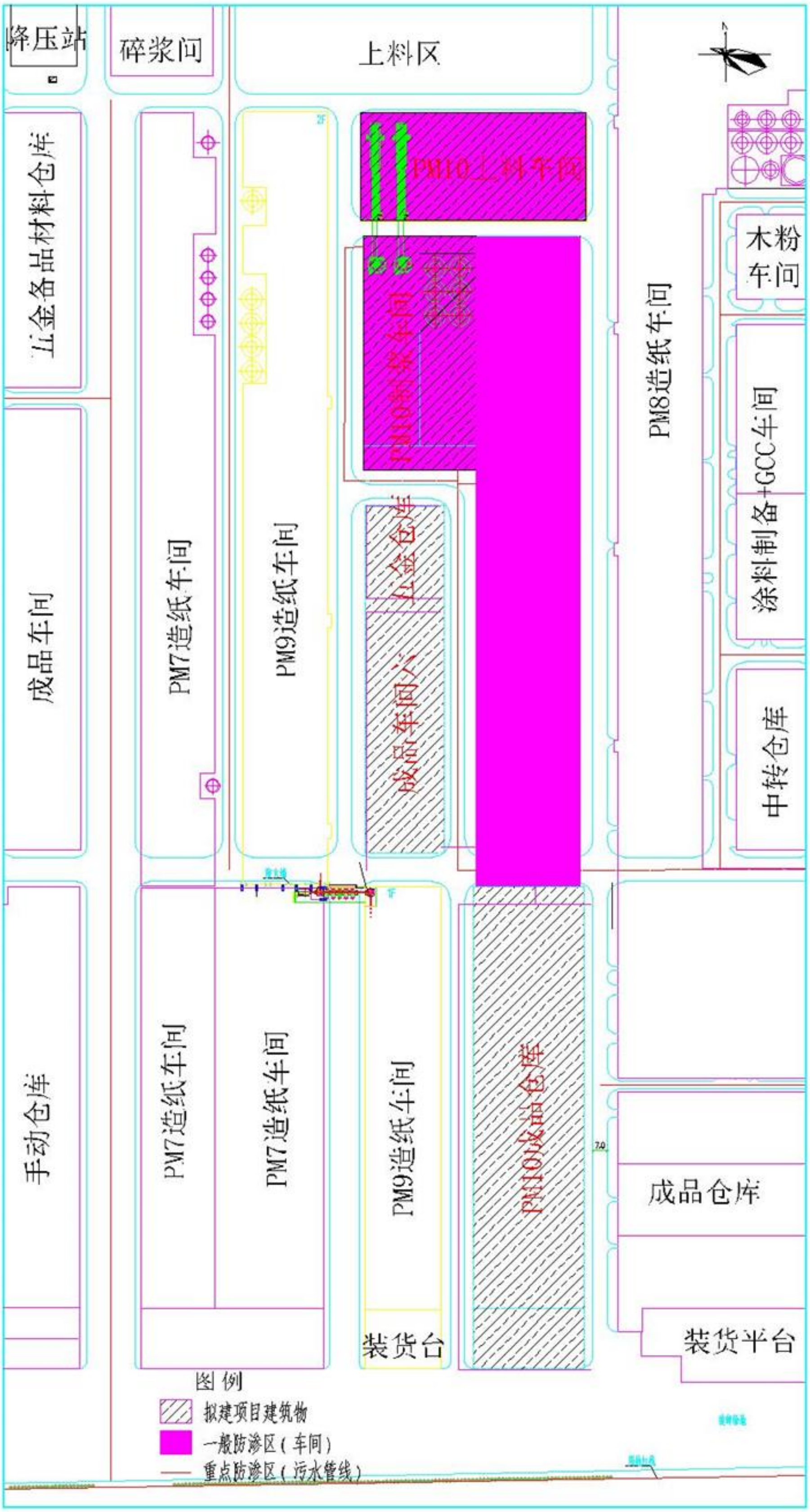


图 0-1　拟建项目地下水分区防渗示意图

Fig. 7.2-1 Diagram of underground water seepage prevention zoning in planned project

手动仓库	Manual warehouse
PM7 造纸车间	PM7 Papermaking workshop
19 造纸车间	19 Papermaking workshop
成品仓库	Finished product warehouse
成品车间六	Finished product workshop VI
五金仓库	Hardware warehouse
中转仓库	Transshipment warehouse
涂料制备+GCC 车间	Coating preparation +GCC workshop
PM8 造纸	PM8 papermaking

7.3 噪声控制措施

7.3 Noise Control Measures

拟建项目噪声源主要为造纸生产机械设备如碎浆机、除砂器、双磨盘、浆泵、水泵、造纸机等工艺设备噪声，其中水力碎浆机及造纸机是重点控制的噪声源。源强为 85~90dB(A)。

The noise source of planned project is mainly noise from papermaking process equipment such as pulper, desander, double-disc refiner, pulp pump, water pump and papermaking machine, in which the hydrapulper and papermaking machine are noise sources under key control, and the source strength is 85~90dB(A).

建设项目应重视噪声的污染控制，从噪声源和噪声传播途径着手，并综合考虑平面布置和绿化的降噪效果，控制噪声对厂界外声环境的影响。具体可采取的治理措施如下：

The construction project shall value noise pollution control from noise source and noise transmission route. The plane layout and green noise reduction effect shall be considered comprehensively to control impact of noise on acoustic environment outside the plant boundary. The specific treatment measures are as follows:

（1）从声源上降噪

(1) Reduce noise from sound source

根据本项目噪声源特征，建议在设计和设备采购阶段，优先选用低噪声设备，如低噪的风机、离心机等，从而从声源上降低设备本身的噪声。

In accordance with characteristics of noise source in this project, it is suggested to preferentially select equipment with low noise in the stage of design and equipment procurement, such as low noise fan and centrifugal machine so as to reduce noise of equipment from the sound source.

（2）从传播途径上降噪

(2) Reduce noise from transmission route

①生产设备噪声

①Noise of production equipment

项目所用碎浆机、造纸机均置于室内，再加上厂房隔声，可使生产设备的隔声量在 25dB(A)以上。

The pulper and papermaking machine adopted in this project shall be placed indoors. In addition to sound insulation of workshop, the noise of production equipment may be above 25 dB(A).

②泵类噪声

②Noise of pumps

项目所使用的各式泵类数量较多，噪声源强较高，通过加装隔声罩和厂房隔声，可使其噪声源强降低 20dB(A)左右。

The project adopts many pumps with various types, and noise source intensity is high; the noise source intensity may be reduced about 20dB(A) through installing acoustic hood and workshop sound insulation.

③对一些机械振动大的高噪音源生产设备，采用合理的基础减震措施。

③Reasonable basic vibration absorbing measures for some high noise production equipment with large mechanical movement.

④对操作室采取隔音措施。

④ Sound insulation measures shall be applied to the operating room.

⑤尽量采用多孔吸声材料吸声降噪。

⑤ Try to use porous sound-absorbing materials to absorb and reduce noise.

对各类噪声源采取上述噪声防治措施后，可降低噪声源强 15～25dB(A)，使厂界达标，能满足环境保护的要求。此外，项目采用“闹静分开”和合理布局的原

则，尽量将高噪声源远离噪声敏感区域或厂界。并且加强厂区绿化，厂房周围设置绿化带，增加对噪声的阻尼作用。在生产过程中强化管理，确保降噪设施的有效运行，并加强对生产设备的保养、检修与润滑，保证设备处于良好的运转状态。

After aforesaid noise prevention measures are applied to various noise sources, 15~25dB(A) noise sound intensity may be reduced, making the sound on plant boundary reach standard and meet requirements of environmental protection. Moreover, the project adopts the principle of “noise-silence separation” and reasonable layout to make the high-noise sound source far from noise sensitive area or plant boundary. In addition, the greening in the plant zone shall be strengthened. Greening belt shall be set around the workshop to add damping effect of noise. During production, the management shall be strengthened to guarantee effective operation of noise reduction facilities, and maintenance, overhaul and lubrication of production equipment shall be intensified to guarantee the equipment in favorable operating status.

项目采取以上有效的污染防治措施，确保厂界噪声达到 GB12348-2008《工业企业厂界环境噪声排放标准》中相应标准限值标准。

The project adopts aforesaid effective pollution prevention measures to guarantee noise on plant boundary to reach corresponding limit standards in GB12348-2008 *Emission standard for industrial enterprises noise at boundary*.

7.4 固体废物处置措施

7.4 Solid Waste Disposal Measures

项目产生的固体废物主要有造纸车间一般固体废物（浆渣、塑料、铁丝、砂石、污泥等）、污水处理站污泥、给水处理站污泥、员工生活垃圾、废润滑油。造纸车间产生的砂石、污泥等，给水处理站产生的污泥，以及生活垃圾均委托环卫部门清运处理。

The solid wastes generated by the project are mainly common solid wastes (pulp slag, plastic, iron wire, sand, sludge, etc.) in papermaking workshop, sludge from sewage treatment station, sludge from water supply treatment station, employ household garbage, and useless lubricating oil. The environment and sanitary department shall be entrusted to clean and transport sand and sludge generated from papermaking workshop, sludge generated by water supply treatment station, and household garbage.

拟建项目固体废物产生及处置情况见表 6.5-1。

The solid waste generation and disposal situations in the planned project can be seen in Table 6.5-1.

1、送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置可行性分析

1. Feasibility analysis on incineration disposal in solid waste power generation project of Zhangzhou Yisheng Environmental Energy Co., Ltd.

浆渣与污水处理站污泥收集后送漳州市益盛环保能源有限公司垃圾发电工程焚烧处置，共计 47741t/a。

The pulp slag and sludge from sewage treatment station shall be collected and sent to solid waste power generation project of Zhangzhou Yisheng Environmental Energy Co., Ltd. for incineration, totally 47741t/a.

漳州市益盛环保能源有限公司垃圾发电（造纸废渣）工程于 2017 年 6 月 26 日竣工并投入运营，燃料主要为联盛纸业厂区内运送的轻渣、浆渣、污泥和在线沼气，设计轻渣、浆渣、污泥处理能力共计 1450t/d，目前实际处理量为 1250t/d，剩余处理能力为 200t/d。拟建工程浆渣与污水处理站污泥产生量为 47741t/a（144.7t/d＜200t/d），漳州市益盛环保能源有限公司垃圾发电（造纸废渣）工程有能力接收拟建工程的浆渣与污水处理站污泥。

The solid waste power generation (papermaking slag) project of Zhangzhou Yisheng Environmental Energy Co., Ltd. is completed and put into operation on June 26, 2017. The fuels are mainly light slag, pulp slag, sludge and online biogas from Liansheng Paper Industry. The designed light slag, pulp slag, and sludge treatment capacity is totally 1450t/d, current actual processing capacity is 1250t/d, and residual processing capacity is 200t/d. The sludge generation quantity in the pulp slag and sewage treatment station of the planned project shall be 47741t/a (144.7t/d＜200t/d). The solid waste power generation (papermaking slag) project of Zhangzhou Yisheng

Environmental Energy Co., Ltd. is capable to receive slug from pulp slag and sewage treatment station of the planned project.

同时，拟建工程与厂区内现有工程的废纸来源基本一致，因此，产生的浆渣与厂区内现有工程产生的浆渣成分一致，拟建工程产生的浆渣的成分不会对漳州市益盛环保能源有限公司垃圾发电（造纸废渣）工程的大气污染治理措施产生额外冲击。

In the meantime, the waste paper source of the planned project and current project inside the plant is largely consistent. Thus, the pulp slag content is the same as that generated by current project of the plant. The content of pulp slag generated by the planned project will not generate additional impact on air pollution prevention measures of solid waste power generation (papermaking slag) project of Zhangzhou Yisheng Environmental Energy Co., Ltd.

因此，漳州市益盛环保能源有限公司垃圾发电（造纸废渣）工程接收拟建工程的浆渣与污水处理站污泥的措施是可行的。

Therefore, it is feasible for solid waste power generation (papermaking slag) project of Zhangzhou Yisheng Environmental Energy Co., Ltd. to receive sludge from pulp slag and sewage treatment station of the planned project.

2、送至联盛纸业的年处理 55 万吨造纸废渣厂区可行性分析

2. Feasibility analysis on solid wastes treatment in annual 550,000t papermaking slag processing plant of Liansheng Paper Industry

造纸车间的铁丝塑料等经收集斗收集后运送至联盛纸业的年处理 55 万吨造纸废渣厂区进行清洗、筛分后铁丝出售给物资回收部门，共计 2.5075 万 t/a。

The solid wastes such as iron steel and plastics from papermaking workshop are collected by collecting bucket and sent to annual 550,000t papermaking slag processing plant of Liansheng Paper Industry for cleaning and screening; after that the iron wire will be sold to material recovery department, totally 25,075t/a.

目前联盛纸业的年处理 55 万吨造纸废渣厂区实际废渣处理量为 1215t/d（41.31 万 t/a），剩余处理能力为 13.69 万 t/a，有能力接收本项目产生的 2.5075 万 t/a 的铁丝、塑料等。

The actual waste slag processing capacity of annual 550,000t papermaking slag processing plant of Liansheng Paper Industry is 1215t/d (413,100 t/a) currently, and remaining processing capacity is 136,900 t/a. It is capable to receive the 25,075t/a iron wire and plastics generated by this project.

因此，联盛纸业的年处理 55 万吨造纸废渣厂区接收拟建工程造纸车间的铁丝塑料的措施是可行的。

Hence, it is feasible for annual 550,000t papermaking slag processing plant of Liansheng Paper Industry to receive iron wire and plastics generated by papermaking workshop of the planned project.

3、送至厂区内危险废物仓库可行性分析

3. Feasibility analysis on solid wastes sending to hazardous waste warehouse in the plant area

生产车间产生的废润滑油属于危险废物，拟建项目产生的危险废物依托厂区现有危险废物仓库暂存。

The useless lubricating oil generated by the production workshop belongs to hazardous wastes. The hazardous wastes generated by the planned project shall be stored temporarily in exiting hazardous waste warehouse in the plant area.

厂区内现有危险废物仓库 3 间，仓库容积为 200m^2。项目危险废物储存间主体采用砖混结构，地面硬化并涂环氧树脂漆进行防腐防渗处理，设置导流沟、收集池，并于危险废物储存间门前危险废物标识上墙，并置于门前醒目的位置。目前厂区内厂区内现有危险废物仓库用于收集厂内现有工程产生的废润滑油，与拟建工程产生的危险废物类别一致。

The plant now has three hazardous waste warehouses, with capacity of 200m^2. The hazardous waste storage room of the project mainly adopts masonry-concrete structure with hardened surface coated with epoxy resin paint for antiseptic and anti-seepage treatment. The diversion ditch and collecting pool are set, and the identification of hazardous waste shall be attached to striking area on the door of hazardous waste storage door. Currently, the existing hazards waste warehouse in the plant zone is collect useless lubricating oil generated by current project, which shall be consistent with hazardous wastes type generated by the planned project.

因此，厂区内危险废物仓库接收拟建工程危险废物的措施是可行的。

Therefore, it is feasible for the hazardous waste warehouse to receive the hazardous wastes of the planned project.

7.5 退役期环境保护措施

7.5 Environmental Protection Measures during the Retirement Period

厂区退役后，如果用地性质发生变更，应遵循“关于切实做好企业搬迁过程中环境污染防治工作的通知”(环办[2004]47 号)中要求：“所有产生危险废物的工业企业、实验室和生产经营危险废物的单位，在结束原有生产经营活动，改变原土地使用性质时，必须经具有省级以上质量认证资格的环境监测部门对原址土地进行监测分析，报送省级以上环境保护部门审查，并依据监测评价报告确定土壤功能修复实施方案”。按照《国务院办公厅关于印发近期土壤环境保护和综合治理工作安排的通知》国办发[2013]7 号要求，开展退役厂区土壤评估。

After retirement of the plant zone, in case of change in land nature, the requirements in “Notice on Environmental Pollution Prevention and Control during Enterprise Relocation [HB [2004] No. 47]” shall be followed: “all industrial enterprise, laboratories generating hazardous wastes and units producing and operating hazardous wastes must entrust environmental supervision department with provincial level quality certification qualification to carry out monitoring and analysis to soil on original address, report to provincial or above environmental protection department for review, and confirm soil function recovery implementation plan according to supervision evaluation report if the original land use nature is changed when ending original production and operating activities”. In accordance with *Notice of the State Council General Office about Releasing Recent Job Arrangement of Soil Environment Protection and Comprehensive Treatment* (GBF [2013] No. 7), the soil evaluation on the retired plant zone shall be carried out.

厂区关闭后用地的环境问题评价应由建设单位另行委托相关单位开展专项

监测评价，进而给出系统、全面的环境污染防治措施。本评价主要提出总体性要求和建议。在厂区的专项监测评价中，应对原址土壤进行环境影响分析，分析内容包括遗留在原址和地下的污染物种类、范围和土壤污染程度；原厂区地下管线和土壤、地下水污染现状等的评价。根据监测评价结果，结合老厂区规划调整为新的用地性质，确定是否需要开展土壤生态修复，进而制定相应的环境污染防治措施和生态修复方案。建设单位在该评价报告的基础上，编制设备拆除方案、危险废物的处置方案，组织相关技术人员、专家论证方案合理性，确保老厂区设备拆除和污染防治方案有序、有效进行。

After the plant zone is closed, the evaluation of environmental problem of the land shall be monitored and evaluated specially by relevant units under entrustment of the construction unit so as to offer systematic and comprehensive environmental pollution prevention measures. This evaluation mainly puts forward overall performance requirements and suggestions. In special monitoring and evaluation on the plant zone, the environmental impact assessment on soil at original address shall be analyzed, including type of pollutants left on the original site and underground, scope and soil pollution degree; evaluation on current status of underground pipeline, soil and underground water pollution on original plant zone. The soil ecological restoration shall be confirmed according to monitoring and evaluation results and new land nature adjusted pursuant to old plant zone planning so as to formulate corresponding environmental pollution prevention measures and ecological restoration plan. The construction unit shall, based on the evaluation report, prepare equipment dismantling plan and hazardous waste disposal plan, organize relevant technicians and experts to demonstrate reasonability of the plan, and guarantee ordered and effective proceeding of equipment dismantling and pollution prevention plan in old plant zone.

7.6 项目“三同时”验收一览表

7.6 List of “Simultaneous Design, Construction and

Commissioning” Acceptance

本项目环保投资为 1290 万元，占总投资额的 0.81%。“三同时”环保措施验收内容见表 0-1。

The investment in environmental protection of this project is RMB12.9 Million Yuan, accounting for 0.81% of total investment amount. The acceptance contents for environmental measures of “simultaneous design, construction and commissioning” can be seen in Table 7.6-1.

表 0-1 项目"三同时"竣工验收一览表

Table 7.6-1 List of "simultaneous design, construction and commissioning" as-built acceptance

污染源 Pollution source		环保设施 Environmental facility	效果 Effect	环保措施（万元） Environmental protection measures (RMB Ten Thousand)	进度 Schedule
污水 Sewage	生活污水 Domestic sewage	化粪池、污水管线 Septic tank and sewage pipeline	生活污水经化粪池处理后，与拟建车间产生的生产废水排入厂内的现有污水处理厂处理达标后外排。《制浆造纸工业水污染物排放标准》（DB35/1310-2013）中表1 制浆和造纸联合生产企业水污染物直接排放限值 After the domestic sewage is treated by the septic tank, it will be drained to current sewage treatment plant inside the plant together with the production wastewater generated by the planned workshop, and discharged after reaching standard. Water pollutant direct discharge limit of pulping and paper making manufacturers in Table 1 of DB35/1310-2013 *Discharge standard of water pollutants for pulp and paper industry*.	350	与生产装置同步 Synchronize with production facility
	造纸车间废水 Wastewater from papermaking workshop	白水回收系统、污水管线 White water recovery system and sewage pipeline			
噪声	设备噪声	减震、吸声、消声、隔声设施	达到《工业企业厂界环境噪声排放标准》（GB	200	

Noise	Equipment noise	Damping, sound-absorbing, sound-eliminating, sound-insulating facilities	12348-2008）3类标准要求 Reach Class 3 standard in *Emission standard for industrial enterprises noise at boundary* (GB 12348-2008)		
固体废物 Solid wastes	造纸车间固体废物 Solid waste of papermaking workshop	浆渣集中收集后送锅炉焚烧处置 The pulp slag is collectively collected and sent to the boiler for incineration	安全处置或综合利用 Safe disposal or comprehensive utilization	20	
		铁丝塑料等集中收集后进入联盛纸业的年处理55万吨造纸废渣厂区进行清洗、筛分后外售 The iron wire and plastics are collectively collected and sent to annual 550,000t papermaking waste slag plant of Liansheng Paper Industry for cleaning and screening before being sold			
		砂石污泥等环卫部门清运处理 Sand and sludge will be cleaned and disposed by environmental and sanitary department			
	污水处理站污泥 Sludge from sewage treatment station	送锅炉焚烧处置 Sent to the boiler for incineration			
	给水处理站污泥 Sludge from water supply treatment station	环卫部门清运处理 Cleaned and disposed by sanitary department			
	办公生活区生活垃圾	环卫部门清运处理			

	Household garbage in office and living quarter	Cleaned and disposed by sanitary department			
	废润滑油 Useless lubricating oil	集中收集暂存于厂内危废间，定期委托有资质单位回收处置 Collectively collected and temporarily stored in hazardous waste room of the plant zone, and recovered and disposed by qualified unit regularly under entrustment			
绿化 Greening		厂区、道路绿化 Greening of the plant zone and road	全厂绿化覆盖率达到17.8% Whole plant greening coverage rate reaches 17.8%	550	
地下水防渗措施 Underground anti-seepage measures		在重点防渗区域（管网铺设区）和一般污染防治区（制浆车间及造纸车间）采取相应的防渗措施 Adopt corresponding anti-seepage measures in key anti-seepage area (pipeline laying zone) and common pollution prevention zone (pulping workshop and papermaking workshop)	达到《危险废物填埋污染控制标准》（GB18598-2001）防渗标准要求（渗透系数达到1.0×10^{-7}cm/s） Reach the anti-seepage standard requirements (seepage coefficient reaches 1.0×10^{-7}cm/s) in *Standard for pollution control on the security landfill site for hazardous wastes* (GB18598-2001)	150	
环境监测 Environment monitoring		定期监测 Regular monitoring	监控运行工况、污染物排放情况 Monitor operating conditions and pollutant discharge situations	20	
环境管理 Environmental management		管理机构设置 Setup of management institution	日常与突发事故环境管理 Routine and sudden accident environment management	/	
		环境风险防范措施及应急预案			

	Environmental risk prevention measures and emergency plan			

8 环境风险评价

8 Environmental Risk Evaluation

8.1 风险识别

8.1 Risk Recognition

8.1.1.1 风险物质识别

8.1.1.1 Risk material recognition

根据工程分析，本次评价涉及各类原辅料中，主要包括废纸、AKD、硫酸铝、淀粉、助留剂等，得到的产品具有可燃性，大量堆存容易发生火灾，其他无风险性较高的物质。

In accordance with project analysis, various raw and auxiliary materials involved in this evaluation are mainly waste paper, AKD, aluminum sulfate, starch, and retention aid, and products may be flammable. Large amount of piling-up may cause fire easily. There is no other material with high risk.

建设项目在生产过程中包括产品及所涉及的原辅材料见表 3.1-4，项目所涉及的物质理化性质、易燃易爆性、毒理毒性列于表 3.1-5。

The products and raw and auxiliary materials involved during the production process of the construction project can be seen in Table 3.1-4, while the physical and chemical properties, flammable and explosive performance, and toxicology and toxicity of substances involved in this project are listed in Table 3.1-5.

① 本项目所存在的物质的理化性质、毒理性质见本报告书工程分析部分。通过对本项目所涉及的主要化学物质进行危险性识别，根据《重大危险源辨别》（GB18218-2009）进行物质危险性判定，具体判定依据详见表 0-1。

The physical and chemical properties, toxicology and toxicity of substances involved in this project can be seen in project analysis of this report. The risks of main chemical substances involved in this project are recognized, and judged in accordance with *Identification of major hazard installations for dangerous chemicals* (GB18218-2009). Specific judgment basis can be seen in Table 8.1-1.

表 0-1 物质危险性判定依据见表

Table 8.1-1 Substance risk judgment reference

类别 Type		LD_{50}(大鼠经口) LD_{50}(rat oral) (mg / kg)	LD_{50}(大鼠经皮口) LD_{50}(rat, skin, oral) (mg / kg)	LC_{50}(小鼠吸入，4小时) LC_{50}(mice, inhaled, 4h) (mg / L)
有毒物质 Toxic substance	1	<5	<l	<0.01
	2	$5<LD_{50}<25$	$10<LD_{50}<50$	0．$1<LC_{50}<0.5$
	3	$25<LD_{50}<200$	$50<LD_{50}<400$	0．$5<LC_{50}<2$
易燃物质 Flammable substance	1	可燃气体一在常压下以气态存在并于空气混合形成可燃混合物；其沸点(常压下)为20℃或20℃以下的物质。 Combustible gas- substance existing in gaseous state under normal pressure, and forming combustible mixture with air; with boiling point (under normal pressure) at 20℃ or below 20℃		
	2	易燃液体一闪点低于21℃，沸点高于20C的物质。 Inflammable liquid- substance with flash point lower than 21℃ and boiling point higher than 20℃.		
	3	可燃液体一闪点低于55℃，压力下保持液态，在实际操作条件下(如高温高压) 可以引起重大事故的物质。 Combustible liquid – substance with flash point lower than 55℃, keeping in liquid state under pressure, and causing serious accident under actual operating conditions (such as high temperature and high pressure)		
爆炸性物质 Explosive substance		在火焰影响下可以爆炸，或者对冲击、摩擦比硝基苯更为敏感的物质。 Substance which may be explode under impact of flame, or more sensitive to impact and frication than nitrobenzene		

注：①有毒物质判定标准序号为1、2的物质，属于剧毒物质；符合有毒物质判定标准序号3的属于一般毒物。②凡符合表中易燃物质和爆炸性物质标准的物质，均视为火灾、爆炸危险物质。

Note: ① The substances with No. 1 and 2 according to toxic substance judgment standard belong to highly toxic substance; with No. 3 belong to common toxic substance; Substances complying with standards as combustible and explosive substances in the table shall be deemed as hazardous substances for fire and explosion.

根据项目特征，纸品、淀粉和废纸等原料均为无毒，原料废纸及产品纸为可燃物质。因此，本项目无危险物质。

According to features of this project, raw materials of papers, starch and wastepaper are non-toxic, and raw material wastepaper and product papers are combustible substances. Therefore, this project has no hazardous substance.

8.1.1.2 生产、储运、公用设施风险识别

8.1.1.2 Recognition of production, storage, transportation and public facility risks

从危害角度可将区域性危险分为：毒物泄漏，通过摄入对人造成伤害；火灾，以热辐射对人造成伤害和对财产造成损失；爆炸，以冲击波和抛射物对人造成伤

害和对财产造成损失。

From the angle of hazards, the regional risks are divided into: toxicant leak, causing damage to human body through ingestion; fire and thermal radiation, causing damage to human body and loss to properties; explosion, shock wave and projectile, causing damage to human body and loss to properties.

表 0-2 列出了建设项目可能产生风险的工程建设情况，表 0-3 列出了厂区内不同工作区可能存在的环境风险类型。

Table 8.1-2 lists project construction situations which may generate risks to construction projects, while Table 8.1-3 lists possible environmental risk types in different plant zones of the plant area.

表 0-2　拟建项目可能产生风险工作区一览表

Table 8.1-2 List of working zones with possible risks in planned project

工作区 Working zone	工程名称 Project name	主要工艺流程 Main process flow
成品仓库 Finished product warehouse	成品仓库 Finished product warehouse	成品储存 Finished product storage
辅料制备仓库 Accessory preparation warehouse	辅料制备仓库 Accessory preparation warehouse	原辅料储存 Raw material and accessory storage
综合仓库 Comprehensive warehouse	综合仓库 Comprehensive warehouse	成品、原辅料储存 Finished products, raw material and accessory storage
依托污水处理站 Sewage treatment station	污水处理站 Sewage treatment station	污水处理 Sewage treatment

表 0-3　拟建项目不同工作区的环境风险类别

Table 8.1-3 Environmental risk types in different working zones of the planned project

工作区 Working zone	风险类别 Risk type			环境危害 Environmental hazards		
	火灾 Fire	爆炸 Explosion	毒物泄露 Toxicant leak	人员伤亡 Casualty	财产损失 Property loss	环境污染 Environmental pollution
成品仓库 Finished product	√			√		

warehouse						
辅料制备仓库 Accessory preparation warehouse	√			√		
综合仓库 Comprehensive warehouse	√			√		
依托污水处理站 Sewage treatment station						√

备注：建设单位已为该污水处理站设置了1.2万m^3的事故水池及相应的应急预案。

Remarks: the construction unit has set 12,000 m^3 accident water pool and corresponding emergency plan to the sewage treatment station.

根据对拟建项目生产设施的危险性和毒性分析，存在火灾及环境污染对环境造成的环境风险。

In accordance with risk and toxicity analysis for production facility of the planned project, there is environmental risk caused to environment by fire and environmental pollution.

8.1.1.3 重大风险源识别

8.1.1.3 Recognition of major risk sources

结合《危险化学品重大危险源辨识》（GB18218-2009）与《建设项目环境风险评价技术导则》(HJ/T169－2004)中辨识重大危险源的依据和方法，对本项目所有危险源进行识别，判别方法如下：

All hazard sources of this project will be recognized in accordance with basis and methods for major hazard source in *Identification of major hazard installations for dangerous chemicals* (GB18218-2009) and *Technical guidelines for environmental risk assessment on projects* (HJ/T169-2004). The judgment methods are as follows:

单元内存在的危险物质为单一品种，则该物质的数量即为单元内危险物质的总量，若等于或超过相应的临界量，则定为重大危险源。

The hazardous substance in the unit is of single variety. The number of the substance is the total volume of hazardous substances in the unit. If the number equals to or exceeds corresponding threshold quantity, the hazardous substance shall be confirmed as major hazard installation.

单元存在的危险物质为多品种时，则按下式计算，若满足下式，则定为重大危险源。

The hazardous substances in the unit which are of multiple varieties shall be calculated according to the following formula; if the formula is satisfied, the hazardous substance shall be confirmed as major hazard installation.

$$\frac{q_1}{Q_1}+\frac{q_2}{Q_2}+\ldots\ldots+\frac{q_n}{Q_n}\geqslant 1$$

式中：q_1、q_2……q_n—每种危险物质实际存在量，t；

In the formula, q_1 ,q_2, …q_n- physical presence of every kind of hazardous substance, t;

Q_1、Q_2……Q_n—与各危险物质相对应的生产场所或贮存区的临界量，t。

Q_1, Q_2,…Q_n – threshold quantity of production site or storage site corresponding to each hazardous substance, t;

根据核查，本项目产品及原辅材料均不属于《危险化学品重大危险源辨识》（GB18218-2009）范围内，因此本项目无重大危险源。

In accordance with the investigation, the products, raw materials and accessories in this project do not belong to the scope of *Identification of major hazard installations for dangerous chemicals* (GB18218-2009). Therefore, this project has no major hazard installation.

8.1.2 风险评价等级与范围

8.1.2 Risk evaluation grade and scope

拟建项目使用的各类化学品均不属于 GB18218-2009《危险化学品重大危险源辨识》中的危险化学品，确定本项目环境风险评价等级为二级，评价范围为距离拟建项目中心点 3km 的范围。

Various chemicals in the planned project do not belong to the hazardous chemicals in *Identification of major hazard installations for dangerous chemicals*

(GB18218-2009). The environmental risk evaluation grade of this project is confirmed as Grade II, and the evaluation scope is the area 3km around the central point of planned project.

8.1.3 风险评价范围内主要敏感点分布

8.1.3 Main sensitive point distribution in risk evaluation scope

拟建项目风险评价范围内主要的敏感目标详见表 0-4。

Main sensitive objects within risk evaluation scope of the planned project can be seen in Table 8.1-4.

表 0-4 风险评价范围内主要敏感目标情况

Table 8.1-4 Main sensitive objects within risk evaluation scope

序号 No.	村庄名称 Name of village	所属行政村 Administrative village	与厂界距离（m） Distance from plant boundary (m)	主要环境特征 Main environmental features
1	沙坂村 Shanban Village	东侧 East side	0.035km	2189人，农业、养殖 2189 persons, agriculture, cultivation
2	丁厝村 Dingcuo Village	西侧 West side	0.06km	800人，农业、养殖 800 persons, agriculture, cultivation
3	蔡店村 Caidian Village	南侧 South side	0.06km	1221人，农业、养殖 1221 persons, agriculture, cultivation
4	埔尾村 Puwei Village	南侧 South side	0.06km	2581人，农业、养殖 2581 persons, agriculture, cultivation
5	杨厝村 Yangcuo Village	西南侧 Southwest side	0.65km	3007人，农业、养殖 3007 persons, agriculture, cultivation
6	上房村 Shangfang Village	东北侧 Northeast side	1.8km	1618人，农业种植 1618 persons, agriculture plantation
7	吴宅村 Wuzhai Village	西北侧 Northwest side	2.4km	4544人，农业种植 4544 persons, agriculture plantation
8	流传村 Liuchuan Village	西南侧 Southwest side	1.95km	3776人，农业、养殖 3776 persons, agriculture, cultivation
9	南门村	东南侧	1.95km	3640人，农业、养殖

	Nanmen Village	Southeast side		3640 persons, agriculture, cultivation
10	埭头村 Daitou Village	东南侧 Southeast side	2.7km	1810人，农业、养殖 1810 persons, agriculture, cultivation
11	石美村 Shimei Village	东侧 East side	1.7km	5464人，农业种植 5464 persons, agriculture plantation
12	东山村 Dongshan Village	东北侧 Northeast side	2.4km	4983人，农业种植 4983 persons, agriculture plantation

8.2 风险分析

8.2 Risk Analysis

8.2.1 火灾和爆炸

8.2.1 Fire and explosion

原料及成品堆存过程中存在的环境风险为火灾问题。诱发火灾的因素主要有：违章吸烟、动火；进入储存场所的机车烟囱上未安装火星熄灭器；使用气焊、电焊等进行维修时，未采取有效防护措施；电气线路和电气设施在开关断开、接触不良、短路、漏电时产生火花，以及静电放电火花；未采取有效避雷措施，或者避雷措施失效而导致雷击失火等。

The environmental risk during raw material and finished product pile-up is fire. Main factors causing fire are smoking and open fire; spark arrester is not installed to automobile chimney entering the storage site; effective preventive measures are not adopted when repairing with gas welding and electric welding; spark and electrostatic discharge spark is generated to electric wire and electric facilities during switch-off, bad contact, short circuit and electric leakage; effective lightning shielding measures are not adopted, or the lightning shielding measures fail, leading to fire by lightning stroke.

8.2.1.1 风险影响评价

8.2.1.1 Risk impact assessment

发生火灾对环境的污染影响主要来自成品纸燃烧释放的大量有害气体，由于燃烧产生的有害气体释放量难以定量，本次评价主要定性分析火灾发生时产生的

有害气体对周围环境的影响。

The pollution impact of fire on environment is mainly from large amount of hazardous gas released by finished paper combustion. Since the harmful gas release quantity generated by combustion is difficult to quantize, this evaluation mainly carries out qualitative analysis on impact of harmful gas on ambient environment in case of fire.

在正常情况下，空气的组成主要有氮气、洋气、氩气、二氧化碳及氢、氖、臭氧、氪、氙和尘，而废纸火灾所产生的烟雾的成分主要为二氧化碳和水蒸气，这两种物质约占所有烟雾的 90%~95%；另外还有一氧化碳、碳氢化合物、氯化氢、硫化物、氮氧化物及微粒物质等，约占 5%~10%，对环境和人体健康产生较大危害的是 CO、NOx、硫化物、烟尘等有害物质。

Under normal circumstances, main components of air are nitrogen, oxygen, argon, carbon dioxide, hydrogen, neon, ozone, krypton, xenon and dust, while main components of smoke generated by fire caused by waste paper are mainly carbon dioxide and water steam, which account for 90%~95% of the entire smoke; moreover, contents of carbon monoxide, hydrocarbon, hydrogen chloride, sulfide, nitrogen oxide and particulates account for 5%~10%. Harmful substances such as CO, NOx, sulfide and smoke may generate hazards greatly to the environment and human health.

一氧化碳产生量相对较大，危害也较大，一氧化碳的浓度过高或持续时间过长都会使人窒息或死亡。一般情况下，火灾附近的一氧化碳的浓度较高（浓度可达 0.02%），而距离火场 30m 处，一氧化碳的浓度逐渐降低（0.001%）。因此，近距离靠近火场会有造成一氧化碳中毒的危险。据以往报道，在火灾造成的人员死亡中，3/4 的人死于有害气体，而有害气体中一氧化碳是主要的有毒物质。

The output of carbon monoxide is relatively large, and hazard is large. Excessive concentration of carbon monoxide or long duration may cause people suffocated or died. In general, the concentration of carbon monoxide is high (0.02%) near the fire, while the concentration is reduced gradually (0.001%) in the area 30m from the fire site. Therefore, when approaching to the fire, it may be dangerous to get carbon monoxide poisoning. According to former reports, among death caused by fire, 3/4 is died from harmful gases, while in the harmful gases, carbon monoxide is the major toxic substance.

8.2.1.2 火灾发生时对近距离村庄的影响分析

8.2.1.2 Analysis on fire impact on nearby villages

火灾发生时对厂区周围近距离村庄也将产生一定影响，周围最近村庄为厂区东侧的沙坂村，距离仓库的最近距离约 400m，位于拟建项目原材料及成品仓库东侧。火灾发生时有害气体的浓度会得到有效的扩散与稀释，对沙坂村环境空气质量只产生暂时性影响。

The fire may generate certain impact on villages close to the plant zone. The nearest village is Shaban Village on the east side of the plant zone, and the nearest distance from the warehouse is 400m, on the east side of raw material and finished product warehouse of the planned project. In case of fire, harmful gas concentration may be effectively scattered and diluted, and may generate temporary impact on ambient air quality of Shaban Village.

在火灾发生时，燃料含水量大或者供氧不足时可产生更过的一氧化碳，一般情况下火灾附近的一氧化碳的浓度较高（浓度可达 0.02%），而距离火场 30m 处，一氧化碳的浓度逐渐降低（0.001%），可降低到 1g/g 以下，不会对人体健康产生危害；在火场之外的空间内，由于新鲜空气与烟雾之间的对流，烟雾的浓度被稀释，对人体的伤害较小，，不会对 400m 外的沙坂村村民造成伤害。

In case of fire, more carbon monoxide may be generated if the fuel water content is large or oxygen supply is insufficient; in general, the concentration of carbon monoxide near the fire site is high (0.02%), while the concentration is reduced gradually (0.001%) in the area 30m from the fire site. It may be reduced below 1g/g, and will not harm human health; in the space outside the fire, due to convection current between fresh air and smoke, the smoke concentration will be diluted, and generate less harm to human body, and will not harm villagers in Shanban Village 400m outside.

因此，火灾发生时，烟气在短时间内会造成周围敏感点环境空气质量一定程度的恶化，但不会对人体健康造成损害。

Therefore, in case of fire, the smoke may be deteriorated ambient air quality on nearby sensitive points to certain degree in a short time, but not harm health of human body.

8.2.2 事故排放

8.2.2 Accident release

（1）废水事故排放

(1) Accident release of wastewater

拟建项目产生的废水（12614m^3/d）全部进入污水处理站进行处理，由于污水处理设施失效或部分失效，生产废水未经处理或不能达到设计要求的排放，将可能对厂外地表水及海域水质产生不良影响。

The wastewater (12614m^3/d) generated by the planned project will be fully treated in the sewage treatment station. Where the production wastewater is discharged without treatment or failing to reach designed requirements due to failure or part failure of sewage treatment facilities, it may generate adverse impact on surface water outside the plant and sea water quality.

对于拟建项目，生产线等生产运行系统若发生泄漏事故，一般都将该异常废水排至事故池，事故经处理后，该废水逐步调节回抽到污水处理站处理达标后排放；相对于上述事故而言，污水处理站发生故障则更有可能导致未经处理达标的废水直接排放对地表水体造成污染的事故发生。

For the planned project, in case of leakage accident of production operating system such as production line, the abnormal wastewater will be drained to the accident pool. After accident treatment, the wastewater will be gradually adjusted and pumped to sewage treatment station, and discharged after reaching standard in the sewage treatment station; relative to aforesaid accident, the failure of sewage treatment station may possibly generate accident of ground water pollution due to direct discharge of untreated wastewater.

根据 GB50016-2006《建筑设计防火规范》，按一次火灾最大消防用水量考虑，消防用水量为 50L/s，火灾延续时间按 3 小时计算，则消防水设计用量为

540m^3。

In accordance with GB50016-2006 *Code of design on building fire protection and prevention*, the fire water volume shall be 50L/s according to the maximum water consumption volume of primary fire; assuming the fire last for 3hours, the designed fire water consumption is 540m^3.

另外，根据《制浆造纸废水治理工程技术规范》（HJ2011-2012），防治发生事故非正常排放，对末端治理系统造成严重破坏，建设单位须设置事故池，事故池有效容积应容纳最大一次事故排放的废水总量。拟建项目投产后，全厂的废水排放量为 56844m^3/d，目前，建设单位已为该污水处理站设置了 1.2 万 m^3 的事故水池，可容纳 4.8h 的事故排放废水，厂内造纸生产线平均一个生产周期为 2h，满足《制浆造纸废水治理工程技术规范》（HJ2011-2012）中事故池有效容积应容纳最大一次事故排放的废水总量的要求。

Moreover, in accordance with *Technical specifications for pulp and paper industry wastewater treatment* (HJ2011-2012), to prevent abnormal discharge of accident and serious damage caused to the end treatment system, the construction unit must set accident pool, the effective capacity of which shall be able to contain total wastewater discharged by the largest primary accident. After the planned project is put into production, the wastewater discharge in the entire plant shall be 56844m^3/d. Currently, the construction unit has set a 12,000 m^3 accident pool which contains 4.8h accident discharge release to the sewage treatment station. An average production cycle of the papermaking production line in the plant is 2h, meeting the requirements for effective capacity of accident pool to contain total wastewater discharged by the maximum primary accident in *Technical specifications for pulp and paper industry wastewater treatment* (HJ2011-2012).

因此厂区内设置的事故水池可满足拟建项目投产后污水处理站废水事故排放。

Therefore, the accident pool set in the plant zone can meet accident discharge of wastewater from sewage treatment station after the planned project is put into operation.

本项目厂区各设有雨水排放口和污水接管口，将根据国家环保总局《关于开展排污口规范化整治试点工作的通知》和《关于加快排污口规范化整治试点工作的通知》精神，做好排污口的规范化设置工作，在排口处设立明显的环境保护圆形标志牌、围护桩及装备废水流量计。项目雨水排口设置切换装置，事故发生后应第一时间切断雨水外排口，使废水全部收集到事故水池，根据项目组成，事故废水其可能的主要污染物为 COD、BOD_5、色度、SS，收集后暂存，待事故排除后，进入厂区污水处理站处理，达 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 要求方可排放。

The plant zone of this project sets rainwater discharge outlets and sewage feed nozzles. The normalized setup of sewage drainage exits shall be arranged in accordance with the *Notice of Carrying out Pilot for Normalized Rectification of Sewage Drainage Exits* and *Notice on Accelerating Points for Normalized Rectification of Sewage Drainage Exits* issued by the State Environmental Protection Administration, and obvious round mark for environmental protection, fender posts and equipment wastewater flow meter shall be set on the exits. The switch device shall be set for rainwater drainage exit to cut off rainwater drainage exit at the first time after the accident to collect wastewater to accident pool fully. In accordance with project composition, main pollutants of accident wastewater are COD, BOD_5, chromaticity and SS. The wastewater shall be stored temporarily after collection, and after the accident is removed, the wastewater shall be treated in the sewage treatment station in the plant zone, and discharged after reaching requirements in Table 1 of DB35/1310-2013 *Discharge standard of water pollutants for pulp and paper industry*.

8.3 风险防范措施

8.3 Risk Prevention Measures

8.3.1 项目设计风险防范措施

8.3.1 Preventive measures for project design risks

拟建项目厂址内设有三级风险防范措施，避免事故废水进入外环境造成污染：

Three-level of risk preventive measures are set on plant site of the planned project, avoiding pollution caused by accident wastewater's entering into external environment:

（1）一级风险防范措施——地沟

(1) Primary risk prevention measure – Ditches

拟建项目各车间内建有地沟，地沟内设泵、管线与厂区事故池相连。若车间发生泄漏事故，泄漏物料进入地沟，待事故妥善处理后将可回收部分进行回收利用，不可回收部分分批送至污水处理站进行处理后达标排放。

The workshops of the planned project build ditches, which set pump, pipeline connecting with accident pool of the plant zone. In case of leakage accident in the workshop, and materials leaked enter into ditches, the recoverable materials after proper treatment will be recycled; while the unrecovered parts will be sent to sewage treatment station and discharge after reaching standards.

（2）二级风险防范措施——依托厂内现有事故池

(2) Secondary risk prevention measure – Existing accident pool in the plant

公司设有事故池一座，设置在污水处理站，容积为 12000m^3。正常情况下，应保证事故池内不能存放废水或其他水，降水时积聚的水应及时排空。

The Company sets one accident pool in the sewage treatment station with capacity of 12000m^3. In normal case, the accident pool shall not store wastewater or other water, and water accumulated during rainfall shall be drained up in time.

若车间泄漏物料超过车间围堰高度的三分之二，应立即打开阀门，将泄漏物料引入事故池中，避免泄漏物料溢流出围堰进入雨水系统或直接进入外环境，待事故妥善处理后，将可回收部分进行回收利用，不可回收部分分批送污水处理站处理后达标排放；若泄漏物料量超过事故池容量的三分之二而事故仍无法得到有效控制，应立即采取停产措施。

If the level of materials leaked in the workshop exceeds two thirds high of the cofferdam, open the valve immediately to introduce the leaked materials into accident pool, and avoid spilled leaked materials flowing into rainwater system or directly entering external environment. After suitable treatment, the recoverable materials after proper treatment will be recycled; while the unrecovered parts will be sent to sewage treatment station and discharge after reaching standards. If the accident cannot be controlled effectively when the leaked materials exceed two thirds of accident pool capacity, shutdown measures shall be adopted immediately.

（3）三级风险防范措施——依托厂内现有雨水闸阀

(3) Third-level risk prevention measure – Existing rainwater sluice valves in the plant

一般情况下，事故发生后，一级、二级风险防范措施即能够将事故控制在厂内，不会对海域水环境造成不良影响，但由于自然灾害等强烈不可抗力造成的危害则更加难以控制。

In general, after the accident, the primary and secondary risk prevention measures may control the accident within the plant, without causing adverse impact on seawater environment. However, hazards caused by fierce force majeure such as natural disasters are more difficult to control.

公司在厂区雨水总排口设置闸阀，一旦由于自然灾害等强烈不可抗力造成物料或污水泄漏，停产后一级、二级风险防范措施未能全部储存物料或污水，或由于自然灾害等不可抗力因素造成围堰、事故池破裂，立即关闭闸阀，避免事故废水由雨水排口进入外环境，最大限度将环境事故风险控制在厂区范围内。

The Company sets sluice valve at the general drain exit of rainwater in the plant zone. In case of material or sewage leakage due to fierce force majeure such as natural disasters, if the primary and secondary risk prevention measures after suspension failed to store materials or sewage fully, or the cofferdam or accident pool is cracked due to force majeure of natural disasters, the sluice valves shall be closed immediately so as to avoid accident waste entering external environment from rainwater drainage exit and control the environmental accident risks within plant scope maximally.

8.3.2 火灾爆炸事故防范措施

8.3.2 Prevention measures for fire and explosion accident

2014 年底，联盛纸业（龙海）有限公司成品仓库发生火灾，在发生此次火

灾事故后，企业认真对照《联盛纸业（龙海）有限公司突发环境事件应急预案》的要求，对风险防控中存在的问题予以认证的整改，具体整改内容如下：

In the end of 2014, finished product warehouse of Liansheng Paper Industry (Longhai) Co., Ltd. broke out a fire. After the fire accident, the enterprise shall carefully rectify the problems during risk prevention and control. Specific rectification contents are as follows:

（1）完善消防报警系统

(1) Perfect fire alarm system

各生产车间及成品仓库均按照消防报警规范安装烟感及红外传感器，确保在遇有火警的情况下第一时间发出报警信号。

Each production workshop and finished product warehouse shall install smoke detector and IR sensor according to fire alarm norms to guarantee to issue alarm signal as long as fire alarm is issued.

（2）安装自动灭火装置

(2) Install automatic fire extinguishers

造纸车间完成工段及成品仓库均安装自动寻的自动消防水炮，与报警系统联动，火警当有火警时系统会在 120 秒内捕捉火源并喷水灭火。

The completion section of papermaking workshop and finished product warehouse are installed with homing automatic fire monitor, which is linked with the alarm system. In case of fire alarm, the system will capture the fire source and spray water to extinguish the fire within 120s.

（3）完善防火隔离和防火分区

(3) Perfect fire partition and fire compartment

对于废纸仓库、成品仓库等重点消防部位，严格按照消防规范要求保持一定的防火间距，同一座仓库内用防火隔墙分隔防火分区，将火灾的影响控制在最小的范围内。

For key fire control parts such as wastepaper warehouse and finished product warehouse, certain fire distance shall be kept strictly pursuant to fire specifications. The some warehouse shall be divided into fire compartments with fire partitions to control the impact of fire within the minimum scope.

另外还加强了《成品车间现场处置预案》等演练，完善了厂内的风险防范体系。

Moreover, the drill of On-site disposal contingency of finished product workshop is reinforced, and risk prevention system in the plant is perfected.

拟建项目要从以下方面做好火灾事故的风险防范措施：

The planned project shall carry out risk prevention measures of fire accidents from the following aspects:

（1）企业及外部消防设施

(1) Enterprise and external fire-fighting facilities

拟建项目从给水、建筑、电力、总平面布置等多个方面配备了完善的消防措施，详述如下：

The planned project is equipped with perfect fire-fighting measures from aspects of water supply, building, power and general layout, specifically as follows:

①给水消防

①Fire water supply

依据 GB50016-2014《建筑设计防火规范》设置室外消火栓给水系统和室内消火栓给水系统。

In accordance with GB50016-2014 *Code for fire protection design of buildings*, the outdoor fire hydrant water supply system and indoor fire hydrant water supply system are set.

②建筑消防

②Building fire protection

建筑设计耐火等级为二级。按防火规范的要求设置出入口及疏散楼梯，在疏散出入口设置疏散标志。按消防规范的要求设置防火分区，各防火分区用防火墙分隔，有门洞处，采用防火门。根据防火规范要求选用建筑材料及构造作法。

The designed fire resistance rating of building shall be Grade II. The exit and emergency staircase shall be set according to requirements of fire specifications, and escape sign is set on exits/entrance. Fire compartment shall be set according to requirements of fire specifications, which are separated by fire partitions. Fire walls shall be adopted at door holes. The building materials and structural practices shall be selected according to fire specifications.

③电力消防

③Electric power fire protection

本工程设置若干消防电源，各生产车间内设置局部照明、事故照明、应急照明及疏散指示标志，在热电站主控楼控制室设置区域火灾报警控制系统。在变压器室、配电室采用防火门窗，并设置相应的灭火设施。

This project sets several fire power sources, and each production workshop sets local lighting, accident lighting, emergent lighting and escape indicating signs. Regional fire alarm control system is set in console room of master control building of the thermal power plant. Fire doors and windows shall be adopted in transformer room and electrical distribution room, with corresponding fire-extinguishing installations.

④总平面布置消防

④General layout fire protection

新建建筑物的平面布置，按现行 GB50016-2014《建筑设计防火规范》执行。厂区内道路布置通畅，满足视距及消防车通行要求。建构筑物的耐火等级按二级标准设计。

The general layout of newly built building shall follow GB50016-2014 *Code for fire protection design of buildings*. The roads inside the plant zone are arranged smoothly, and meet traffic requirements for sight distance and fire trucks. The fire resistance rating of buildings and structures shall be designed according to level II standards.

（2）原料堆场、成品库火灾

(2) Fire in raw material yard and finished product warehouse

为了避免或减少火灾发生，在原料堆场和成品仓库四周每隔一定距离设置消防栓；消防用水储存于生产、消防高位水池中，并设有消防用水不被他用的技术设施，以保证用水安全。若发生火灾事故，应立即启用应急预案，进行灭火处理，

消防废水不能直接排放，须排入事故池暂存，经监测处理达标后方可外排，若监测超标，应分批进入污水处理站处理达标后排放。

In order to avoid or reduce fire accident, fire hydrants shall be set every certain distance on raw material yard and around the finished warehouse; the fire water is stored in production and fire high level tank, and other technical facilities not for other purpose shall be set to guarantee water safety. In case of fire accident, immediately launch emergency plan to extinguish the fire. The fire control wastewater shall not be discharged directly, and must be drained to accident pool for temporary storage and discharged after reaching standard under supervision. If the wastewater exceeds standards after monitoring, the wastewater shall be discharged before sending to sewage treatment station in batches and reaching standard after treatment.

对于成品仓库和其它消防要求高的车间，要设置自动喷水灭火系统，并配置报警、烟感、水流指示器等装置；同时根据 GB50016-2014《建筑设计防火规范》及 GB50140-2005《建筑灭火器配置设计规范》在各车间内设置室内消火栓及灭火器，并在室内消火栓上设置报警阀。

The automatic sprinkling fire extinguisher shall be set in finished product warehouse and other workshop with higher fire control requirements, equipped with devices such as alarm, smoke detector and water flow indicator; in the meantime, according to GB50016-2014 *Code for fire protection design of buildings* and GB50140-2005 Code for design of extinguisher distribution in buildings, indoor fire hydrant and fire extinguisher shall be set in each workshop and alarm valves shall be set to indoor fire hydrants.

8.3.3 事故排放风险防范措施

8.3.3 Prevention measures for accident release risks

建议在正常情况下保证事故池内不能存放废水或其它水，降雨时积聚的雨水及时排空，当发生各种可能引起水污染的事故时保证泄漏和消防、冲洗废水能迅速、安全的集中到事故池，然后逐步进入污水处理装置进行必要的处理，不致发生事故排放，污染环境。项目事故状态下的废水收集系统见图 8.3.1

In normal circumstance, it is recommended to guarantee not store wastewater or other water in accident pool. During rainfall, the rainwater accumulated shall be drained in time, and guarantee leakage and fire, washing wastewater may be rapidly, safely and intensively into accident pool and then to sewage treatment device for necessary treatment in case of various accidents which may possibly lead to water pollution accident so as to avoid accident release and environment pollution. The wastewater collection system under accident state can be seen in Fig. 8.3.1.

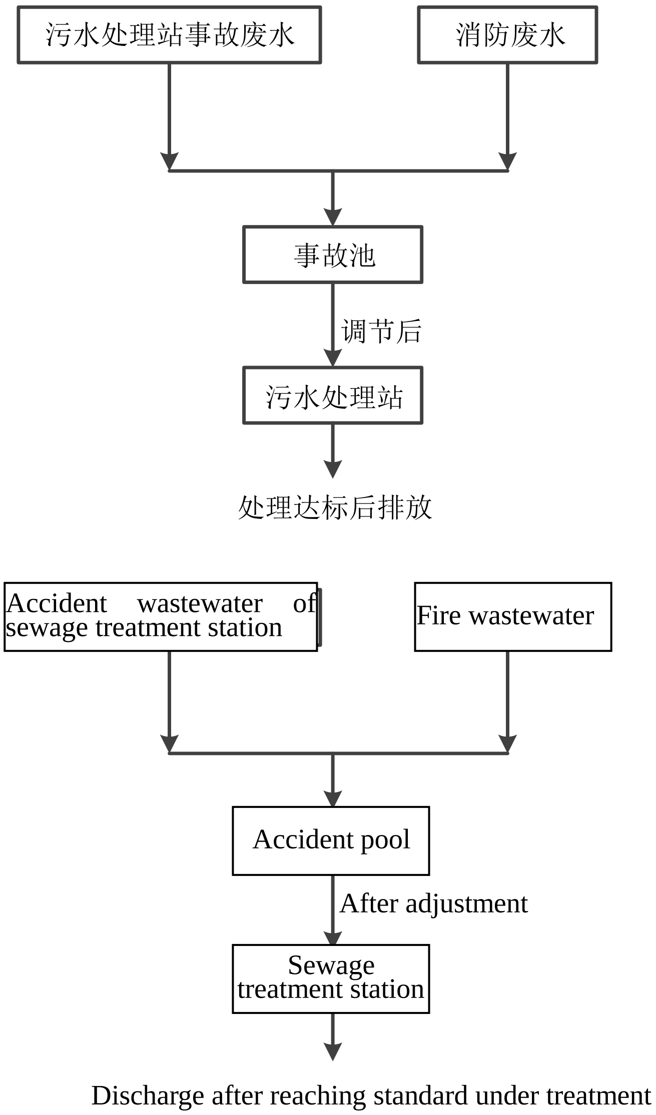


图 0-1　事故废水收集系统

Fig. 8.3-1 Accident wastewater collection system

主要生产装置区域应防止工艺过程及产品装卸过程“跑、冒、滴、漏”的物料对外环境造成污染、需对所涉及地面区域进行硬化，一旦发生污水及化学品泄漏，

立即进行紧急处理，若泄漏物料无法回用，应及时将污染物引入事故池暂存，并分批进入污水处理站处理。

The main production facility zone shall prevent the leaked materials during processing and product handling from damaging pollution to external environment. The ground area involved shall be hardened. In case of sewage and chemical leakage, emergent treatment shall be carried out immediately; if the leaked materials cannot be recovered, the pollutants shall be introduced to accident pool for temporary storage and sent to sewage treatment station in batches for treatment.

①污水处理站发生故障

① Failure of sewage treatment station

当污水处理站发生故障时，应立即通知机修人员排查、检修，若是短时间内无法修好，则要求厂区停止生产，防止污水进入。

In case of failure of sewage treatment station, machine maintenance personnel shall be notified to troubleshoot and repair; if it is unable to repair in a short time, the plant zone shall end production to prevent from sewage entering.

②污水管道破损

② Sewage pipeline damage

拟建项目污水管道要严把质量关，采用良好的抗腐蚀管道，当发生污水管道发生破损时，应立即关闭雨污水切换阀，同时上报应急办公室，办公室通知抢险抢修组成员及时赶到管道破损区域，在管道破裂处选择适当的管道连接卡箍或管道快速连接器等应急堵漏工具进行修补，将泄漏量控制在最小。若泄漏源大，立即考虑停产，停止污水排放，待管道修复后再恢复生产。

The quality of sewage pipeline of the planned project shall be controlled strictly. Favorable corrosion-resisting pipelines shall be adopted. In case of damage of sewage pipeline, the rainwater/sewage switch valve shall be closed immediately, and meanwhile the damage shall be reported to the emergency office. The office shall notify the rescue and repair group members to repair the rapture of pipeline with emergent plugging tools such as suitable pipeline connecting clamp or pipeline rapid adapter, and control the leakage volume to the minimum. If the leakage source is large, consider stopping production, and stopping sewage discharge; recover production after pipeline is repaired.

③消防废水

③ Fire wastewater

若发生火灾或者爆炸事故，有大量的消防废水产生时，抢险抢修组长立即关闭污水排放口应急阀门，利用双回路电源将事故废水从雨水缓冲池抽至事故应急池暂存，防止事故废水排出厂外。待事故结束后将事故废水排入厂区自建污水处理站处理达标后排放。

If large amount of wastewater from fire control is generated in fire or explosion, the leader of rescue and repair group shall immediately turn off emergency valve of sewage drainage exit; pump accident wastewater from rainwater buffer pool to accident emergency pool with double-circuit supply to prevent accident wastewater from being discharged outside the plant. After the accident is ended, the accident wastewater shall be drained to sewage treatment station of the plant zone, and discharged after reaching standard through treatment.

为监控厂区地下水环境质量及项目对地下水环境的影响，项目建成后须对地下水进行定期监测。

In order to monitor impact of underground water environment quality on underground water of the plant zone, it is necessary to regularly monitor the underground water after the project is completed.

8.3.4 风险防范管理要求

8.3.4 Management requirements for risk prevention

拟建项目应严格执行《关于进一步加强环境影响评价管理防范环境风险的通知》（环发[2012]77 号）的有关规定：

The planned project shall strictly follow relevant regulations of *Notice on Further Strengthening Environment Impact Assessment Management and Preventing Environmental Risks* (HF [2012] No. 77):

（1）在设计方案确定后、设计文件批复前，逐项对比防治污染、防止生态

破坏以及防范环境风险设施的设计方案与环境影响评价文件及批复要求的相符性，建设单位应将上述环保设施在设计阶段的落实情况报环境影响评价文件审批部门备案，并抄报当地环保部门。

(1) After the design plan is confirmed and before the design document is approved, the conformity between the design plan of pollution prevention, ecological damage prevention and environmental risk prevention facilities and EIA document and approval requirements shall be confirmed item by item. The construction unit shall report implementation of aforesaid environmental protection facilities in design stage to EIA document approval department for filing and copy to local environmental protection department.

（2）建设单位应委托环境监理单位开展环境监理工作，重点关注项目施工过程中各项防治污染、防止生态破坏以及防范环境风险设施的建设情况。

(2) The construction unit shall entrust environmental supervision department to carry out environmental supervision, and mainly focus on construction of various pollution prevention, ecological damage prevention and environmental risk prevention facilities during project construction.

（3）申请试生产时，建设单位应将拟建项目设计阶段环保措施落实情况、环境监理报告和企业突发环境事件应急预案的备案材料一并提交。

(3) When applying for pilot production, the construction unit shall submit implementation situations of environmental protection measures in design stage, environment supervision report and filing materials of enterprise burst environmental event emergency plan jointly.

8.4 环境风险应急预案

8.4 Emergency Plan for Environmental Risks

企业目前已经制定了较为完善的突发环境风险应急预案，并且 2016 年 11 月编制完成《联盛纸业（龙海）有限公司突发性环境事件应急预案》，并于 2016 年 12 月 01 日于漳州台商投资区环境保护和安全生产监督管理局备案。

The enterprise now has formulated perfect emergency plan for outburst environment risks, and finished preparation of *Emergency Plan for Outburst Environmental Events of Liansheng Paper Industry (Longhai) Co., Ltd*. in November 2016. The emergency plans have been filed in Environmental Protection and Safety Production Supervisory Administration of Zhangzhou Taiwan Investment Zone on Dec. 1, 2016.

结合拟建项目特点，针对依托工程的现有风险源严格按照企业已经制定的突发环境风险应急预案执行，针对新增的生产设施风险源在现有突发环境风险应急预案基础上针对拟建项目进行完善。

In combination with characteristics of the planned project, the planned project is improved aiming at implementation of emergency plan for outburst environmental risks formulated according to existing risk sources of the project, and based on current outburst environmental risk emergency plan for newly added production facility risk sources.

拟建项目风险应急预案框架见表 0-1。

The framework of emergency plan for risks of the planned project can be seen in Table 8.4-1.

表 0-1 风险应急预案框架

Table 8.4-1 Framework of risk emergency plan

序号 No.	项目 Item	内 容 及 要 求 Contents and requirements
1	总则 General principles	本预案为联盛纸业（龙海）有限公司年产60万吨箱板纸工程环境风险应急预案，规定了其内容和要求，在后期的设计和建设中需加以落实，进一步具体化，并规定属于环境风险验收三同时检查内容 This emergency plan is made for environment risks of annual 600,000t cardboard paper project of Liansheng Paper Industry (Longhai) Co., Ltd., and regulates the contents and requirements, which shall be implemented and further concreted in later design and construction. The simultaneous design, construction and commissioning acceptance inspections regarding environmental risks are regulated.
2	危险源概况 Overview of hazard sources	详述危险源的种类、数量及其分布 Describe type, quantity and distribution of hazard sources

序号 No.	项目 Item	内 容 及 要 求 Contents and requirements
3	应急计划区 Emergency plan zone	生产车间、厂区、邻区 Production workshop, plant zone, adjacent zone
4	应急组织 Emergency organization	工厂： Plant: 厂区风险应急指挥部：负责现场的全面指挥 Risk emergency command center in the plant zone: take full charge of command on site 专业救援队伍：负责对事故的控制、救援、善后处理工作 Professional rescue team: take charge of accident control, rescue and rehabilitation 地区： Region: 应急指挥部：负责对邻区全面的指挥、支援、管制以及疏散工作 Emergency command center: take charge of comprehensive command, support, management, control and evacuation 专业救援队伍：负责对厂内专业救援队伍的支援 Professional rescue team: support the work of professional rescue team of the plant zone
5	应急状态分类及应急响应程序 Emergency state classification and emergency response procedures	针对事故的级别，对相应的事故采取应急分类管理程序 Adopt emergency classification management procedures of corresponding accidents aiming at accident levels
6	应急设施，设备与材料 Emergency facilities, equipment and materials	防火灾爆炸的应急设施、设备与材料，主要为相关的消防器材 Emergency facilities, equipment and materials for fire and explosion prevention, mainly fire facilities
7	应急通讯、通知和交通 Emergency communication, notice and transportation	规定事故风险下的通讯方式，通知方式以及交通管制的措施， Regulate communication ways, notification ways and traffic control measures under accident risks, 通讯方式：电话、对讲机、计算机网络 Communication way: telephone, interphone, computer network 通知方式：电话、对讲机、计算机网络 Notification way: telephone, interphone, computer network 交通保障：汽车为主 Traffic guarantee: mainly automobiles

序号 No.	项目 Item	内 容 及 要 求 Contents and requirements
		管制：厂区内部及其邻区交通道路 Management and control: internal and adjacent traffic roads of plant zone
8	应急环境监测及事故后评估 Emergency environment monitoring and post-accident evaluation	有专业队伍对事故造成的影响进行紧急监测，对事故的性质、参数以及后果进行评估，为指挥部门决策提供支持 Professional team shall carry out emergency monitoring on impact caused by the accident, evaluate accident nature, parameters and results, and provide decision-making of the command center
9	应急防护措施、清除泄漏措施方法和器材 Emergency protection measures, leakage removal measures, methods and apparatus	事故现场：控制事故、防止事故的蔓延及连锁反应，清除现场泄漏物，降低危害，配备相应的设施器材 Accident site: control the accident, prevent accident spreading and chain reaction, remove on-site leakage, reduce hazards and equip corresponding facilities 邻近区域：控制防火区域，防止链锁反应事故，控制和清除污染措施及相应设备配备 Nearby regions: control fire control region, prevent chain reaction accident, control and remove pollution and corresponding equipment
10	应急剂量控制、撤离组织计划、医疗救护与公众健康 Emergency dose control, withdrawal plan, medical rescue and public health	事故现场：事故处理人员对事故的应急剂量进行控制制定，现场撤离组织计划及救护 Accident site: control and formulate emergency dose for accident by accident treatment staff, onsite withdrawal plan and rescue 邻近区域：对受影响区域的邻近人员对毒物应急剂量规定，撤离组织计划及救护 Nearby regions: regulate emergency dose for toxicant for nearby personnel in area affected, withdrawal plan and rescue
11	应急状态终止与恢复措施 Emergent status termination and recovery measures	解除事故警戒，事故现场善后处理，恢复措施 Terminate accident guard, carry out rehabilitation on accident site, and adopt recovery measures
12	人员培训与演练 Personnel training and drill	应急计划制定后，厂区应按时组织人员进行培训和演练 After the emergency plan is formulated, the plant zone shall organize personnel training and drill
13	公众教育和信息 Public education and information	对厂区邻近地区，开展公众教育、培训并发布有关信息。 Carry out public education, training to adjacent area of the plant area, and release relevant information
14	记录和报告 Record and report	设置应急事故专门记录，建档案、设置专门报告制度 Set special record for emergent accident, establish files, and set

序号 No.	项目 Item	内 容 及 要 求 Contents and requirements
		special report system;
15	附件 Attachments	与应急事故有关的多种附件材料 Various attached materials with regard to emergency accident

8.4.1 总则

8.4.1 General principles

8.4.1.1 目的

8.4.1.1 Objective

为有效应对突发环境事故，提高企业应对突发环境事件的能力，将突发环境事件对人员、财产和环境造成的损失减少到最小、最大限度的保障人民群众的生命财产安全及环境安全，根据相关法律法规要求，结合项目实际，制定出本应急预案。在项目后期的实际实施中，还需要进一步的具体和细化。

In order to effectively cope to emergent environmental accident, improve ability of enterprise to cope to emergent environmental event, minimize losses caused to personnel, property and environment by emergent environmental events, and maximally guarantee live, property and environment safety of people, this emergency plan is formulated according to requirements of laws and regulations and combining actual situations of the project. In actual implementation in later stage, the plan shall be further specified and detailed.

8.4.1.2 使用范围

8.4.1.2 Scope of application

本应急预案适用于拟建项目及厂内所引发的突发环境污染事件，拟建项目可能发生的风险事故主要包括：火灾爆炸事故。

This emergency plan is applicable to outburst environmental pollution events incurred in the planned project and the plant. Possible risk accidents of the planned project are fire and explosion accident.

8.4.2 组织机构与职责

8.4.2 Organizational institution and responsibilities

本次评价应急预案设计的组织结构与场内现有应急预案组织体系相结合，将

拟建项目生产技术部纳入全厂组织体系中。应急预案的的应急组织体系如图 0-1。

This evaluation combines organizational structure designed by the emergency plan and organizational system in current emergency plan on site, and includes production technology department of the planned project into the whole plant organizational system. The emergency organizational system of the emergency plan can be seen in Fig. 8.4-1.

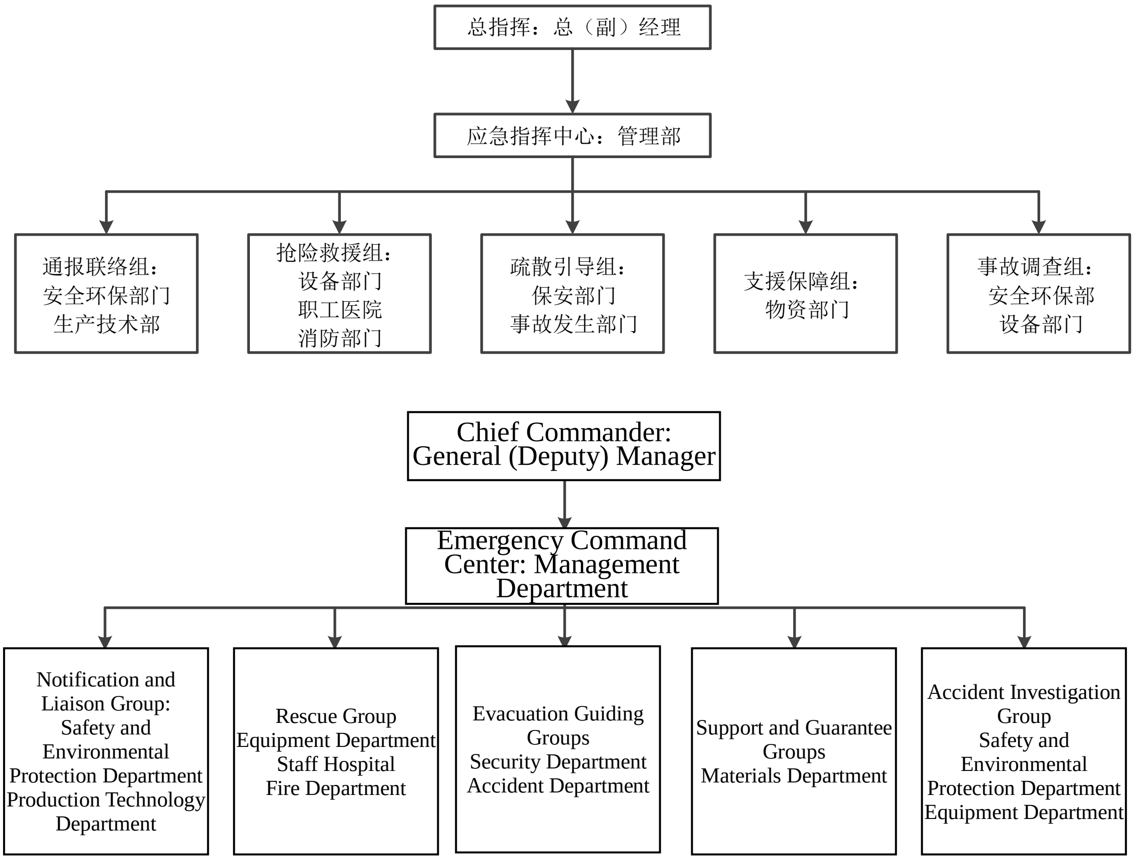


图 0-1　应急预案组织体系图

Fig. 8.4-1 Emergency Plan Organizational System Diagram

应急预案成立的领导小组应该包括各个技术部门，其中各个部门职责如下：

The leading group established according to emergency plan shall contain each technical departments, and responsibilities of various departments are as follows:

（1）总指挥：负责发布和解除应急预案，授权应急指挥中心开展应急救援活动；

(1) Chief commander: releasing and eliminating emergency plan, authorizing emergency command center to carry out emergency rescue;

（2）生产技术部门：负责事故报警、报告以及事故的处理工作；

(2) Production technology department: taking charge of accident alarm, report and accident treatment;

（3）设备部门：负责协助总指挥处理事故，组织成立应急抢险队，负责现场抢修的指挥；

(3) Equipment department: helping the Chief Commander to treat accidents, organizing emergency rescue team, and taking charge of command of field rescue;

（4）安全环保部门：处理事故及布置安全、环保防范措施，向政府对口机关进行报告事故情况，负责事故现场的应急监测工作；

(4) Safety and Environmental Protection Department: taking charge of accident treatment, safety and environmental prevention measures arrangement, reporting accident situations to authorized government organ, and taking charge of emergency supervision on accident site;

（5）保安部门：负责治安、警戒、疏散人群及现场保卫工作；

(5) Security department: taking charge of public security, guard, people evacuation and site protection;

（6）职工医院：负责指挥全体医护人员进行抢救受伤、中毒人员；

(6) Staff hospital: commanding all medical personnel for rescue of the injured and poisoned personnel;

（7）消防部门：负责查明有毒气体的性质，提出防范措施；实施中毒区域中毒人员救护；指挥人员疏散并且指挥灭火；

(7) Fire department: checking nature of poisonous gases, putting forward prevention measures; implementing poisoned staff rescue in the poisoned area; evacuating commander and commanding the fire extinguishment;

（8）物资部门：负责抢险物资的供应，保障生产必须品的供给。

(8) Materials department: supplying rescue materials and guarantying supply of production necessities;

8.4.3 信息报告与通知

8.4.3 Information report and notification

一旦发生风险事故，必须按照《国家突发环境事件应急预案》、《环境保护行政主管部门突发环境事件信息报告办法(试行)》及国家有关规定，第一时间及时地向应急指挥部进行报告，并且同时向上级主管部门和地方人民政府报告事故，确定 24 小时与相关部门的通讯、联络方式，以便及时采取相应的救援措施。

Once risk accident is incurred, relevant department shall report to local emergency command center at the first time in accordance with *National Emergency Plan for Abrupt Environmental accidents*, *Measures for Environmental Protection Administration to Report Information of Abrupt Environmental accident (Trial)*, and national regulations; meanwhile report the accident to the superior authorized department and local people’s government to confirm communication and liaison way with relevant department for 24h so as to adopt corresponding rescue measures in time.

8.4.4 应急响应与救援措施

8.4.4 Emergency response and rescue measures

8.4.4.1 应急响应

8.4.4.1 Emergency response

（1）最初应急响应

(1) Initial emergency response

事故发生初期，先由各值班主管担任初期应急岗位指挥，监控室作为应急救援指挥中心启动，根据应急的类型和位置，在事故现场作出反应。同时，通讯负责人向厂外组织和政府机构作出最初的通报，公司经理接到通知后，在紧急情况下定级为现场应急或全体应急。

In the initial period of the accident, the head on duty will serve as initial emergency commander, while the monitoring room shall be launched as emergency rescue command center to make response on accident site pursuant to type and position of emergency. In the meantime, the person in charge of communication shall release initial notification to external organization and government institution. After the notice is received, the Manager shall decide the emergency level is site emergency or full emergency.

（2）全体应急

(2) Full emergency

一旦事故定级或升级，公司应急救援总指挥立即向厂外政府机构通报，应急指挥中心开始启动，立即召集有关的应急救援反应组织。指定的通讯联络员要与现场的最初的应急小组保持通讯联络，直到现场指挥以及现场救援和企业外机构到来接替现场指挥。现场保安人员负责查点所有原现场人员。一旦紧急情况得到控制，公司应急救援总指挥可降低事故级别，指示重新进入和恢复行动。

Once the accident is graded or upgraded, the company emergency rescue commander shall notify the external government organs, and the Emergency Command Center shall be launched to collect relevant emergency response organizations. The designated liaison shall keep communication with the initial emergency response group on site till the field commander and on-site rescue and external institutions to take the place. The on-site security personnel shall check all field staff. Once emergency situation is controlled, the emergency rescue command may degrade accident and indicate to enter and recover.

（3）外部应急联动体系

(3) External emergency linkage system

企业建立与上级主管部门及所在地环境保护主管部门之间的应急联动机制，当污染物超出本厂控制范围，由副总指挥立即上报漳州台商投资区管委会、漳州台商投资区环安局，当上级主要部门赶到现场时，公司应急救援指挥部总指挥应将指挥权交由上级主管部门，并将已掌握情况告知，全力配合上级主管部门的进行抢修。

The enterprise shall establish emergency linkage mechanism between superior authorized departments and local environmental protection departments. When the pollutants exceed the control scope of the plant, the deputy chief commander shall report to Zhangzhou Taiwan Investment Zone Management Committee and Zhangzhou Taiwan Investment Zone Environmental Protection and Security Bureau. When superior authorities arrive at the site, the chief commander of emergency rescue command center shall submit the command authority to the superior authorized department, inform situations known, and cooperate with superior authorized department for repair fully.

若需要做监测，立即上报漳州台商投资区环安局，请求监测人员立即赶往现场组织监测工作，企业的应急监测组负责协助，并提供人力，交通工具等。若事态较严重，立即上报漳州市环保局（联系电话：0596-2523312），相关人员到达后，提供相关应急物资，将已掌握情况第一时间告知上级领导，各应急小组处于应急状态，积极配合有关的应急处置工作。

If monitoring is required, relevant department shall immediately report to Zhangzhou Taiwan Investment Zone Environmental Protection and Security Bureau and request monitoring personnel to arrive at site and organize monitoring immediately. The emergency monitoring group of the enterprises shall offer assistance and provide human power and traffic tools. If the situation is severe, report shall be made to Zhangzhou Municipal Bureau of Environmental Protection (contact number: 0596-2523312) immediately. Each emergency group shall be under emergency state, and actively cooperate with relevant emergency treatment.

8.4.4.2 应急救援技术方案

8.4.4.2 Technical program of emergency rescue

（1）火灾爆炸事故应急救援

(1) Emergency rescue for fire and explosion accident

① 事故发生区

①Accident zone

生产操作人员一旦发现火情，根据火势大小果断采取措施：如果是火势不大，应使用就近配备的灭火器材及时灭火；如果火势无法控制，应立即向消防队(119)以及本企业的调度处报警，同时采取必要的措施，为专业消防队的赶到现场争取时间。

Once fire is found by production and operating personnel, measures shall be adopted precisely according to fire situations; if the fire is small, fire extinguishing facilities equipped nearby shall be used to put off the fire in time; if the fire situation is out of control, relevant department shall call the Fire Brigade (119) and dispatching department of the enterprise; meanwhile, necessary measures shall be adopted to win time for professional fire brigade.

②应急救援部门

②Emergency rescue department

调度处接到报警后应迅速通知事故发生部门负责人查明事故情况，下达应急救援预案处理的指令，通知指挥部成员及消防队、医疗救护队迅速赶往事故现场。

After alarm is received, the dispatching department shall immediately notify the person in charge of department where the accident occurred to check the accident situations, release instructions of emergency rescue plan treatment, and notify members of the Command Center and Fire Brigade and medical rescue team to go to accident site rapidly.

消防队到达现场后应及时灭火，与部门抢险队搜救现场中毒以及受伤人员，以最快速度脱离现场，严重者应立即送往医院进行治疗。事故处理过程中产生的消防废水不能直接排放，需要储存在应急事故池中，处理达标后方可排放。

After arriving at the site, the Fire Brigade shall put off the fire in time, search and rescue poisoned and injured personnel on site together with the rescue team and send them out of the site and send those who are seriously poisoned or injured to hospital for medical treatment. Fire wastewater generated during accident treatment shall not be discharged directly but stored in emergency accident pool. The wastewater may be discharged after reaching standard under treatment.

8.4.4.3 **应急联络**

8.4.4.2 Emergency liaison

根据突发环境事件的可控性、严重程度和影响范围，结合公司可能发生的突发环境事件的特点，将应急响应级别分为四级，分别为一级——外部应急（I级响应，红色警报）、二级——内部全面应急（II级响应，橙色警报）、三级——内部现场应急（III级响应，黄色警报）、四级——内部预警（IV级响应，蓝色警报）。实行分级响应。

According to controllability, seriousness and scope of impact of abrupt environmental accidents, and in combination with characteristics of possible outburst environmental accidents, the emergency response shall be divided into four grades: first-grade external emergency (Grade I response, red alarm), second-grade – internal comprehensive emergency (Grade II response, orange alarm), third-grade – internal field emergency (Grade III response, yellow alarm), four-grade – internal warning (Grade IV response, blue alarm). The leveled response shall be implemented.

各专业指挥部接到突发环境事件信息后，主要采取下列行动：

After information about abrupt environmental accident, each professional command center shall mainly take the following actions:

（1）启动并实施相应等级的应急预案，及时向联盛纸业突发环境事件应急总指挥部报告；

(1) Launching and implementing emergency plan with corresponding grade, and report to abrupt environmental accident emergency head office of Liansheng Paper Industry;

（2）启动各专业应急指挥机构；

(2) Launching each professional emergency commanding organization;

（3）协调组织应急救援力量开展应急救援工作；

(3) Coordinate and organize emergency rescue forces to carry out emergency rescue;

（4）需要其他应急救援力量支援时，向应急救援总指挥部提出请求；

(4) When other emergency rescue forces are required to support, request shall be put forward to the emergency rescue command center;

（5）重大环境事件，污染超出公司范围，影响周边区域，公司难以控制，需请求外部救援，并报告漳州台商投资区管委会、漳州台商投资区环安局，做好与周边企业应急联动。

(5) For serious environmental accident, the pollution of which exceeds the scope of the Company and affects nearby area, and the Company is difficult to control, relevant department shall request for external rescue and report to Zhangzhou Taiwan Investment Zone Management Committee and Zhangzhou Taiwan Investment Zone Environmental Protection and Security Bureau; meanwhile, the emergency linkage with nearby

enterprise shall be done.

8.4.4.4 撤离组织计划

8.4.4.4 Evacuation organization plan

公司成立应急救援总指挥部办公室，负责突发环境事件信息接收、报告、处理。较大、重大环境事件预警信息经核实后，及时上报地方突发环境事件应急领导小组办公室及当地环保局。

The Company shall set up Office of Emergency Rescue Command Center, which will take charge of information receiving, report and treatment of abrupt environmental accident. After being verified, the warning information of larger and significant environmental accident shall be reported to local abrupt environmental accident emergency leading group office and local environmental protection bureau.

公司突发环境事件责任单位和责任人以及负有监管责任的单位发现突发环境事件后，应迅速做出判断，10 分钟内向本单位领导及上一级相关专业主管部门报告，并立即组织进行现场应急处理，紧急情况下，可以直接报告公司突发环境事件应急救援总指挥部办公室。

After abrupt environmental accident is found by responsible department, responsible person and departments in charge of supervision shall rapidly make judgment, report to leaders of the company and superior professional authorized department within 10min, and organize on-site emergency treatment. In emergency, relevant department may directly report to the office of emergency rescue command center for abrupt environmental accident.

如果环境事件可能影响厂区外环境，由公司突发环境事件应急总指挥部办公室将有关信息及时向龙海市突发环境事件应急总指挥部办公室通报。

If the environmental accident may affect environment outside the plant, the emergency rescue command center for abrupt environmental accident of the Company shall notify relevant information to Longhai City Emergency Rescue Command Center Office for Abrupt Environmental Accident in time.

8.4.4.5 医疗救护与公众健康

8.4.4.5 Medical rescue and public health

发生风险事故后，根据事故发生的程度作出判断，配合医疗救护部门做好周

边群众的疏散工作，对于已经出现中毒以及其它身体伤害反应的人群要及时地进行救治，确保人员生命安全。

After the risk accident occurred, relevant department shall make judgment according to accident degree, cooperate with medical rescue department for nearby mass evacuation, and rescue people poisoned and suffered other body injury reactions in time to guarantee life safety of people.

8.4.4.6 应急环境监测

8.4.4.6 Emergency environmental monitoring

事故发生后，厂内必须利用现有监测设备，积极配合当地环境监测部门做好相应污染物质的监测工作，分析对周边环境所造成的影响并提出可行的控制措施。事故发生后要对相应的污染物浓度进行监测，分析影响的范围以及程度，提出可行的措施。

After the accident, the plant shall actively cooperate with local environmental monitoring department with current monitoring equipment in the plant to monitor corresponding pollutants, analyze impact caused to nearby environment and put forward feasible control measures. After the accident, concentration of corresponding pollutants shall be monitored, scope and degree of impact shall be analyzed and feasible measures shall be proposed.

8.4.4.7 应急终止与恢复措施

8.4.4.7 Emergency termination and recovery measures

确保应急救援工作完全结束的工作条件是：所有的火灾全部被扑灭，所有的可能的污染物泄漏均被隔离控制不再对周边环境产生影响时，才可以通知本单位相关部门、周边社区及人员事故危险已解除并终止应急程序。

The conditions guarantying end of emergency rescue are that the fire is fully extinguished, all possible pollutant leaks are isolated and controlled, which will no longer generate impact on ambient environment. Then, relevant department in the enterprise, nearby communities and personnel shall be notified that the accident risks have been eliminated and the emergency procedure can be terminated.

事故应急终止后，根据突发事故计划组织实施恢复工作，包括设备的检修、安装以及调试工作。对于事故的发生情况编制事故报告，报告中应指明事故发生

的原因、损失情况、并总结经验教训以免同类事故再次发生。对于事故引发的损失，要对受灾人员进行合理安置及损失赔偿。组织专家对环境污染事故中长期环境影响进行评估，提出补偿和对遭受污染的生态环境进行恢复的建议。

After the accident emergency is ended, the recovery work, including equipment repair, installation and debugging, shall be organized and implemented in accordance with abrupt accident plan. Accident report shall be prepared for accident situations, and indicate causes, losses of the accident, and summary of experience to avoid similar accident. For losses caused by the accident, personnel suffering the disaster shall be settled reasonable and compensated. Experts shall be organized to evaluate long-term environmental impact of environmental pollution accident, and put forward suggestions on compensation and recovery of ecological environment polluted.

8.4.4.8 员工培训与演练

8.4.4.8 Staff training and drill

由应急指挥部对全厂职工进行应急教育，危险岗位的职工进行安全和事故处置培训，实行上岗考核；另外对于风险应急预案要及时进行演练，要求理论知识培训每个月进行一次，演习训练每半年组织一次。另外，各应急救援专业组的组长应参加由消防部门、安全生产监督管理部门以及其它相关部门组织的专业培训。

The emergency command center shall provide education to full staff for emergency, and offer training for safety and accident treatment to staff on hazardous posts, and implement pre-post assessment; moreover, drill the risk emergency plan in time, and require providing training on theoretical knowledge per month and drill per half a year. In addition, the leader of each professional emergency rescue group shall participate in professional training organized by fire department, safety production supervision and management department and other departments concerned.

8.4.4.9 应急救援保障

8.4.4.9 Emergency rescue guarantee

一旦发生风险事故，必须保障相关应急救援预案能够及时启动，能够在第一时间将污染控制，将影响减少到最小，因此在日常的工作中必须做好应急救援的相关保障工作。

Once risk accident occurred, it is necessary to guarantee timely startup of relevant emergency rescue plan to control the pollution at the first time and minimize the impact. Therefore, guarantee of emergency rescue shall be made in routine work.

（1）应急通讯保障

(1) Emergency communication guarantee

明确与应急工作相关联的单位或人员的通信联系方式和方法，并提供备用方案。建立信息通信系统及维护方案，确保应急期间信息通畅。

It is necessary to clarify communication information and method with departments or personnel with regard to the emergency work, and provide standby plan; establish information communication system and maintenance plan, and guarantee smooth communication during emergency period.

（2）应急队伍保障

(2) Emergency team guarantee

明确各类应急响应人力资源，包括专业应急队伍、兼职应急队伍的组织与保障方案。

It is necessary to clarify human resources of various emergency responses, including organization and guarantee plan of professional emergency team and part-time emergency team.

（3）应急物资装备保障

(3) Emergency material and equipment guarantee

划拨一定的污染事故应急资金，用于日常应急物资与设备的购买、管理、维护上，主要是对于一些消防设备，防止污染物扩散的喷淋装置、一些配用装置的情况进行检查，由专人进行保管。

The enterprise shall appropriate certain emergency fund for pollution accident for purchase, management and maintenance of daily emergency materials and equipment, and check some fire equipment, spraying devices preventing pollutant spreading, and auxiliary equipment. The fund shall be safeguarded by specialized personnel.

（4）经费保障

(4) Fund guarantee

单位需要保证划拨一定的资金进行用于风险防范的工作，作到专款专用，保障应急状态时应急经费的及时到位。

The enterprise shall guarantee to appropriate certain fund for risk prevention. The special fund shall be used for special purpose, and be inputted in time in case of emergency.

（5）其它保障

(5) Other guarantees

根据该项目应急工作需求还需要确定的其它相关保障措施，如：技术保障、交通运输保障、治安保障、医疗保障、后勤保障等。

Other guarantee measures shall be confirmed according to demands of emergency work, such as technical guarantee, transportation guarantee, security guarantee, medical guarantee and logistics guarantee, etc.

8.5 小结

8.5 Summary

根据风险识别，拟建项目不存在重大风险源，周边无重要的敏感区域，确定本项目环境风险评价等级为二级，评价范围为距离项目中心 3km 范围。

The planned project has no serious risk source according to risk recognition, and there is no important sensitive area nearby. The environmental risk evaluation grade of this project is confirmed as Grade II, and the evaluation scope is the area 3km around the central point of planned project.

本项目存在的风险主要表现为火灾爆炸风险事故及依托污水处理站污染物质的事故排放。经过分析，各类事故的影响均能控制在厂内，不会对外环境产生不良影响。

The main risks of this project are shown in fire and explosion risk accidents, and accident release of pollutant substances relying on sewage treatment station. Through analysis, the impact of various accidents may be controlled within the plant, and the accidents will not generate adverse impact on external environment.

综上，在落实各项环境风险防范措施及应急预案的基础上，本项目的环境风险是可以接受的。

To sum up, the environmental risks of this project are acceptable when various environmental risk prevention measures and emergency plans are implemented.

9 污染物总量控制

9. Total Pollution Load Control

根据项目的工艺特征和排污特点、所在区域环境质量现状、以及当地环保部门的要求，参照《国务院办公厅关于转发环境保护部“十二五”主要污染物总量减排考核办法的通知》（国办发[2013]4 号）、《环境保护部关于印发建设项目主要污染物排放总量指标审核及管理暂行办法的通知》（环发[2014]197 号）等有关规定，确定本项目总量指标控制因子为：

In accordance with the features of process and sewage drainage of this project, current status of regional environment quality, and requirements of local environmental protection departments, the total index control factors of this project are confirmed as follows pursuant to Notice of the General Office of the State Council on Forwarding Assessment Measures of Ministry of Environmental Protection for Total Pollution Load during the “12th Five-year” Plan (GBF [2013] No. 4), and *Notice of Ministry of Environmental Protection on Releasing Interim Measures for Audit and Management of Total Pollution Load in Construction Projects* (HF [2014] No. 197):

污染物总量指标控制因子：废气中的 SO_2、NOx；废水中 COD、氨氮。

Total index control factors of pollutants: SO_2 and NOx in waste gas; COD and ammonia nitrogen in wastewater.

9.1 现有工程已取得的排污许可证

9.1 Pollutant Discharge Permit Acquired by Current Project

2017 年建设单位对厂内建成工程进行了排污许可证申请，主要内容包括：

The construction unit applied for pollutant discharge permit for the completed projects in the plant in 2017, and main contents are:

一期 45 万 t/a 牛皮箱板纸生产线（PM5 线）；

Phase I 450,000t/a kraft board paper production line (Line PM5);

一期 35 万 t/a 高强瓦楞原纸生产线（PM6 线）；

Phase I 350,000t/a high strength corrugating medium production line (Line PM6);

二期 35 万 t/a 灰板纸（PM7 线）；

Phase II 350,000 t/a grey board (Line PM7);

三期 40 万 t/a 灰底涂布白板纸（PM8 线）；

Phase III 400,000t/a duplex grey board (Line PM8);

锅炉及发电系统（2 台循环流化床锅炉及 2 套汽轮机）；

Boiler and power generation system (two circulating fluidized bed boilers and two sets of turbines);

公辅工程（碎煤工序、贮煤场、灰库、油罐、供水系统、污水处理站等）。

Public auxiliary project (coal crashing process, coal storage yard, ash silo, oil tank, water supply system and sewage treatment station, etc.);

2017 年 06 月 23 日，联盛纸业（龙海）有限公司取得漳州台商投资区环安局颁发的排污许可证，许可证编号为 913506815575947589001P。

On June 23, 2017, Liansheng Paper Industry (Longhai) Co., Ltd. acquired pollutant discharge permit issued by Zhangzhou Taiwan Investment Zone Environmental Protection and Security Bureau. The license No. is 913506815575947589001P.

表 0-1 排污许可证允许排放量

Table 9.1-1 Allowable emission amount of the pollutant discharge permit

污染物种类 Type of pollutant	第一年 The first year	第二年 The second year	第三年 The third year
颗粒物（t/a） Particulate matter	267.7	267.7	267.7
SO_2（t/a）	1784.6	1784.6	1784.6
NOx（t/a）	1784.6	1784.6	1784.6
COD（t/a）	1342.120	1342.120	1342.120
氨氮（t/a） Ammonia nitrogen	158.400	158.400	158.400

9.2 污染物排放总量

9.2 Total Amount of Pollutant Discharge

根据现有工程的污染物排放数据以及拟建项目工程分析数据，拟建项目建成

后，全厂污染物的排放及总量指标关系见表 0-1。

In accordance with pollutant discharge data of current project and analysis data of planned project, the discharge and total index relationship of pollutants in the entire plant after the planned project is constructed can be seen in Table 9.2-1.

表 0-1 拟建项目建成后污染物的排放与总量指标关系

Table 9.2-1 Discharge and total index relationship of pollutants after the planned project is constructed

污染物种类 Type of pollutant	现有工程排放总量 Total discharge amount of current project	拟建工程排放总量 Total discharge amount of the planned project	全厂工程排放总量 Total discharge amount of projects in the entire plant	原环评批复总量 Total amount approved by original EIA	排污许可总量 Total amount of pollutant discharge permit	拟建项目投产后全厂新增总量 Newly added amount of the entire plant after the planned project is put into production
SO_2（t/a）	675.65	0	675.65	2263.55	1784.6	0
NOx（t/a）	1126.08	0	1126.08	3594.96	1784.6	0
排水量（万t/a） Displacement (ten thousand t/a)	1503.82	416.262	1920.082	1508	/	416.262
COD（t/a）	1172.98	324.68	1497.66	1342.12	1342.120	324.68
氨氮（t/a） Ammonia nitrogen	30.08	8.33	38.41	/	158.400	8.33

综上，拟建工程建成后，全厂新增总量为：SO_2：0t/a、NOx：0t/a、COD：324.68t/a、氨氮：8.33t/a。

In general, after the planned project is completed, the newly increased discharge amount of the entire plant shall be SO_2: 0t/a, NOx: 0t/a, COD: 324.68t/a, ammonia nitrogen: 8.33t/a.

9.3 污染物总量申请

9.3 Application of Total Pollutants

根据福建省环境保护厅关于印发《福建省建设项目主要污染物排放总量指标管理办法（试行）》的通知（闽环发[2014]13 号），本项目所需申请的主要污染物排放总量控制指标，建设单位应通过排污权交易获得；按照环保厅行政主管部门出具的排污权交易来源限制条件进行交易，并在该项目环评批复前，按交易凭证补充总量来源和调剂方案。

In accordance with the *Notice of Fujian Provincial Department of Environmental Protection on Releasing Management Measures (Trial) for Total Pollutant Discharge Index of Construction Projects in Fujian Province* (MHF [2014] No. 13), the construction unit shall acquire the main pollutant discharge control indexes applied in this project through emission trading. The trading shall follow emission trading source restriction conditions issued by administrative departments of the Provincial Department of Environmental Protection, and total amount source and adjustment plan shall be submitted upon trade vouchers prior to approval of EIA.

按照重点区域和行业总量倍量调剂原则，COD 按不低于 1.2 倍调剂，按不低于 1.5 倍调剂。

Pursuant to the principle of key region and industrial total amount time quantity regulation, COD shall be regulated no lower than 1.2times, and no lower than 1.5 times.

拟建项目建成后总量指标购买情况如下表 9.3-1。

The total amount purchase situations after the planned product is completed can be seen in the following 9.3-1.

表 0-1 拟建项目建成后总量指标购买情况一览表

Table 9.3-1 List of total amount purchase after the planned product is completed

污染物种类 Type of pollutant	拟建工程排放总量 Total discharge of the planned project	调剂倍数 Regulating times	拟建工程总量购买量 Total amount purchase of the planned project

SO_2（t/a）	0	/	0
NOx（t/a）	0	/	0
COD（t/a）	324.68	1.2	389.616
氨氮（t/a） Ammonia nitrogen	8.33	1.5	12.495

因此，拟建项目需要购买总量为：COD：389.616t/a、氨氮：12.495t/a。

Therefore, the total purchase amount of the planned project shall be COD: 389.616t/a and ammonia nitrogen: 12.495t/a.

9.4 拟建项目排污许可

9.4 Pollutant Discharge License of the Planned Project

贯彻落实国家相关法律法规及政策，以国家相关法律法规为依据，建设项目的改造工程设计，应按照环境保护设计规范的要求，并依据经批准的建设项目环境影响报告书，在项目建设阶段、生产运行阶段及服务期满后向当地环境保护部门汇报各阶段的情况。

In order to implement relevant national laws, regulations and policies, the reconstruction project design of the construction project shall follow requirements of design specifications for environmental protection based on national laws and regulations concerned. Situations in each stage shall be reported to local environmental protection departments during project construction stage, production and operation stage and after the service period expires in accordance with environmental impact report approved of the construction project.

1）建设项目发生实际排污行为之前，排污单位应当按照国家环境保护相关法律法规以及排污许可证申请与核发技术规范要求申请排污许可证，不得无证排污或不按证排污。

1) Before actual pollutant discharge from the construction project, the discharging unit shall apply for pollutant discharge permit in accordance with national laws and regulations regarding environmental protection, and requirements in technical specifications for pollutant discharge permit application and issuance. It is forbidden to discharge pollutant without the permit or not following the permit.

2）项目正常生产运行产生实际排污行为前 20 天内办理排污许可证，排污单

位应当严格执行排污许可证的规定，遵守下列要求：排污口位置和数量、排放方式、排放去向、排放污染物种类、排放浓度和排放量、执行的排放标准等符合排污许可证的规定，不得私设暗管或以其他方式逃避监管；落实重污染天气应急管控措施、遵守法律规定的最新环境保护要求等。

2) The pollutant discharge license shall be handled 20 days prior to actual pollutant discharge behavior during normal production and operation of the project. The discharging unit shall strictly abide by regulations of the pollutant discharge license and meet the following requirements: sewage drainage exit position and quantity, discharge mode, discharge direction, type of discharged pollutants, discharge concentration and amount, and discharge standards implemented shall comply with regulations of the pollutant discharge permit, and the construction unit shall not lay buried pipeline or adopt other ways to escape supervision; emergency management and control measures for heavy pollution weather shall follow latest environmental protection requirements regulated by laws.

3）根据国家主要污染物总量控制指标要求，结合拟建项目排污情况，给出本项目污染物总量控制指标。

3) The total pollutant control indexes of this project are proposed according to national requirements for total main pollutant control indexes and in combination with pollutant discharge situations of the planned project.

表 0-1 拟建工程废气排污节点、污染物及污染治理设施信息表

Table 9.4-1 Table of waste gas and pollutant discharge node, pollutants and pollution treatment facility information of the planned project

序号 No.	生产设施编号 No. of production facility	生产设施名称 Name of production facility	对应产污环节名称 Name of corresponding pollutant generating link	污染物种类 Type of pollutant	排放形式 Discharge form	污染治理设施 Pollution treatment facilities			有组织排放口编号 No. of organized drainage exit	排放口类型 Type of drainage exit
						污染治理设施编号 No. of pollution treatment facility	污染治理设施名称 Name of pollution treatment facility	污染治理设施工艺 Process of pollution treatment facility		
1	MF0001	破碎机 Crusher	输煤转运站 Coal conveying transfer station	粉尘 Dust	有组织 Organized	TA001	除尘器 Deduster	静电除尘 Electrostatic precipitator	DA001	一般排放口 Common drainage exit
2	MF0002	破碎机 Crusher	输煤转运站 Coal conveying transfer station	粉尘 Dust	有组织 Organized	TA001	除尘器 Deduster	静电除尘 Electrostatic precipitator	DA002	一般排放口 Common drainage exit
3	MF0009	循环流化床锅炉 Circulating fluidized bed boiler	锅炉烟气 Boiler fuel gas	粉尘 Dust	有组织 Organized	TA001	除尘器 Deduster	静电除尘 Electrostatic precipitator	DA004	主要排放口 Main drainage exit
4	MF0009	循环流化床锅炉	锅炉烟气	氮氧化物	有组织	TA005	脱硝系统	循环流化床	DA004	主要排放口

		Circulating fluidized bed boiler	Boiler fuel gas	NOx	Organized		Denitrification system	燃烧 Circulating fluidized bed boiler combustion		Main drainage exit
5	MF0009	循环流化床锅炉 Circulating fluidized bed boiler	锅炉烟气 Boiler fuel gas	二氧化硫 SO_2	有组织 Organized	TA006	单塔单循环 Single-tower single-circulation	石灰石-石膏湿法 Lime-gypsum wet method	DA004	主要排放口 Main drainage exit
6	MF0010	循环流化床锅炉 Circulating fluidized bed boiler	锅炉烟气 Boiler fuel gas	烟尘 Dust	有组织 Organized	TA007	除尘器 Deduster	静电除尘 Electrostatic precipitator	DA004	主要排放口 Main drainage exit
7	MF0010	循环流化床锅炉 Circulating fluidized bed boiler	锅炉烟气 Boiler fuel gas	氮氧化物 NOx	有组织 Organized	TA008	脱硝系统 Denitrification system	循环流化床燃烧 Circulating fluidized bed boiler combustion	DA004	主要排放口 Main drainage exit
8	MF0010	循环流化床锅炉 Circulating fluidized bed boiler	锅炉烟气 Boiler fuel gas	二氧化硫 SO_2	有组织 Organized	TA006	单塔单循环 Single-tower single-circulation	石灰石-石膏湿法 Lime-gypsum wet method	DA004	主要排放口 Main drainage exit

表 0-2 拟建工程废水类别、污染物及污染治理设施信息表

Table 9.4-2 Table of Wastewater Type, Pollutants and Pollution Treatment Facilities of the Planned Project

序号 No.	废水类别 Type of wastewater	污染物种类 Type of pollutant	排放去向 Discharge direction	排放规律 Discharge rules	污染治理设施 Pollution treatment facilities			排放口编号 No. of drainage exit	排放口类型 Type of discharge exit
					污染治理设施编号 No. of pollution treatment facility	污染治理设施名称 Name of pollution treatment facility	污染治理设施工艺 Process of pollution treatment facility		
1	造纸废水 Papermaking wastewater	pH、色度、SS、BOD5、COD、氨氮、总氮、总磷 pH, chromaticity, SS, BOD5, COD, ammonia nitrogen, total nitrogen, total phosphate	排至厂内综合污水处理站 Drain to comprehensive sewage treatment station in the plant	连续排放流量稳定 Stable continuous discharge flow	TW001	工业废水系统 Industrial wastewater system	混凝沉淀、厌氧反应器、深度处理 Coagulation sedimentation, anaerobic reactor, in-depth processing	DW001	主要排放口 Main drainage exit
2	生活污水 Domestic sewage	pH、色度、SS、BOD5、COD、氨氮、总氮、总磷 pH, chromaticity, SS, BOD5, COD, ammonia nitrogen, total nitrogen, total phosphate	排至厂内综合污水处理站 Drain to comprehensive sewage treatment station in the plant	间断排放，排放期间流量不稳定，但有周期性规律 Interruptive discharge; flow during discharge is unstable but	TW001	工业废水系统 Industrial wastewater system	混凝沉淀、厌氧反应器、深度处理 Coagulation sedimentation, anaerobic reactor, in-depth processing	DW001	主要排放口 Main drainage exit

				periodic					
3	热电锅炉排水 Thermoelectric boiler drainage	pH	不外排 Not drain outside	间断排放，排放期间流量不稳定，但有周期性规律 Interruptive discharge; flow during discharge is unstable but periodic	TW002	工业废水系统 Industrial wastewater system	混凝沉淀 Coagulation sedimentation		

表 0-3 废气排放口情况

Table 9.4-3 Table of waste gas discharge exits

序号 No.	排放口编号 Exit No.	污染物种类 Type of pollutant	排放口地理坐标 Geographic coordinates of exit		排气筒高度 Height of exhaust funnel	排气筒出口内径 Inner diameter of exhaust funnel exit	许可排放浓度限值（mg/m^3） Limit of permissible discharge concentration	许可排放速率限值（kg/h） Limit of permissible discharge speed	排放量（t/a） Displacement
			经度 Longitude	纬度 Latitude					
1	DA001	粉尘 Dust	117°51′	24°30′	15	0.6	120	3.5	0.0646
2	DA002	粉尘 Dust	117°51′	24°30′	15	0.6	120	3.5	0.0646

3	DA004	烟尘 Smoke	117°51′	24°30′	150	4.8	30	/	29.6
		二氧化硫 SO_2	117°51′	24°30′			200	/	105.89
		氮氧化物 NOx	117°51′	24°30′			200	/	176.54

表 0-4 废水排放口情况

Table 9.4-4 Table of wastewater drainage exit

序号 No.	排放口编号 Exit No.	污染物种类 Type of pollutant	排放口地理坐标 Geographic coordinates of exit		排放去向 Drainage direction	排放规律 Drainage rules	受纳水体信息 Information of receiving water body		汇入受纳自然水体处地理坐标 Geographic coordinates of receiving natural water body		许可排放浓度限值（mg/L） Limit of permissible discharge concentration	排放量（t/a） Displacement
			经度 Longitude	纬度 Latitude			名称 Name	受纳水体功能目标 Functiona	经度 Longitude	纬度 Latitude		

								l objective of receiving water body				
1	DW001	pH	117°51′	24°29′	直接进入海域 Directly enter the sea area	连续排放流量稳定 Stable continuous drainage flow	九龙江北港 Jiulong River North Port	第二类 Class II	117°52′	24°29′	6~9	/
		BOD_5									20	83.25
		悬浮物 SS									30	83.25
		色度 Chromaticity									50	/
		总氮 Total nitrogen									12	41.63
		COD									80	324.68
		氨氮 Ammonia nitrogen									8	8.33
		总磷 Total phosphate									0.8	0.83

9.5 小结

9.5 Summary

拟建项目建成后，综上，拟建工程建成后，全厂新增总量为：SO_2：0t/a、NOx：0t/a、废水量：416.262 万 t/a、COD：324.68t/a、氨氮：8.33t/a。

After the planned project is completed, in general, the tnewly increased discharge amount of the entire plant shall be SO_2: 0t/a, NOx: 0t/a, wastewater: 4,162,620 t/a, COD: 324.68t/a, ammonia nitrogen: 8.33t/a.

按照重点区域和行业总量倍量调剂原则，需要购买总量为：COD：389.616t/a、氨氮：12.495t/a。

Pursuant to the principle of key region and industrial total amount time quantity regulation, the total purchase amount of the planned project shall be COD: 389.616t/a and ammonia nitrogen: 12.495t/a.

10 项目建设及选址合理性分析

10. Analysis on Reasonability of Project Construction and Site Selection

10.1 项目与相关政策、规划的符合性分析

10.1 Analysis on Conformity between the Project and Relevant Policies and Planning

10.1.1项目与国家政策、规划的相符性分析

10.1.1 Analysis on conformity between the project and national policies and planning

（1）《产业结构调整指导目录（2011 年本）（2013 年修正）》

(1) *Directory Catalogue on Readjustment of Industrial Structure* (Version 2011) (2013 Amendment);

《产业结构调整指导目录（2011 年本）》中指出，淘汰类第十二项轻工第 10～13 条：单条 1 万吨/年及以下、以废纸为原料的制浆生产线；幅宽在 1.76 米及以下并且车速为 120 米/分以下的文化纸生产线；幅宽在 2 米及以下并且车速为 80 米/分以下的白板纸、箱板纸及瓦楞纸生产线。

The *Directory Catalogue on Readjustment of Industrial Structure* (Version 2011) points out to eliminate Article 10~13 in Item 12 light industry of the elimination category: pulping line with single production of 10000t/year and below and with wastepaper as raw materials; cultural paper production line with width below 1.76m and speed below 120m/min; white board, cardboard paper and corrugated paper production line with width below 2m and speed below 80m/min.

拟建项目为年产 60 万吨高档箱板纸工程，成纸幅宽在 8660mm，工作车速为 1100m/min，不属于淘汰类范畴，符合《产业结构调整指导目录（2011 年本）（2013 年修正）》的要求。

The planned project is annual output 600,000t high-grade cardboard paper project with paper width of 8660mm and operating speed of 1100m/min. It does not belong to the category of elimination, and complies with requirements in *Directory Catalogue on Readjustment of Industrial Structure* (Version 2011) (2013 Amendment).

（2）造纸产业发展政策

(2) Development policy of paper industry

《造纸产业发展政策》由国家发改委于 2007 年发布，其中提出如下要求：

The *Development Policy for Paper Industry* is issued by the National Development and Reform Commission in 2007, and puts forward the following requirements:

①产业布局：造纸产业发展总体布局应“由北向南”调整，形成合理的产业新布局。长江以南是造纸产业发展的重点地区，要以林纸一体化工程建设为主，加快发展制浆造纸产业；

① Industrial distribution: the overall deployment of paper industry shall be adjusted “from north to south” to form reasonable new arrangement of the industry. The key area for the development of the paper industry is to the south of Yangtze River; the paper and pulp industry development shall be accelerated mainly focusing on forestry-paper integration project construction;

②纤维原料：充分利用国内外两种资源，提高木浆比重、扩大废纸回收利用、合理利用非木浆，逐步形成以木纤维、废纸为主、非木纤维为辅的造纸原料结构。到 2010 年，木浆、废纸浆、非木浆结构达到 26%、56%、18%。

② Fibrous materials: both domestic and overseas materials shall be made full use of to improve wood pulp ratio, expand wastepaper recovery and utilization, use non-wood pulp reasonably and gradually form papermaking raw material structure with wood fiber and wastepaper as main materials while non-wood fibers as auxiliary materials. By 2010, the structure of wood pulp, wastepaper pulp, and non-wood pulp will reach 26%, 56% and 18%.

③行业准入：造纸产业发展要实现规模经济，突出起始规模。新建、扩建制浆项目单条生产线起始规模要求达到：化学木浆年产 30 万吨、化学机械木浆年

产 10 万吨、化学竹浆年产 10 万吨、非木浆年产 5 万吨；新建、扩建造纸项目单条生产线起始规模要求达到：新闻纸年产 30 万吨、文化用纸年产 10 万吨、箱纸板和白纸板年产 30 万吨、其他纸板项目年产 10 万吨。薄页纸、特种纸及纸板项目以及现有生产线的改造不受规模准入条件限制。

③ Industrial access: The paper industry shall realize scale economy and highlight initial scale. The initial scale of single production line in the newly built and expanded pulping project shall reach: annual output 300,000t for chemical wood pulps, annual output 100,000t for chemical and mechanical wood pulps, annual output 100,000t for chemical bamboo pulps, and annual output 50,000t for non-wood pulps; the initial scale of single production line in the newly built and expanded pulping project shall reach: annual output 300,000t for newspaper, annual output 100,000t for cultural paper, annual output 300,000t for cardboard box and white paper, and annual output 100,000t for other cardboard projects. The reconstruction of tissue paper, special paper and cardboard projects and current production line will not be restricted by scale access conditions.

拟建项目位于福建省漳州市台商投资区联盛纸业现有厂区内，主要使用原料为废纸，生产规模为年产 60 万吨高档箱板纸，均满足《造纸产业发展政策》中关于产业布局、纤维原料及箱纸板和其他纸板项目年产 10 万吨的行业准入条件。

The planned project is located in current plant site of Liansheng Paper Industry in Zhangzhou Taiwan Investment Zone, Fujian Province, and main raw material is wastepaper with annual production scale of 600,000t high-grade cardboard paper. All the conditions meet the industrial access conditions for industrial layout, fiber raw materials and annual output 100,000t cardboard box and other cardboard projects in the *Development Policy for Paper Industry*.

（3）中国造纸协会关于造纸工业“十三五”发展的意见

(3) Opinions of China Paper Association about the “13th five-year” plan for paper industry

《中国造纸协会关于造纸工业“十三五”发展的意见》中指出，

The document *Opinions of China Paper Association on the “13th Five-year”*

Plan Development for the Paper Industry points out to:

①加大废纸利用。废纸回收和利用体现了造纸行业循环经济和低碳的特点，充分利用废纸资源是调整造纸原料结构的重要措施。目前国内废纸回收率因经济结构原因已接近可回收极限，可回收量短期内难以明显增加，需要稳定和拓宽国外废纸回收渠道，同时加大国内废纸回收系统建设，规范和统一回收及贸易行为，提高国内废纸有效供给水平和利用率。

① Strengthen utilization of wastepaper: the wastepaper recovery and utilization shows characteristics of papermaking industry such as circular economy and low carbon, and adequate utilization of wastepaper resource is an important measure to adjust structure of papermaking raw materials. At present, the domestic wastepaper recovery rate has approached the limit of recoverability due to the reason of economic structure, and the recoverable amount is difficult to increase in a short time. It is necessary to stabilize and expand overseas wastepaper recovery channel, and meanwhile strengthen construction of domestic wastepaper recovery system, normalize and unify recovery and trade behaviors, and improve effective supply level and utilization rate of wastepaper in China.

②华南沿海地区：要实施调整与治污并重。采取推进造纸原料林基地建设和利用境外木片等措施，发展“林纸一体化”项目。珠江三角洲地区要控制开发强度，区域内局部地区企业布局过于密集且规模小，应加快现有企业整合，促进产业升级，以商品浆和废纸为原料，进一步完善包装纸板生产基地，调整产品结构，改变产品结构单一状况。

② Coastal area in South China: to implement both adjustment and pollution treatment; take measures such as promoting construction of papermaking raw material forest base and utilization of overseas wood chips, and develop “forestry-paper integration” project; the development strength shall be controlled in Pearl River Delta, and local area enterprises are arranged tensely with small scale in the region; it is necessary to speed up integration of current enterprises, promote industrial upgrading, further perfect packing cardboard production base with commercial pulp and wastepaper, adjust product structure and change single status of product structure.

③新建箱纸板单条生产线 30 万吨/年及以上。

③ Newly build single production line of cardboard box with annual production of 300,000t and above;

拟建项目建设内容为年产 60 万吨高档箱板纸，主要原来使用国外废纸原料，不属于淘汰类范畴，并且能够满足箱纸板的起始规模为年产 30 万吨/年的要求，符合《中国造纸协会关于造纸工业“十三五”发展的意见》的相关要求。

The construction content of the planned project shall be annual output 600,000t high-grade cardboard paper, and main source is from overseas wastepaper, which does not belong to the category of elimination and may meet the requirements of initial scale of annual output 300,000t cardboard paper. The project complies with relevant requirements in *Opinions of China Paper Association on the "13th Five-year" Plan Development for the Paper Industry*.

10.1.2项目与地方政策和规划符合性分析

10.1.2 Analysis on conformity between the project and local policies and planning

10.1.2.1 与《福建省“十三五”工业转型升级专项规划》的符合性分析

10.1.2.1 Analysis on conformity to "Special Plan of Fujian Province for Industrial Transformation and Upgrading during the 13th Five-year Plan"

《福建省“十三五”工业转型升级专项规划》中提出：

The document *Special Plan of Fujian Province for Industrial Transformation and Upgrading during the 13th Five-year Plan* puts forward that:

①造纸

① Papermaking

发挥沿海港口优势，利用境外纸浆、废纸和木片等资源，建设临港大型造纸和纸制品项目。省内流域上游、城市周边及重点环境保护地区、生态功能区，禁止新建扩建制浆造纸项目。加快技术改造，淘汰能效低、污染严重的落后工艺与设备，促进造纸企业提升生产线和储运装备智能化、生产过程自动化和企业管理信息化水平，推动造纸工业清洁生产、节能减排。调整产品结构，培育龙头企业，限制新建扩建中小型低水平包装板纸项目，逐步退出新闻纸，化解过剩产能，提

升生活用纸质量，鼓励研发新型特种纸，提高产业集中度。

The large-scale papermaking and paper products project near the port shall be built with resources such as overseas pulp, wastepaper and wood chips by bring the port advantages into full play. The pulp and paper construction and expansion projects are not allowed in upstream of provincial catchment, nearby cities, key environmental protection zones and ecological function zone. Speed up technological reconstruction, eliminate backward process and equipment with low efficiency and serious pollution, promote papermaking enterprises to improve intelligent production line, storage and transportation equipment, automatic production process and enterprise management information level. And drive clean production, energy conservation and emission reduction of the paper industry; adjust product structure, cultivate leading enterprise, restrict construction and expansion of medium and small low-level packaging paperboard project, gradually eliminate newspaper, solve excessive capacity, improve life paper quality, encourage research and development on new special papers and improve industrial concentration ratio.

②完善产业政策

② Improving industrial policy

发挥国家产业结构调整指导目录、产业准入等产业政策的引导作用，动态发布重点行业产业政策，组织实施“一业一策”。加强产业政策与财税、政府采购、信贷、土地、质量品牌等政策的协调配合，促进工业提质增效。以主体功能区划为指导，引导资源开发利用项目、拟建工程项目合理布局，对限制开发区域以及不符合主体功能定位的产业，通过设备折旧补贴、贷款担保、迁移补贴、土地置换等手段，促进产业跨区域转移。开展企业能效对标，制订行业结构调整和能效提升指南，明确淘汰类、限制类目录及产品能耗限额，在钢铁、水泥、建陶、玻璃、造纸、印染、皮革、合成革等行业先行开展能效对标，实施差别电价政策。落实固定资产投资项目节能评估和审查制度。

To play the leading role of national Directory Catalogue on Readjustment of Industrial Structure and industrial policies such as industrial access, dynamically issue key industrial policies, organize and implement “one policy for one industry”;

strengthen coordination and cooperation between industrial policies and policies regarding financial, taxation, government purchase, credit, land and quality brand to promote industrial quality improvement and efficiency advancing; lead reasonable arrangement of resource development and utilization project and planned project under guidance of main function zoning; promote trans-region transfer by means of equipment discount subsidy, load guarantee, relocation subsidy and land replacement for industries in area with restricted development and nonconforming to main function orientation; carry out enterprise energy efficiency benchmarking, formulate guidance on industrial structure adjustment and energy efficiency improvement, clarify elimination category, restriction category contents and product energy consumption limit, carry out energy efficiency benchmarking firstly and implement differentiated electricity charge policies in industries of iron and steel, cement, building ceramics, glass, papermaking, printing and dyeing, leather and synthetic leather; implement energy conservation assessment and review system of fixed assets investment project.

拟建项目建设内容为年产 60 万吨高档箱板纸，属于联盛纸业投资建设，建设项目所在地在现有项目厂区内，生产线的规模满足产业准入条件，不属于淘汰类范畴，并且原料大部分使用废纸浆，以上均符合《福建省“十三五”工业转型升级专项规划》的相关要求。

The construction contents of the planned project shall be annual output 600,000t high-grade cardboard paper with investment of Liansheng Paper Industry. The construction project is in the plant zone of current project, and the scale of the production line meets industrial access conditions. The project does not belong to the elimination category. Moreover, most raw materials are waste paper pulps. Aforesaid conditions all meet requirements in the *Special Plan of Fujian Province for Industrial Transformation and Upgrading during the 13th Five-year Plan*.

10.1.2.2 与《福建省人民政府关于全省石化等七类产业布局的指导意见》的符合性分析

10.1.2.2 Analysis on conformity to *Guiding Opinions of Fujian People’s Government on Provincial Layout of Seven Industries such as Petrochemical*

福建省人民政府于 2013 年 12 月 27 日以闽政〔2013〕56 号文下发《关于全省石化等七类产业布局的指导意见》，对于制浆造纸产业的具体要求如下：

The People’s Government of Fujian Province released the MZ [2013] No. 56 *Guiding Opinions on Provincial Layout of Seven Industries such as Petrochemical* on Dec. 27, 2013, and put forward specific requirements for the pulp and paper industry:

①发挥沿海港口优势，充分利用境外纸浆、废纸和木片等资源，加快建设临港大型制浆造纸项目。促进闽西、闽北现有造纸企业整合和技术提升，进一步优化产业布局。优化临港区域布局。

① To play the advantages of coastal port, and speed up constructing coastal large-scale pulp and paper project by full use of overseas pulp, wastepaper and wood chips; promote integration and technical improvement of current papermaking enterprises, and further optimize industrial layout; optimize layout in port area.

②新上制浆造纸工业项目应立足湄洲湾东吴、厦门湾南部、泉州湾北部等沿海重点港湾区域布局，建设莆田东吴大型浆纸基地，引导造纸企业向专业园区集中；着力推进莆田亚太集团福建林浆纸一体化、漳州联盛纸业包装板纸、泉州玖龙纸业包装板纸等沿海大型浆纸项目建设。除上述海湾外，其余地方不再布点新建制浆造纸项目。

② Deploy new pulp and paper industry project based on coastal key port zones such as Dongwu, Meizhou Bay, South of Xiamen Bay, and North of Quanzhou Bay, build large-scale pulp and paper base in Dongwu, Putian, and lead the papermaking enterprises to professional park zone; strive to push construction of coastal large-scale pulp and paper projects such as Putian Asia Pacific Group Fujian Forestry-Pulp-Paper integration project, Zhangzhou Liansheng Paper Industry packing paperboard, and Quanzhou Jiulong Paper Industry packing paperboard project. Except aforesaid bays, no new pulp and paper project will be arranged in other places.

③禁止生态敏感区和重要生态功能区布局建设制浆造纸项目。重点流域上游、城市周边及重点环境保护地区和生态功能区禁止新建扩建制浆造纸项目。禁止在九龙江北溪江东北引桥以上、西溪桥闸以上、晋江和洛阳江流域上游流域范围新建扩建制浆造纸项目；严格控制在闽江水口库区上游沿江两岸流域范围扩建

增加水污染物排放总量的制浆造纸项目。

③ Forbid to build pulp and paper project in ecological sensitivity area and important ecological function zone; forbid to build and expand pulp and paper project in upstream of key catchment, nearby cities as well as key environmental protection zone and ecological function zone; forbid to build and expand pulp and paper project in the catchment above the Northeast Approach Span of North Stream, Bridge Sluice of West Stream of Jiulong River, and upstream of Jinjiang and Luoyang River; strictly control expansion of pulp and paper project adding total water pollutant discharge in the catchment on both banks long the river in upstream of Min River Reservoir Zone.

拟建项目为年产 60 万吨高档箱板纸工程，使用废纸作为原料，项目建设位于泉州湾的联盛纸业（龙海）有限公司现有厂址内，项目建设符合产业布局的要求。

The planned project is annual output 600,000t high-grade cardboard paper project with wastepaper as raw materials. The project construction is located in current plant site of Liansheng Paper Industry (Longhai) Co., Ltd. in Quanzhou Bay. The project construction complies with requirements of industrial layout.

另外文件对于项目所在区域泉州湾，提出要重点优化发展机械电子、化浆造纸、建筑建材等产业，从外延扩大再生产为主转向内涵扩大再生产为主，突出已有产业优势，促进产业重组整合与转型升级，打造在国内外市场有影响力的知名品牌和产业集群。其中化浆造纸，重点发展废纸制浆、外购纸浆发展包装板纸、高档文化纸、生活用纸等，主要布局于晋江、台商投资区等地。

Moreover, the document puts forward to optimally develop industries such as mechanical electronics, chemical pulp papermaking, construction and building materials in Quanzhou Bay where the project locates, turn from extension-oriented expanded production to connotation-oriented extended production, highlight advantages of current industry, promote industrial restructuring, transformation and upgrading, and create influential well-known brands and industrial clusters in domestic and overseas market. For chemical pulp papermaking, mainly develop pulping with wastepaper, packing paperboard, high-grade cultural paper and household paper with outsourced pulps, which are mainly arranged in Jinjiang and Taiwan Investment Zone.

拟建项目为年产 60 万吨高档箱板纸工程，位于台商投资区内的联盛纸业（龙海）有限公司现有厂址内，项目的建设能够突出现有产业的优势，符合《关于全省石化等七类产业布局的指导意见》的总体要求。

The planned project is annual output 600,000t high-grade cardboard paper project and located in current plant site of Liansheng Paper Industry (Longhai) Co., Ltd. in Taiwan Investment Zone. The project construction may highlight advantages of current industry, and comply with overall requirements of *Guiding Opinions on Provincial Layout of Seven Industries such as Petrochemical*.

10.1.2.3 与《漳州市人民政府关于印发大气污染防治行动计划实施细则的通知》的符合性分析

10.1.2.3 Analysis on conformity to *Notice of Zhangzhou People's Government on Releasing Detailed Rules for Implementation of Air Pollution Prevention Action Plan*

根据《漳州市人民政府关于印发大气污染防治行动计划实施细则的通知》（漳政综〔2014〕56 号）：全面整治城市燃煤小锅炉。加快推进集中供热、“煤改气”、“煤改电”等清洁能源替代工程建设。到 2017 年，城市建成区基本淘汰每小时 10 蒸吨及以下的燃煤锅炉，禁止新建每小时 20 蒸吨以下的燃煤锅炉；其他地区原则上不再新建每小时 10 蒸吨以下的燃煤锅炉。淘汰分散型工业燃煤炉窑。在化工、印染、造纸、制革、制药等产业集聚区，通过集中建设热电联产机组或大型集中供热设施或实施清洁燃料替代工程，逐步淘汰分散燃煤炉窑。到 2015 年，基本淘汰燃煤炉窑集中区和工业园区内燃煤炉窑，确实无法淘汰的，必须按规范建设投运除尘、脱硫和脱硝设施，确保污染物稳定达标排放。新建建筑陶瓷业项目原则上使用天然气。

In accordance with *Notice of Zhangzhou People's Government on Releasing Detailed Rules for Implementation of Air Pollution Prevention Action Plan* (ZZZ [2014] No. 56): to comprehensively renovate urban coal-fired small boilers; speed up promoting clean energy replacement project construction such as central heating, “coal-to-gas” and “coal-to-electricity”; eliminate coal-fired boilers with 10t/h or below and forbid to newly build coal-fired boilers with 20t/h in urban built-up area and in principle not build coal-fired boilers below 10t/h in other region by 2017; eliminate scattered industrial coal-fired furnace kiln; in the industrial cluster for chemical engineering, dyeing, papermaking, tanning and pharmaceutical industries, intensively build cogeneration units or large-scale central heating facilities or implement clean fuel replacement project to gradually eliminate scattered coal-fired furnace kiln; by 2015, basically eliminate coal-fired kilns in intensive kiln zone and industrial park; those which may not be eliminated must be attached with dust removal, desulfurization and denitration facilities to guarantee up-to-standard emission of pollutants; the newly built building ceramics project shall use natural gas in principle.

拟建项目依托厂内动力车间现有的 2 台循环流化床锅炉，不新建燃煤锅炉，锅炉配套建设了低氮燃烧器，且采用石灰石-石膏炉外湿法脱硫+五电场静电除尘器处理处理烟气，符合《漳州市人民政府关于印发大气污染防治行动计划实施细则的通知》（漳政综〔2014〕56 号）中相关要求。

The planned project will not newly build coal-fired boiler but apply current two circulating fluidized bed boilers in power workshop. The boilers are equipped with low-nitrogen combustor, and flue is processed by limestone-gypsum outer-furnace wet desulfurization method + five electric fields electrostatic precipitator, complying with requirements in *Notice of Zhangzhou People's Government on Releasing Detailed Rules for Implementation of Air Pollution Prevention Action Plan* (ZZZ [2014] No. 56).

10.1.2.4 与《漳州市人民政府办公室关于印发漳州市高污染燃料禁燃区划分实施方案（试行）的通知》（漳政办〔2015〕15 号）的符合性分析

10.1.2.4 Analysis on conformity to *Notice of Zhangzhou People's Government on Releasing Implementation Plan for High-polluted Fuel Combustion Restriction Zoning* (Trial) (ZZZ [2015] No. 15)

《漳州市人民政府办公室关于印发漳州市高污染燃料禁燃区划分实施方案（试行）的通知》（漳政办〔2015〕15 号）中规定如下：

The document *Notice of Zhangzhou People's Government on Releasing Implementation Plan for High-polluted Fuel Combustion Restriction Zoning* (Trial)

(ZZZ [2015] No. 15) puts forward the following regulations:

禁燃区范围：

Scope of combustion prohibition zone:

（一）芗城区、龙文区全境划定为禁燃区。

(i) Entire area of Xiangcheng District and Longwen District is divided into combustion restriction zone;

（二）各县（市）县城所在地建成区划定为禁燃区。

(ii) The built-up area of each county (city) is divided into combustion restriction zone;

禁燃区建成时限：

Completion time of the combustion restriction zone:

（一）芗城区、龙文区建成区须于 2014 年年底建成禁燃区，芗城区、龙文区全境须于 2015 年年底前建成禁燃区。禁燃区内禁止新、改、扩建燃用高污染燃料的锅炉、炉窑、炉灶、沥青机组等设施，现有设施应当于 2015 年 12 月 31 日前改用天然气、液化石油气、电等清洁能源，逾期未改用的不得继续使用。

(i) The built-up area of Xiangcheng District and Longwen District shall be built to combustion restriction zone by the end of 2014; entire area of Xiangcheng District and Longwen District shall be built to combustion restriction One by the end of 2015. It is forbidden to newly build, reconstruct or expand boilers, kilns, range, and asphalt units with high-polluted fuels. Current facilities shall be changed to those with clean energy such as natural gas, liquefied petroleum gas and electricity before Dec. 31, 2015; those which are not reconstructed shall not be used continuously.

（二）各县（市）县城所在地建成区 2016 年年底前建成禁燃区。禁燃区内禁止新、改、扩建燃用高污染燃料的锅炉、炉窑、炉灶、沥青机组等设施，现有设施应当于 2017 年 12 月 31 日前改用天然气、液化石油气、电等清洁能源，逾期未改用的不得继续使用。

(ii) The built-up area of each county (city) shall be built to combustion restriction zone by the end of 2016. It is forbidden to newly build, reconstruct or expand boilers, kilns, range, and asphalt units with high-polluted fuels. Current facilities shall be changed to those with clean energy such as natural gas, liquefied petroleum gas and electricity before Dec. 31, 2015; those which are not reconstructed shall not be used continuously.

拟建项目位于漳州台商投资区凤山工业园，不在漳政办〔2015〕15 号中涉及的禁燃区范围内；另拟建工程用汽依托现有工程的 2 台燃煤锅炉，不新增燃煤锅炉。因此，拟建工程符合《漳州市人民政府办公室关于印发漳州市高污染燃料禁燃区划分实施方案（试行）的通知》（漳政办〔2015〕15 号）的相关要求。

The planned project is located in Fengshan Industrial Park in Zhangzhou Taiwan Investment Zone, and not in the combustion restriction zone involved in the ZZZ [2015] No. 15 Document; moreover, the planned project will not add coal-fired boilers but use the two coal-fired boilers of current project. Therefore, the planned project complies with requirements in *Notice of Zhangzhou People's Government on Releasing Implementation Plan for High-polluted Fuel Combustion Restriction Zoning* (Trial) (ZZZ [2015] No. 15).

10.2 规划选址的可行性分析

10.2 Analysis on Feasibility of Site Selection

（1）与《漳州台商投资区凤山埔尾片区产业发展规划》的符合性

(1) Conformity to *Fengshan Puwei District Industry Development Plan in Zhangzhou Taiwan Investment Zone*

漳州台商投资区凤山埔尾片区位于漳州台商投资区凤山工业园内，北侧为丁厝山，南侧为龙池大道，东侧为角泰路，西侧为经二路，规划总面积 1587 亩（即 105.8hm^2）。

The Fengshan Puwei District of Zhangzhou Taiwan Investment Zone is located inside Fengshan Industrial Park, with Dingcuo Mountain in the north, Longchi Street in the south, Jiaotai Road in the east, and Jinger Road in the west. The total planned area is 1587mu (105.8hm^2).

园区发展目标：至 2020 年，园区造纸及纸制品年产能新增 60 万吨，产能达到 260 万吨，其中牛皮箱板纸 150 万吨，高强瓦楞纸 35 万吨，灰板纸 35 万吨，

灰底涂布白板纸 40 万吨，产值达到 100 亿元，建成 55 万吨造纸废渣回收系统。至 2027 年，园区产业产值达到 150 亿元，形成造纸及纸制品产业集群。

Development objective of the park zone: by 2020, the annual output 600,000t papermaking and paper products will be added in the park zone, and capacity will reach 2.6 million ton, in which capacity of kraft board paper is 1.5 million ton, of high strength corrugated medium is 350,000t, of grey board is 350,000t and of duplex grey board is 400,000t; the output value will reach RMB 10 billion Yuan; a 550,000t papermaking waste residue recovery system. By 2027, the output value in the park zone will reach RMB15 billion, forming industrial cluster of papermaking and paper products.

产业园总规划面积 1587 亩，园区中心布局造纸及纸制品生产区，地块北侧布局热电供应中心，东侧布局资源回收利用中心，至 2022 年，逐步整合迁移园区内的体育用品、磁性材料、塑料制品、休闲用品等零散产业，基本形成“一区两中心”的造纸及纸制品产业发展格局。“一区”：是指造纸及纸制品生产区。“两中心”：是指热电供应中心及资源回收利用中心。

The total planned area of the industrial park is 1587mu. The papermaking and paper products production zone is arranged in the center of the park zone, thermal power supply center shall be arranged in the north side of the land, and resource recovery and utilization center is arranged in the east side. By 2022, the scattered industries such as sports products, magnetic materials, plastic products and snack foods in the park zone shall be integrated and relocated gradually, and the “one-zone two-center” development pattern of the papermaking and paper products industry will be formed largely. The “one zone” refers to the production zone of papermaking and paper products, while “two centers” refer to thermal power supply center and resource recovery and utilization center.

园区内目前，造纸产能为 200 万吨/年，拟建项目为年产 60 万吨高档箱板纸，项目位于联盛纸业（龙海）有限公司现有厂址内，位于院内内的造纸及纸制品生产区；拟建项目投产后满足“至 2020 年，园区造纸及纸制品年产能新增 60 万吨”的发展目标，因此，拟建项目符合《漳州台商投资区凤山埔尾片区产业发展规划》

的相关发展规划要求。

In the park zone, the current capacity of papermaking is 2million ton/year. The planned project is annual output 600,000t high-grade cardboard paper and is located in current plant site of Liansheng Paper Industry (Longhai) Co., Ltd. and in the production zone of papermaking and paper products; after the planned project is put into production, it may meet the development goal of “newly increased 600,000t annual output of papermaking and paper products in the park zone by 200”. Therefore, the planned project complies with requirements for relevant development planning in *Fengshan Puwei District Industry Development Plan in Zhangzhou Taiwan Investment Zone*.

规划区产业准入负面清单符合性分析详见表 10.2-1。

The analysis on industrial access negative list conformity in the planned zone can be seen in Table 10.2-1.

表 0-1 产业准入负面清单符合性分析

Table 10.2-1 Analysis on industrial access negative list conformity

产业 Industry	类别 Type	禁止类清单 Prohibition list	限制类清单 Restriction list	拟建项目符合性 Conformity of planned project
--	行业清单 Industrial List	除可以延伸造纸和纸制品业产品链、综合利用园区各类废物循环经济项目以外的所有行业（现状金沙拉链除外） All industries except extended papermaking and paper product chain, comprehensive utilization of various waste circular economy projects (current Jinsha Zipper is excluded)	--	拟建项目属于机制纸及纸板制造，不属于禁止清单类 The planned project belongs to mechanical paper and paper board manufacturing, not belong to the prohibition list
造纸及纸制品业 Papermaking and paper products industry	--	--	元素氯漂白制浆工艺 Elemental chlorine free bleaching and pulping process	拟建项目不采用氯漂白制浆工艺，不属于限值清单类 The planned project does not adopt elemental chlorine free bleaching and pulping process, not belong to restriction list
	工艺清单 Process list	1、5.1万t/a以下的化学木浆生产线； 1. Chemical wood pulp production line below 51,000t/a; 2、单条3.4万t/a以下的非木浆生产线；	1、单条化学木浆30万t/a以下、化学机械木浆10万t/a以下、化学竹浆10万t/a以下的生产线；	拟建工程采用以废纸为原料的制浆工序，年产60万吨高档箱板纸，车

		2. Single non-wood pulp production line below 34,000t/a; 3、单条1万t/a及以下、以废纸为原料的制浆生产线； 3. Single pulping line with capacity below 10,000t/a and with wastepaper as raw materials; 4、幅宽在1.76m及以下并且车速为120m/min以下的文化纸生产线； 4. Cultural paper production line with width below 1.76m and speed below 120m/min; 5、幅宽在2m及以下并且车速为80m/min以下的白板纸、箱板纸及瓦楞纸生产线。 5. White board, cardboard paper and corrugated paper production line with width below 2m and speed below 80m/min;	1. Single chemical wood pulp line bellow 300,000t/a, chemical mechanical wood pulp production line below 100,000t/a, chemical bamboo pulp production line below 100,000t/a; 2、新闻纸、铜版纸生产线。 2. Newspaper and coated paper production line	速为1100m/min，幅宽为8660mm，不属于禁止清单类 The planned project adopts the pulping procedure with wastewater as raw materials to produce 600,000t high-grade cardboard paper annually with speed of 1100m/min and width of 8660mm. It does not belong to the prohibition list.
		新、扩建箱纸板和白纸板年产30万吨、其他纸板项目年产10万吨以下项目。 Newly built and expanded and whit board annual output 300,000t, and other paper board projects with annual output below 100,000t		拟建工程扩建年产60万吨高档箱板纸，不属于禁止清单类 The planned project is annual output 600,000t high-grade cardboard paper, and does not belong to prohibition list
	产品清单 Product list	--	--	拟建工程不属于禁止清单类 The planned project does not belong to the

				prohibition list

（2）与《九龙江流域（漳州段）产业布局规划》的符合性

(2) Conformity to *Industrial Layout Plan of Jiulong River Catchment (Zhangzhou Section)*

漳州市人民政府于 2010 年 10 月 29 日以漳政综〔2010〕183 号印发《九龙江流域（漳州段）产业布局规划》，其中提出，在九龙江流域鼓励发展低污染、低能耗的环保型产业，鼓励发展低碳产业，鼓励发展特殊钢铁、汽车、船舶、食品加工、电子信息、机械、医药等重点产业和其他国家鼓励类产业。其中提出鼓励发展产业包括国家及福建省已发布的各行业“产业发展政策”、结构调整指导意见、“‘十一五’规划”、其它“中长期规划”、“专项规划”、“产业调整振兴规划”等重点发展类的产业。

Zhangzhou People’s Government released the ZZZ [2010] *Industrial Layout Plan of Jiulong River Catchment (Zhangzhou Section)* No. 183 on Oct. 29, 2010, and putted forward to encourage environmental industry with low pollution and low energy consumption, encourage low-carbon industry, key industries such as special iron and steel, auto, ship, food processing, electronic information, mechanical and medicine and other industries encouraged by the country in the catchment of Jiulong River. The document also proposed national and provincial “industrial development policy” leased for each industry, guiding opinions on structural adjustment, the “11th five-year plan”, other “medium and long-term planning”, “special planning”, “industrial adjustment and revitalization plan”, and other key development industries.

拟建项目为年产 60 万吨高档箱板纸，项目位于联盛纸业（龙海）有限公司现有厂址内，使用废纸作为原料造纸，符合《福建省“十三五”工业转型升级专项规划》中提出的：“发挥沿海港口优势，利用境外纸浆、废纸和木片等资源，建设临港大型造纸和纸制品项目”的整体要求相符合。基于此，拟建年产 60 万吨高档箱板纸工程也满足《九龙江流域（漳州段）产业布局规划》的相关要求。

The planned project is annual output 600,000t high-grade cardboard paper project with wastepaper as raw material for papermaking, and located in current plant site of Liansheng Paper Industry (Longhai) Co., Ltd. It complies with the overall requirements of “bringing coastal port advantages into play, and building coastal large-scale papermaking and paper products project with overseas resources of pulp, wastepaper and wood chips” in *Special Plan of Fujian Province for Industrial Transformation and Upgrading during the 13th Five-year Plan*. On that basis, the annual output 600,000t high-grade cardboard paper project also meets relevant requirements of *Industrial Layout Plan of Jiulong River Catchment (Zhangzhou Section)*.

（3）与《漳州台商投资区总体规划（2012~2030）》的符合性

(3) Conformity to *Overall Planning (2012~2030) of Zhangzhou Taiwan Investment Zone*

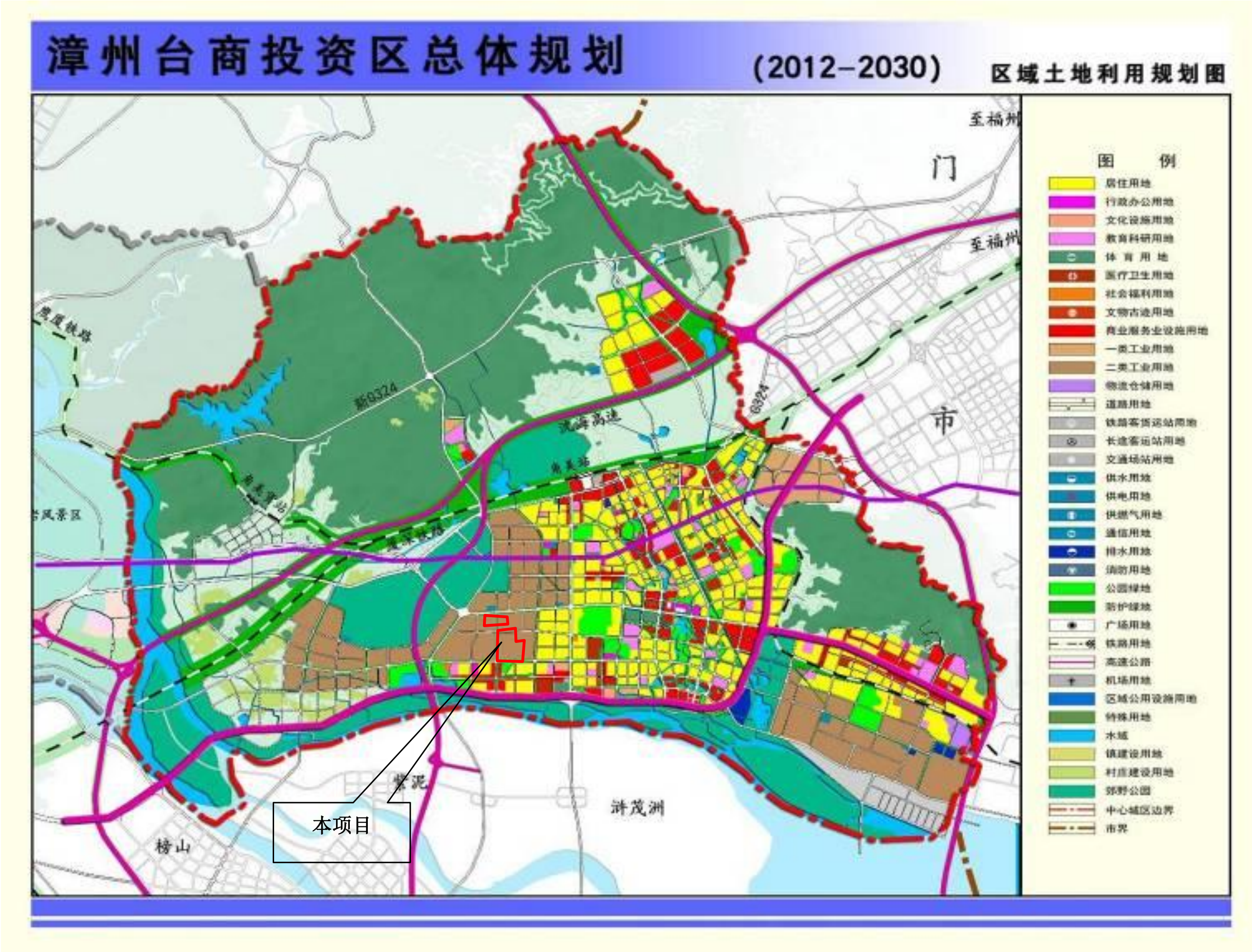
龙海开发区（原角美和龙池开发区）：为省级开发区，批准面积 17 平方公里，至 2008 年已开发建设 17.6 平方公里，总规划面积 23.5 平方公里。重点发展特殊钢铁及金属制品加工、家电电力器具、交通运输设备、普通机械制造、食品加工、纸制品加工、电子及通讯设备制造、生物及医药制造等产业及其配套项目。

Longhai Development Zone (former Jiaomei and Longchi Development Zone): it is a provincial development zone with approved area of 17km^2, and by 2008, totally 17.7km^2 has been developed and constructed. The total planned area is 23.5km^2. The industries of special iron and steel, metal product processing, household appliances, transportation equipment, common machinery manufacturing, food processing, paper product processing, electronic and communication device manufacturing, biological and pharmaceutical manufacturing and supporting projects will be developed mainly.

拟建项目建设内容为年产 60 万吨高档箱板纸，所在地在联盛纸业现有项目厂区内，项目属于造纸行业，位于漳州台商投资区凤山工业园，用地性质为工业用地（详见

图 0-1），项目建设符合《漳州台商投资区总体规划》和《九龙江流域（漳州段）产业布局规划》中的规划用地布局和规划产业发展要求。

The planned project is annual output 600,000t high-grade cardboard paper project with wastepaper as raw material for papermaking, and located in current plant site of Liansheng Paper Industry (Longhai) Co., Ltd. The project belongs to paper industry and is located in Fengshan Industrial Park of Zhangzhou Taiwan Investment Zone. The land nature is industrial land (referring to Fig. 10.2-1). The project construction complies with planned land deployment and planned industry development requirements in *Overall Planning of Zhangzhou Taiwan Investment Zone* and *Industrial Layout Plan of Jiulong River Catchment (Zhangzhou Section)*.


漳州台商投资区总体规划
(2012−2030)
区域土地利用规划图
图例
居住用地
行政办公用地
文化设施用地
教育科研用地
体育用地
医疗卫生用地
社会福利用地
文物古迹用地
商业服务业设施用地
一类工业用地
二类工业用地
物流仓储用地
道路用地
铁路客货运站用地
长途客运站用地
交通场站用地
供水用地
供电用地
供燃气用地
通信用地
排水用地
消防用地
公园绿地
防护绿地
广场用地
铁路用地
高速公路
机场用地
区域公用设施用地
特殊用地
水域
镇建设用地
村庄建设用地
郊野公园
中心城区边界
市界
至福州
门
市
本项目
榜山
许茂洲

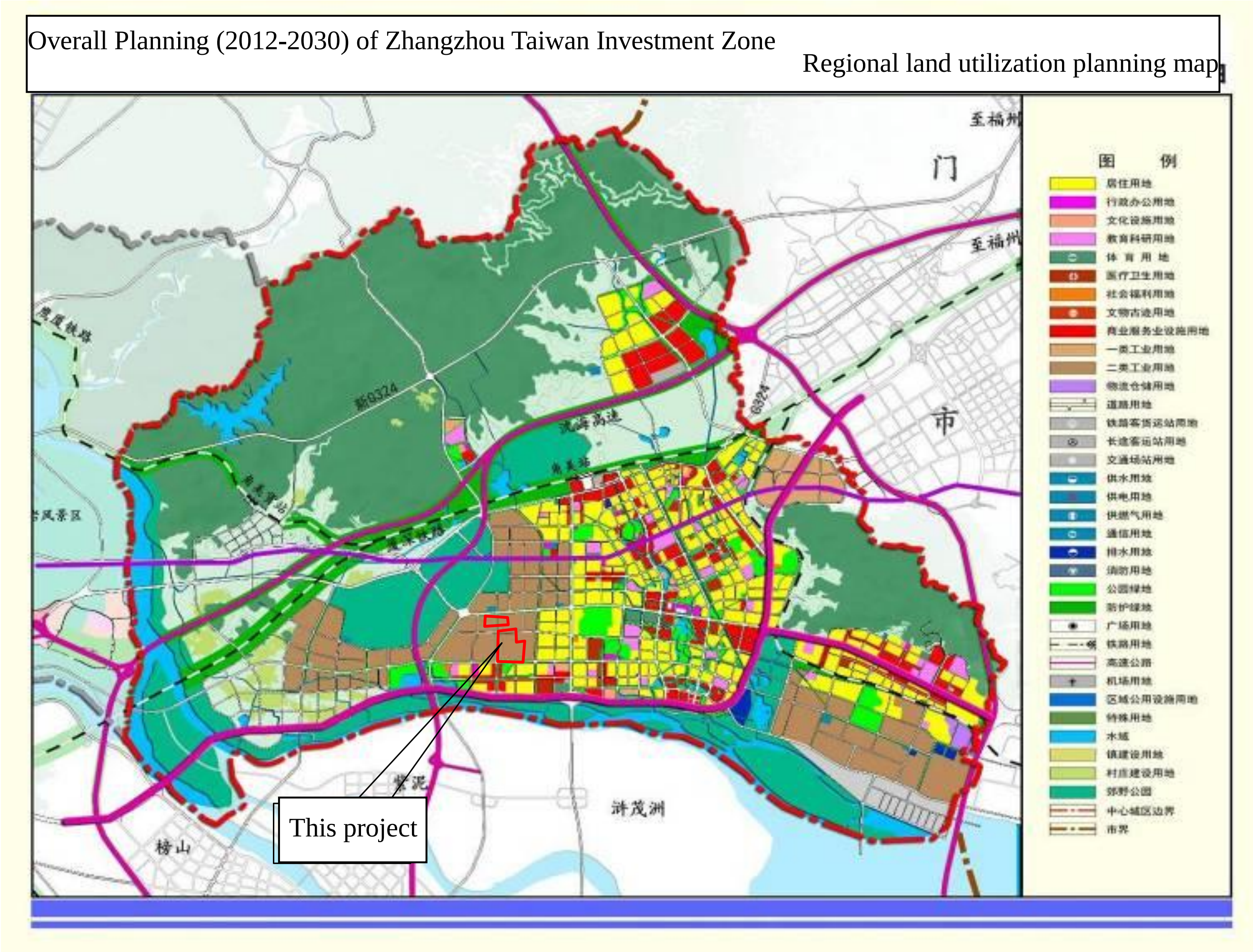

Overall Planning (2012-2030) of Zhangzhou Taiwan Investment Zone
Regional land utilization planning map
至福州
门
至福州
市
图 例
浒茂洲
榜山
This project

图 0-1 拟建项目与漳州台商投资区总体规划符合性分析

Fig. 10.2-1 Analysis on conformity of planned project to overall planning of Zhangzhou Taiwan Investment Zone

10.3 项目选址合理性分析

10.3 Analysis on Reasonability of Project Site Selection

10.3.1项目用地情况

10.3.1 Project land

拟建项目建设内容为年产 60 万高档箱板纸，建设地点在联盛纸业现有项目厂区内，项目属于造纸行业，位于漳州台商投资区角美镇凤山工业园，用地性质为工业用地。

The planned project is annual output 600,000t high-grade cardboard paper project with wastepaper as raw material for papermaking, and located in current plant site of Liansheng Paper Industry (Longhai) Co., Ltd. The project belongs to paper industry and is located in Fengshan Industrial Park of Zhangzhou Taiwan Investment Zone. The land nature is industrial land.

10.3.2交通条件

10.3.2 Traffic conditions

项目采用汽车运输的方式，厂址距国道 324、沈海高速公路较近，交通便利，为项目的原辅材料及产品的运输提供了优越的条件。

The project adopts motor transport. The plant site is near to National Road 324 and Shenyang-Haikou Expressway. The convenient traffic provides outstanding conditions for transportation of raw materials, auxiliaries and products of the project.

10.3.3基础设施条件

10.3.3 Infrastructure conditions

（1）拟建项目供水

(1) Water supply for the planned project

拟建工程用水量 16924m^3/d，给水水源由角美工业区附近九龙江北溪左高干渠及九龙江北溪左低干渠引水联合提供，给水有保证。

The water consumption of the planned construction shall be 16924m^3/d. The water will be supplied from the left high canal and left lower canal of North Stream of Jiulong River near Jiaomei Industrial Zone. The water supply is guaranteed.

（2）拟建项目排水

(2) Water drainage of the planned project

拟建项目排水进入厂内污水处理厂进行处理，目前厂内已经建成污水处理站处理规模 80000m^3/d，采用“预处理+厌氧（IC）+好氧+深度处理”处理工艺，现有工程建成后，全厂废水排放量为 44230m^3/d，剩余余量足够处理拟建项目 12614m^3/d 的废水量，废水经过处理后满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 要求，废水目前暂时排放至九龙江北港；待排海管道建设完成后，拟建项目产生废水及厂内现有工程产生的废水经过厂内污水处理厂处理达标后统一纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

The wastewater of the planned project shall be drained to and processed in sewage treatment plant inside the project plant. Currently, the processing scale of sewage treatment plant which has been built in the project plant is 80000m^3/d. The treatment process of “pre-treatment + anaerobic (IC) + aerobic + deep treatment” is adopted. After the current project is completed, the wastewater displacement in the entire plant shall be 44230m^3/d, and idle processing ability is 35770m^3/d, sufficient for the 12614m^3/d wastewater of the planned project. After treatment, the wastewater shall meet requirements in Table 1 of DB35/1310-2013 Discharge standard of water pollutants for pulp and paper industry, and drained to the estuary of Jiulong River North Port through special sewage pipeline network (coordinate of discharge outlet: 24°29'1.40"N, 117°52'0.40"E). After the drainage pipeline is completed, the wastewater will be drained to deep sea uniformly through wastewater sea-oriented drainage pipeline (250,000t/d) of Jiaomei Sewage Treatment Plant after being treated in plant sewage treatment station and reaching standard.

（3）供汽及供电

(3) Gas and electricity supply

拟建项目供气及供电依托厂内 2 台 410t/h 循环流化床锅炉。本工程用电通过自备电站 35KV 变电站从供电电网供电。

The gas and electricity supply to the planned project relies on two sets 410t/h circulating fluidized bed boilers of the plant. The electricity for this project shall be supplied from power grid through 35KV substation.

10.4　总平面布置合理性分析

10.4 Analysis on Reasonability of Overall Layout

（1）厂区平面布置充分利用自然条件，总体布局较为紧凑、各功能分区明确，保证工艺、物料流顺畅；

(1) The plan layout of the plant makes full use of natural conditions, and overall layout is compact with clear functional zones to guarantee smooth process and material flow;

（2）厂前区与生产区相对独立，便于管理；

(2) The front area of the plant is separated from the production zone for the convenience of management;

（3）各生产车间由区间道路隔开，保证建筑物之间的防火间距和消防要求；

(3) The workshops are separated by plant roads to guarantee fir distance and fire control requirements between buildings;

（4）生产车间高噪声如生产设备等布局于车间内，远离办公宿舍区；

(4) The high-noise equipment such as production equipment is arranged inside the production workshop, and far from office and living quarters.

整体而言，项目总平面布置功能区划明确、物流顺畅，平面布置基本合理。

In general, the functional zoning of overall plan layout is distinct, materials are smooth and plan layout is basically reasonable.

10.5　小结

10.5 Summary

拟建项目与国家产业政策及相关规定如《造纸产业发展政策》、《中国造纸协会关于造纸工业“十三五”发展的意见》、《产业结构调整指导目录（2011 年本）（2013 年调整）》等均相符；与地方产业规划《福建省“十三五”工业转型升级专项规划》、《福建省人民政府关于全省石化等七类产业布局的指导意见》

的要求也相符合；另外，拟建项目与《漳州台商投资区总体规划》及《九龙江流域（漳州段）产业布局规划》均相符合。

The planned project complies with national industrial policies and regulations such as *Development Policy for Paper Industry*, *Opinions of China Paper Association on the "13th Five-year" Plan Development for the Paper Industry*, *Directory Catalogue on Readjustment of Industrial Structure* (Version 2011) (2013 Amendment); local industrial planning such as *Special Plan of Fujian Province for Industrial Transformation and Upgrading during the 13th Five-year Plan*, and *Guiding Opinions of Fujian People's Government on Provincial Layout of Seven Industries such as Petrochemical*; moreover, the planned project also complies with *Overall Planning of Zhangzhou Taiwan Investment Zone* and *Industrial Layout Plan of Jiulong River Catchment (Zhangzhou Section)*.

11 环境影响经济损益分析

11. Analysis on Economic Profits or Losses of Environmental Impact

11.1 经济效益分析

11.1 Analysis on Economic Efficiency

本项目总投资 158667 万元，其中建设投资 141622 万元；项目建成后，利润总额 31292 万元；静态投资回收期所得税前为 6.46 年，所得税后为 7.46 年，低于行业基准投资回收期 9.0 年；财务内部收益率为 18.39%，高于行业基准收益率 16%；盈亏平衡点为 51.35%，投资利润率、投资利税率均处于同行业的较好水平；综合来看项目财务盈利能力较好，经济效益较好。本项目经济指标见表 0-1。

The total investment in this project shall be RMB 1.58667 Billion, in which investment in construction shall be RMB 1.41622 Billion; after the project is completed, the total profit shall be RMB 312.92 Million; the static investment recovery period of pre-tax income tax shall be 6.46 years, and after-tax income tax shall be 7.46 years, lower than the 9.0 years industrial benchmark investment recovery period; the financial internal rate of return shall be 18.39%, higher than the 16% industrial benchmark rate of return; the break-even point shall be 51.35%. The ROI and profit and tax investment ratio are in higher level of the industry; in general, the financial profitability of the project is favorable, and economic benefit is good. The economic indexes of this project can be seen in Table 11.1-1.

表 0-1 经济标准汇总一览表

Table 11.1-1 Summary List of Economic Standard

编号 No.	项目 Item	单位 Unit	投资 Investment	备注 Note
1	总资金 Total fund	万元 Ten Thousand Yuan	158667	
2	其中：建设投资 Including: investment in construction	万元 Ten	141622	

		Thousand Yuan		
3	年税后利润总额 Total annual after-tax profit	万元 Ten Thousand Yuan	31292	达产期平均 Average during the period of design capacity
4	总资金收益率 Total income rate of funds	%	17.82	
5	财务内部收益率(全部投资) Internal rate of return (total investment)	万元 Ten Thousand Yuan	18.39	所得税前 Before income tax
6	财务净现值(全部投资) Financial net present value (total investment)	万元 Ten Thousand Yuan	50926	所得税前 Before income tax
7	静态投资回收期(全部投资) Static payback time (total investment)	年 Year	6.46	所得税前 Before income tax
8	静态投资回收期(全部投资) Static payback time (total investment)	年 Year	7.46	所得税后 After income tax
9	销售收入 Sales income	万元 Ten Thousand Yuan	260330	
9	总成本费用 Total cost	万元 Ten Thousand Yuan	228029	
10	盈亏平衡点 Break-even point	%	51.35	

11.2 环境效益分析

11.2 Analysis on Environmental Benefits

依据环境影响评价所提出的环境保护对策与措施，本项目环保措施包括，废气污染防治措施、废水污染防治措施、固体废物污染防治措施、噪声污染防治措施、绿化和水土保持等措施。本项目总投资 158667 万元，其中环保投资 1290 万元人民币，环保投资占项目总投资的 0.81%。

Environmental protection countermeasures and measures are proposed based on environmental impact assessment. The environmental measures for this project area waste gas pollution treatment measures, waste water pollution prevention measures, solid waste pollution prevention measures, noise pollution treatment measures, greening and water and soil conservation measures. The total investment of this project is RMB 1.58667 Billion Yuan, in which investment in environmental protection is RMB 12.9 million. The investment in environmental protection is accounting for 0.81% of total investment.

从各个分项投资来看环保投资比例适当，分配较为合理。污染防治环境保护投资成本 2600 万元/a，占年总利润的 13%。

In terms of sub-item investment, the investment in environmental protection is suitable, and distribution is reasonable. The investment cost for pollution treatment and environment protection shall be RMB 26 Million Yuan/a, accounting for 13% of annual total profits.

项目建成后，废水可以实现稳定达标排放，减缓了对水环境的不利影响；废气污染物的排放对项目所在地周边的环境空气影响较小；拟采取的相关的环保措施及节能措施，将使本项目的水重复利用率可达到 90%以上，清洁生产水平可达到国内清洁生产先进水平，厂区的总平面布局较为合理。废水排入现有污水处理站处理，可以减少废水污染物的产生量，进而减少对环境的影响。

After the project is completed, the wastewater may be discharged stably after reaching standard, and adverse impact on water environment may be eased; the waste gas pollutant discharge affects little on ambient air nearby the project; relevant environmental and energy-saving measures to be adopted may allow the recycling rate of water to reach over 90%; clean production level may reach advanced domestic production level; the overall layout plan of the plant area is reasonable. The wastewater is drained to current sewage treatment station so as to reduce output of wastewater pollutants and minimize impact on environment.

针对项目环境风险特点，建立了三级风险防控体系，可有效防范环境风险，做到风险情况下废水不外排至地表水。

Aiming at environment risk characteristics of the project, three-level risk prevention and control system is established to effectively prevent environmental risks and make sure no wastewater is discharged to ground water in case of risks.

11.3　社会效益

11.3 Social Benefits

本项目建设、生产过程中巨额的资金投入，对区域发展产生的巨大的影响，从而带来相关财税收入，例如伴生产业、建筑、交通、运输、化工、机械制造等行业带来的财政收入，将引起区域经济结构和社会关系的变动，从而为区域调整经济结构和布局，提高当地居民生活水平做出了极大的贡献。

The vast fund input in project construction and production affects the regional development greatly, and brings relevant fiscal revenue. For instance, fiscal revenue from production industry, building, traffic, transportation, chemical engineering and mechanical manufacture will cause change in regional economic structure and social relationship so as to adjust regional economic structure and arrangement, and make great contribution to improving people’s living standard.

联盛纸业的产量在福建省规模以上造纸企业中排名靠前，销售收入和上缴税金连续多年保持前茅，并连续被县政府、市政府评为纳税大户。本项目被列入省政府“重点建设项目”。项目建设可为国家和地方带来可观、稳定的税收，也能极大的推动区域经济的发展。联盛纸业（龙海）有限公司地处工业区密集、经济高速发展的厦门、泉州、漳州三市的结合地带，造纸产业在此区域的工业格局中具有比较重要的战略地位，本项目的上马必然为保持区域经济发展、促进出口、稳定就业提供强有力的支撑。

The output of Liansheng Paper Industry ranks top among scale and above papermaking enterprises in Fujian Province, and its sales income and taxes paid has come top for consecutive years. It is rewarded as great tax payer by the county government and municipal government continuously. This project is listed into “key construction project” of provincial government. The project construction may bring considerable and stable tax income to the country and local finance, and may also greatly push development of regional economy. Liansheng Paper Industry (Longhai) Co., Ltd. is in the zonelink of Xiamen, Quanzhou and Zhangzhou where the industrial zone is intensive and economy is highly developed. The paper industry plays an important strategic role in the industrial pattern in this region. This project will surely provide powerful support to keep development of regional economy, promote import and stabilize employment.

造纸产业的发展需要电站、物流、化学品等配套工程，对上下游产业链的增长也能起到明显的拉动作用，还能促进当地服务业的发展，能为当地居民创造大量的就业机会，提高他们的收入水平。另外，公司为员工提供的系统培训、优质的居住环境和完善的社会保障制度，对于提高当地居民的知识水平和劳动技能、保持社会稳定也会起到积极的作用。

The paper industry may not be developed without supporting project such as power station, logistics and chemicals. It may not only greatly drive growth of upstream and downstream industrial chain, but also promote development of local service industry. It could create large amount of job opportunities to local residents, and improve their income level. Besides, the system training, good living environment and perfect social insurance system provided to employees may actively improve knowledge level and labor skills of local residents and keep social stability.

联盛纸业（龙海）有限公司通过引进国内外先进的生产设备和工艺技术，提高了企业的生产效率，也降低了单位能耗和污染，在客观上带动了当地造纸产业及相关产业的升级，进一步缩小了与国外同行业的差距，提高企业在国际市场上的竞争力，保持经济的稳定和长足发展。

By introducing domestic and overseas advanced production equipment and process technology, Liansheng Paper Industry (Longhai) Co., Ltd. has improved productivity and reduced per unit energy consumption and pollution. It objectively drives upgrading of local paper industry and relevant industries, further narrows down the gap with foreign peers, improves international competitiveness and keeps stable and significant development of economy.

本项目采用废纸作为原料，生产高档箱板纸，属于再生资源的再利用，充分体现了循环经济的理念，社会效益明显，可促进社会主义和谐发展。

This project adopts wastepaper as raw materials to produce high-grade cardboard papers. It is a project recycling the renewable resources, and sufficiently showing ideas of circular economy. With obvious social benefits, it may promote socialist harmonious development.

12 环境管理与监测计划

12. Environmental Management and Monitoring Plan

项目建设单位应将拟建项目纳入到公司环境管理计划与环境监测计划内，确保项目环保设施正常运行和排污达标，有效地预防风险事故并减轻事故带来的损失，使建设项目对环境的危害控制在最小范围内。

The project owner shall include the planned project into the environmental management plan and environmental monitoring plan of the Company, guarantee normal operation and up-to-standard pollutant discharge of environmental facilities, and effectively prevent risk accidents and ease losses caused by accidents so as to minimize the hazards caused by the construction project to environment.

12.1 环境管理

12.1 Environment Management

环境管理，是指本项目工程在施工期和运营期遵守执行国家和地方的有关环境保护法律、法规、政策及标准，接受地方环境保护主管部门的环境监督，调整和制定环境规划和目标，协调同其它有关部门的关系，以及一切与改善环境有关的管理活动。环境管理同计划管理、生产管理、技术管理、质量管理等各专项管理一样，是项目建设单位工业企业管理的一个组成部分，指导着环境监测的实施。

Environmental management means that this project abides by national and local laws, regulations, policies and standards with regard to environmental protection, accepts environmental supervision of local environmental protection authorities, adjusts and formulates environmental planning and objective, coordinates with other departments concerned and participates in all management activities regarding environment improvement during the construction and operation period. The same as other special management such as planning management, production management, technical management and quality management, the environment management is a constituent part of industrial enterprise management of the project owner, and guides implementation of environmental monitoring.

12.1.1环境管理机构

12.1.1 Environmental management organ

目前联盛纸业（龙海）有限公司已经设置有专门的环境保护管理部门，并由副总经理分管环保工作，形成了一支完善的环境管理队伍。

Currently, Liansheng Paper (Longhai) Co., Ltd. has set a special environmental protection administrative department and the Deputy General Manager is in charge of environmental protection. A perfect environmental management team has been formed.

12.1.2环境管理职能

12.1.2 Environmental management functions

环保机构作为项目建设单位的综合管理部门，负责对整个项目环境保护措施的落实情况实行统一的监督管理，并对项目所在区域环境质量全面负责，接受上级环境保护行政部门的监督、检查和指导。具体环境管理职能包括：

As a comprehensive management department of the project owner, the environmental management organ shall apply uniform supervision and management of environmental protection measures implementation situations in the entire project, take full charge of environmental quality in the region where the project is located, and accept supervision, inspection and guidance of superior environment administrative departments. Specific functions of environmental management are:

（1）主管项目各项环境保护工作；

(1) Being in charge of environment protection work in the project;

（2）贯彻执行环境保护法规、政策和标准；

(2) Implementing laws, policies and standards regarding environmental protection;

（3）制定并组织实施项目环境保护规划和计划；

(3) Formulating and organizing implementation of environmental protection planning and program;

（4）根据国家及地方有关施工管理要求和施工操作规范，结合本项目特点

制定施工环境管理条例，监督检查施工单位对条例的执行情况，受理附近居民对施工过程中环境保护意见，并及时与施工单位协调解决；

(4) Formulating construction environment management regulations according national and local management requirements and operating specifications for construction and in combination with characteristics of this project, supervising and inspection implementation situations of the construction unit, accepting opinions of nearby residents on environmental protection during construction, and coordinating with the construction unit in time;

（5）定期监督和检查环保设施运行状况，指导污水处理站等环保设施的维护管理工作；

(5) Regularly supervising and inspecting operating situations of environmental facilities, and guiding maintenance and management of environmental facilities such as sewage treatment station;

（6）组织制定项目环境保护管理的规章制度和主要污染岗位的操作规范，并监督执行；

(6) Organizing to formulate and supervising the implementation of rules and systems for environmental protection management in this project, and operation specifications of main polluting posts;

（7）组织开展环境保护专业技术培训，对职工进行经常性的环境保护知识教育和宣传，提高职工环保意识，提高职工自觉履行保护环境义务的觉悟；

(7) Organizing to carry out training for professional technology of environmental protection, and applying frequent education and publicity of environmental protection knowledge to staff to improve their awareness of environmental protection and consciousness of performing obligations of environmental protection;

（8）参与项目环保验收和环保污染事故的调查工作；

(8) Participating in environmental protection acceptance and investigation on environmental pollution accidents;

（9）推广应用环境保护的先进技术和经验；

(9) Popularizing and applying advanced technologies and experience of

environmental protection;

（10）承担上级主管部门以及有关部门委托的环境监测任务，协同有关部门解决本项目出现的污染事故；

(10) Undertaking environmental monitoring tasks entrusted by superior authorized department and relevant departments, and coordinating with relevant departments to solve pollution accident incurred to this project;

（11）负责事故状态下环境污染分析、决策，必要时聘请设计单位或有关专家协同解决；

(11) Taking charge of environmental pollution analysis and decision making under accident state, and hiring design unit or relevant experts to solve together where necessary;

（12）除完成本项目有关环境保护工作外，还应接受环保部门的检查监督，并按要求上报各项管理工作执行情况。

(12) Accepting inspection and supervision of environmental departments and reporting various management implementation situations as required, apart from finishing environmental protection work in regard with this project.

12.1.3环境管理办法

12.1.3 Environmental management measures

（1）项目建设过程中必须贯彻执行“三同时”方针，建设单位必须确保防治污染及其它公害的设施与主体工程项目同时设计、同时施工、同时投入运行，工程竣工后应提交有环保内容的竣工验收报告或专项竣工验收报告，经环保主管部门验收合格后，方可投入运行；

(1) The project owner must implement “simultaneous design, construction and commissioning” during construction, and guarantee pollution and hazard prevention facilities are simultaneously designed, constructed and commissioned with the main project; after the project is completed, the project owner shall submit as-built acceptance report or special as-built acceptance report with contents of environmental protection, and the project may be put into operation upon acceptance of

environmental protection authorities;

（2）进行施工期监理，确保施工期各项环保措施落到实处；

(2) The project owner shall apply supervision during the construction period to guarantee implementation of various environmental protection measures during the construction period;

（3）按照国家和地方环境保护规定，应及时向当地环境保护部门进行污染物排放申报登记，经环保部门批准后，方可按分配的指标排放；

(3) The project owner shall apply for registration of pollutant discharge to local environmental protection department in time, and may discharge according to distributed index upon approval of the environmental protection departments;

（4）加强环境监测数据的统计工作，建立项目完善的污染源及物料流失档案，严格控制污染物排放总量，确保污染物排放指标达到设计要求；

(4) The project owner shall strengthen statistics of monitoring data, establish perfect files of pollutant source and material loss, strictly control total pollutant discharge and guarantee the pollutant discharge indexes reach design requirements;

（5）强化对环保设施运行监督、管理的职能，建立项目完善的环保设施运行、维护、维修等技术档案，以及加强对环保设施操作人员的技术培训，确保环保设施处于正常运行情况，污染物排放连续达标；

(5) The project owner shall strengthen the function of supervision and management of environmental facilities, establish perfect technical files such as environmental protection facility operation, maintenance and repair, and strengthen technical training to operators of environmental facilities so as to guarantee normal operation of facilities and continuous up-to-standard discharge of pollutants;

（6）加强对开停车等非正常工况及周围环境的监测，并制订能够控制污染扩大、防治污染事故发生的有效措施；

(6) The project owner shall strengthen monitoring on abnormal conditions such as startup and shutdown and nearby environment, and formulate effective measures to control pollution expansion and prevent pollution accidents;

（7）在制定产品标准、工艺文件和操作规程的工作中，把环境保护的要求

统一考虑在内；

(7) The project owner shall contain requirements of environmental protection into the formulation process of product standard, process file and operating specifications;

（8）开展环境教育，提高项目建设单位干部和广大职工的环境意识，使干部和职工自觉地为环境保护进行不懈的努力；

(8) The project owner shall carry out education about environmental protection, and improve the environmental awareness of leaders and staff so that they may consciously work hard for environmental protection;

（9）将环境保护列入岗位责任制和统一评分计奖的指标，纳入生产调度，以行政手段督促、检查、表扬、奖励或惩罚，使各部门更好的完成环保任务；

(9) The project owner shall list environmental protection into the index of post accountability and unified score-based reward, and include into production dispatching, and make each department better finish the environmental protection tasks by means of administrative means including supervision, inspection, commending, rewards or punishment;

（10）把环境管理纳入企业总体管理计划，通过环境管理体系的运行和持续改进，达到减少污染、节能降耗、保护环境的要求，从而提高企业环境效益和经济效益。

(10) The project owner shall include the environmental management into overall management plan of the enterprise, and reach the requirements of pollution reduction, energy conservation, consumption reduction and environmental protection through operation of environmental management system and continuous improvement so as to improve environmental benefits and economic benefits of enterprise.

12.1.4环境管理体系

12.1.4 Environmental management system

12.1.4.1 施工期环境保护管理

12.1.4.1 Environmental protection management during the construction period

施工期的环境管理包括了建设单位、施工单位和监理单位的三级管理体系，

各单位都应充分地重视环境保护工作。

The environmental management during the construction period contains three-level management system of the project owner, construction unit and supervisory unit. Each unit shall attach full importance to environmental protection.

建设单位在招标选择时将环保工程质量以及工程资质充分进行考虑，并随时对环境保护工作进行检查，消除环保安全隐患，并负责与环保主管部门的协调工作。

The project owner shall take full account of environmental project quality and qualification when selecting the bid, and carry out inspection on environmental protection at any time to eliminate safety loopholes; it shall coordinate with environmental protection authorities.

施工单位也应设置由主要负责人及专业技术人员组成的内部环境保护管理机构，负责各个施工工序的环境管理工作，保证施工期环保设施的正常进行以及各项环保措施的落实。施工单位的管理内容包括：

The construction unit shall set up an internal environment protection management organ comprising main person in charge and professional technicians. The organ shall take charge of environmental management of each construction procedure, and guarantee normal operation of environmental facilities and implementation each environmental measure. The management contents of the construction unit shall contain:

（1）负责制定、监督、落实有关环境保护管理规章制度，负责实施环境保护控制措施、管理污染治理设施，并进行详细的记录，以备检查。

(1) Formulating, supervising and implementing management rules and systems regarding environmental protection, implementing environmental protection control measures, managing pollution treatment facilities and recording in details for inspection;

（2）及时向环境保护主管机构或向单位负责人汇报与本项目施工有关的污染因素、存在问题、采取的污染控制对策、实施情况等，提出改进建议。

(2) Reporting pollution factors, existing problems, pollution countermeasures

adopted and implementation situations with regard to construction of this project to environmental protection authorities or to the person in charge of the unit, and put forward suggestions on improvement.

（3）按本报告提出的各项环境保护措施，编制施工期环境保护措施落实计划，明确各施工工序的场地位置、环境影响、环境保护措施、落实责任机构（人）等，并将该环境计划以书面形式发放给相关人员，以便于各项措施的有效落实。

(3) Preparing implementation plan of environmental protection measures putted forward in this report during the construction period, clarifying site position, environmental impact, environmental protection measures and responsible body (person) for each construction process, and releasing the written environmental plan to personnel concerned for the convenience of effective implementation of various measures;

（4）需要加强对施工人员的教育和培训，使其树立良好的环境保护意识，倡导文明施工，环保施工。

(4) Strengthening education and training of constructors so that they may establish favorable awareness of environmental protection, and advocate civilized and environmental construction.

项目施工期间，建设单位应委托有资质的监理单位进行监理工作。通过日常的现场考察，对施工过程中出现的环境问题及时与建设单位和施工单位沟通并采取相应措施把这些问题控制在源头，将施工中对环境的各项不利影响降到最低限度。监理单位不仅要对工程质量负责，还建议指派专门的人员负责环境保护的监督工作，按照环境影响评价文件的措施要求，以及国家、地方环保法规、标准进行监督，对建设项目的各项环保工程建设质量严格把关，监督施工单位落实施工中应采取的各项环保措施。

During project construction, the project owner shall entrust qualified supervisory unit for supervision. Through field investigation, the supervisory unit shall communicate with the project owner and construction unit about environmental problems incurred during construction process and adopt corresponding measures to control the problems from the source and minimize various adverse impact on environment during construction. The supervisory unit shall not only be responsible for project quality, but also assign special personnel to take charge of supervision on environmental protection according to measure requirements of the EIA as well as national and local environmental protection laws and standards. The special personnel shall strictly control construction quality of various environmental projects, and supervise the construction unit to implement various environmental measures to be adopted during construction.

施工单位在办理完投标手续后，在工程开工前十五日，携带施工合同等有关资料到当地环保局申报《建设施工环保审批表》，经批准后方可施工。施工期环境监理内容见表 0-1。

After the bidding procedures are handled, the construction unit shall apply for *Environmental Approval Table for Construction Project* to local environmental protection bureau with relevant materials such as construction contract 15 days prior to commencement, and may start constructing upon approval. The environmental supervision contents during the construction period can be seen in Table 12.1-1.

表 0-1 建设项目施工期环境监理内容一览表

Table 12.1-1 List of Environmental Supervision Contents during Project Construction

项目 Project	内容 Contents	目标 Objective
施工废气 Waste gas generated during constructio n	对工地及进出口定期洒水抑制尘土，并清扫，保持工地整齐干净 Regularly spray water to restrict dust on construction site and exits/entrance, and keep the construction site neat and clean	废气排放达到GB16297-1996《大气污染物综合排放标准》二级标准；并使周围环境敏感点满足GB3095-2012《环境空气质量标准》中的二级标准。 The waste gas discharge shall reach Grade II standard in GB16297-1996 *Integrated emission standard of air pollutants*; make sensitive point in ambient environment meets Grade II standard in GB3095-2012 *Ambient air quality standards*
	运输车辆在运输砂石、水泥等粉尘较多的物料时，应覆盖 The transportation truck shall be covered when transporting materials with much dust such as sand and cement	
	对固定的机械设备，安装除尘设施 Install dust removal facilities to fixed mechanical equipment	
	大型运输车辆排放的尾气，安装吸收或净化器 Install absorbing or purification device for	

项目 Project	内容 Contents	目标 Objective
	tail gas emitted by large-scale trucks	
	燃用天然气、液化气、电等清洁燃料，严禁燃用煤、木柴、油毡等燃料，避免造成空气污染 Apply clean fuels such as natural gas, liquefied gas and electricity; forbid to use fuels such as coal, firewood and asphalt felt to avoid air pollution	
	运输车辆禁止超载，不得使用劣质燃料 The transportation truck shall neither overload nor use inferior fuels	
施工噪声 Constructio n noise	尽可能选用低噪声设备和工艺，可从根本上降低源强 Try to select low-noise equipment and process to reduce source strength from the root	施工噪声达到GB12523-2011《建筑施工场界环境噪声排放标准》；并使周围环境敏感点满足GB3096-2008《声环境质量标准》2类标准。 The construction noise shall reach GB12523-2011 *Emission standard of environment noise for boundary of construction site*; make sensitive point in ambient environment meets Class 2 standard in GB3096-2008 *Environmental quality standard for noise*
	合理布置施工设备，避免局部声级过高，对敏感点需要设置临时声屏障 Reasonably arrange construction equipment to avoid excessive sound level in local area; set temporary noise barrier to sensitive points	
	车辆装卸时不允许鸣笛，不得影响周围居民的休息 Do not horn when uploading/downloading, do not interfere nearby residents	
施工废水 Constructio n wastewater	施工期产生的废水，排入现有污水处理站集中处理，再通过排污设施排放 The wastewater generated during the construction period shall be drained to current sewage treatment station for centralized treatment, and then discharged through sewage disposal facilities	生活污水达到GB8978-1996《污水综合排放标准》二级标准 The domestic sewage shall reach the Grade II standard in GB8978-1996 *Integrated wastewater discharge standard*
	施工清洗废水做到回用，不影响水环境的水质 The wastewater for cleaning during construction shall be recycled, and not affect quality of water environment	
	避免在雨季进行基础开挖施工对水环境的影响 Avoid foundation excavation in rainy season affecting water environment	

环境管理与监测计划

Environmental Management and Monitoring Plan

项目 Project	内容 Contents	目标 Objective
固体废物 Solid wastes	施工期的弃土废渣不能排入附近地表水体及海域 The spoil and residue generated during the construction period shall not be drained to nearby ground water body and sea area	保持工程所在现场清洁整齐，并不产生二次污染 Keep the project site clean and tidy, and not generate secondary pollution
	施工期间产生的建筑垃圾和开挖多余弃土应及时清运，不能长期堆存，做到当日产生当日清运，装满垃圾的清运车辆需要进行覆盖，防止沿途洒落 The building wastes and excessive spoil excavated during construction period shall be cleaned in time, and shall not be stocked for a long time; the wastes shall be cleaned on current day; the cleaning vehicle loading wastes shall be covered to prevent scattering	
	施工期间的生活垃圾集中收集，及时运出 The household waste shall be collected during construction period and sent out in time	
生态影响 Ecological impact	施工期间水土流失问题、物料堆场及主体开挖、弃渣及弃渣堆放应符合环境管理规范要求 The soil erosion problem, material stockyard, foundation excavation, spoil and spoil stock shall comply with requirements of environmental management regulations	施工过程中不破坏周围植被和山体，不乱占土地等；对原有野生动植物采取各种迁移、隔离保护 Do not damage nearby plantation and mountain, and do not occupy land without approval; adopt migration and isolation protection for wild animals and plants
	绿化面积达到规定要求 Greening area shall reach regulated requirements	
环境监测、环境监理 Environmental monitoring and environment supervision	施工期水、气、声及厂区防渗措施等监测及监督 Monitoring and supervision of water, gas, noise and seepage prevention measures on the plant site during construction	对施工过程进行监督管理，及时发现并解决环境问题，厂区防渗达到相关要求 Apply supervision management on construction process, find out and solve environmental problems in time, and make sure seepage prevention in the plant zone may reach relevant requirements

拟建项目应设置施工期环境监理日志，对施工过程中可能发生的水质污染、噪声扰民、扬尘污染、妨碍交通等因素进行全面监控，及时发现项目施工过程中

出现的各种问题并及时处理污染事件，将对周围环境的不利影响降到最低。

The planned project shall set environmental supervision log during the construction period, comprehensively monitor possible water quality pollution, residents disturbing with noise, dust pollution and traffic hindering, find out various problems during project construction and handle pollution events in time to minimize adverse impact on nearby environment.

施工期环境监理日志格式见表 0-2。

The format of environmental monitoring log during construction can be seen in Table 12.1-2.

表 0-2 施工监理日志一览表

Table 12.1-2 List of Construction Supervision Log

序号 No.	项目名称 Item Name	记录内容 Record Contents
1	日期 Date	
	天气状况 Weather conditions	
2	施工起止时间 Start/end time of construction	
	主要工程施工内容 Main project construction contents	
3	主要环境问题 Main environmental problems	
	整改情况 Rectification situations	
4	旁站部位名称 Name of standby part	
	施工工艺描述 Construction process description	
	环境监理人员达到及离开时间	

	Arrival and departure time of environmental supervisor	
	完成的施工量 Construction workload completed	
	施工过程与环评文件及批复是否一致 Consistency between construction process and EIA and approval	
5	来访人员姓名 Name of visitor	
	洽谈记录 Negotiation record	

12.1.4.2 运营期环境保护管理

12.1.4.2 Environmental protection management during operation

运营期环境保护管理措施主要包括：

The environmental protection management measures during the operation period mainly contain:

（1）环境管理规定：包括公司环境管理体制、机构、职责分工及相互关系，实施环境管理与防治的基本途径与方法，环境保护工作的检查与考核、奖罚规定等。

(1) Environmental management regulations: including environmental management system, institution, responsibility assignment and relationship, basic approach and methods of environmental management and prevention, inspection, assessment, reward and punishment regulations on environmental protection work, etc.;

（2）环境质量管理规程：包括环保目标控制要求、污染源管理规定、环境监测规程（包括监测采样分析方法、点位设置、环境监测制度）等。

(2) Environmental quality management regulations: including environmental protection target control requirements, pollution source management regulations, and

environmental monitoring regulations (including monitoring and sampling analysis method, site setting, and environmental monitoring system), etc.;

（3）环境技术管理规程：包括综合防治的原则与技术途径、污染防治对策控制工艺参数、环境保护装置及设施的操作规程等。

(3) Environmental technology management regulations: including principle and technical approach of comprehensive prevention and control, control process parameters of pollution prevention countermeasures, and operation specifications of environmental protection device and facilities, etc.;

（4）环境保护业务管理制度：包括环境保护计划管理制度，“三同时”管理规定，环保设施检查、维护、保养规定，有毒有害物品管理规定，污染事故管理制度及应急预案，公司环境与绿化管理制度，文明生产规章等。

(4) Environmental protection business management system: including environmental protection plan management system, “” management regulations, environmental facility inspection, maintenance and repair regulations, management regulations on poisonous and hazardous articles, pollution accident management system and contingency plan, environment and greening management system of the Company, and regulations on civilized production, etc.;

（5）环境保护管理培训与管理：定期组织员工进行学习培训，增强员工的环保意识，在工作中能够充分的体现出节能降耗以及环境保护的素质。

(5) Environmental protection management training and management: regularly organizing learning and training for staff to enhance their awareness of environmental protection, and show their quality for energy conservation, consumption reduction and environmental protection sufficiently during work.

12.1.5环境管理制度

12.1.5 Environmental management system

近年来，随着公司生产的正常，公司环保意识上了一个新台阶，企业环境管理、监测制度也逐步规范和完善，先后制定了多项环境管理条例和规章制度，并结合生产指标一同制定了环保考核指标。

In recent years, with normal production, the environmental protection awareness of the Company is stepped to a new level. The environmental management and monitoring system has been gradually normalized and improved. The Company has formulated multiple environmental management regulations and systems successively, and formulated environmental protection assessment indexes according to the production indexes.

12.2 环境监测计划

12.2 Environmental Monitoring Plan

12.2.1环境监测目的

12.2.1 Purposes of environmental monitoring

环境监测是环境保护中最重要的环节和技术支持，开展环境监测的目的在于：

Environmental monitoring is the most important link and technical support in environmental protection. The purposes are:

（1）检查项目施工期存在的对裸露施工面的保护以及施工扬尘、施工废水等环境问题，以便及时处理；

(1) Checking

（2）检查、跟踪项目投产后运行过程中各项环保措施的实施情况和效果，掌握环境质量的变化动态；

(2) Checking and following-up implementation situations and effect of various environmental measures after the project is put into operation, and master dynamic changes of environmental quality;

（3）了解项目环境工程设施的运行状况，确保设施的正常运行；

(3) Knowing operating status of facilities of environmental project, and make sure normal operation of facilities;

（4）了解项目有关的环境质量监控实施情况；

(4) Knowing implementation of environmental quality monitoring regarding this project; and

（5）为改善项目周围区域环境质量提供技术支持。

(5) Providing technical support to improve environmental quality in nearby area of the project;

12.2.2监测计划

12.2.2 Monitoring plan

（1）施工期监测计划

(1) Monitoring plan during the construction period

施工期环境监测将委托当地环境监测站进行，监测方案详见表 0-1。

The local environmental monitoring station shall be entrusted to monitor environment during the construction period. The monitoring plan can be seen in Table 12.2-1.

表 0-1 施工期环境监测方案

Table 12.2-1 Environmental Monitoring Plan during the Construction Period

监测类别 Monitoring type	监测内容 Monitoring contents	监测位置 Monitoring position	监测项目 Monitoring item	监测频次 Monitoring frequency
污染源监测 Pollution source monitoring	大气污染源 Air pollution source	原材料堆场、施工作业区边界 Raw material stockyard, boundary of construction zone	TSP	施工期间每两个月监测一次，每次连续监测两天，每天四次 Monitor once every two months during construction with two days in a row, four times per day
	噪声污染源 Noise pollution source	施工场地设备旁 Beside equipment on construction site	等效连续A声级 Equivalent continuous A sound level	每半年一次 Once every half a year
环境质量监测 Environmental	环境空气质量 Ambient air quality	沙坂村、埔尾村、蔡店村、丁厝村 Shaban Village, Puwei Village, Caidian Village, Dingcuo Village	TSP	每季度一次，一次7天 Once every quarter with seven days in a row

quality monitoring	地下水 Underground water	主要施工场地对地下水影响点位 Points that construction site affecting underground water	pH、色度、总硬度、高锰酸盐指数、氨氮、汞、铅、六价铬 pH, chromaticity, total hardness, permanganate index, ammonia nitrogen, Hg, Pb, Cr6+,	每季度一次 Once every quarter
	声环境质量 Acoustic environment quality	沙坂村、埔尾村、蔡店村、丁厝村 Shaban Village, Puwei Village, Caidian Village, Dingcuo Village	等效连续A声级 Equivalent continuous A sound level	每月一次，一次2天 Once a month, two days per time

（2）运营期环境监测

(2) Monitoring plan during operation

本项目在联盛纸业（龙海）有限公司现有预留场地，扩建年产 60 万吨高档箱板纸工程，给排水设施、供汽供热设施等均依托厂区内现有工程，运营期环境监测方案分为依托厂内现有工程监测方案和针对本项目扩建工程的监测方案，详见表 0-2。

The project will expand annual output 600,000t high-grade cardboard paper project on the reserved site of Liansheng Paper Industry (Longhai) Co., Ltd. The water supply, drainage, gas and heat supply facilities all rely on current project on the plant site. The monitoring plan during the operation period can be divided into the monitoring plan based on current project and monitoring plan for the expanded project. See Table 12.2-2.

表 0-2 运营期环境监测方案

Table 12.2-2Envirionemntal Monitoring plan during the operation period

监测类别 Monitoring type	监测内容 Monitoring contents	监测位置 Monitoring position	监测项目 Monitoring item	监测频次 Monitoring frequency
污染源监测（依托工程）	大气污染源 Air pollution source	锅炉烟囱 Boiler chimney	SO_2、NOx、烟尘 SO_2, NOx, dust	连续在线自动监测 Continuous online automatic

监测类别 Monitoring type	监测内容 Monitoring contents	监测位置 Monitoring position	监测项目 Monitoring item	监测频次 Monitoring frequency
Pollution source monitoring (based on current project)				monitoring
		煤炭粗碎、细碎工段排气筒 Exhaust funnel of coal breaking and fine crushing section	粉尘、排气量 Dust, displacement	1次/季 Once/quarter
		厂界 Plant boundary	臭气浓度 Odor concentration	1 次/半年，2天/次 Once/half a year, Two days/time
	水污染源 Water pollution source	废水处理设施污水进水口及排放口 Sewage inlet and outlet of waste treatment facilities	水量、pH、SS、COD_{Cr}、BOD_5、氨氮、色度、总磷 Water volume, pH, SS, COD_{Cr}, BOD_5, ammonia nitrogen, chromaticity, total phosphorus	水量、COD_{Cr}、氨氮、总磷连续自动监测，其余项目 1 次/季 Continuously automatic monitoring for water volume, COD_{Cr}, ammonia nitrogen and total phosphorus; other once per quarter
	噪声 Noise	厂界外1m 1m outside the plant boundary	等效连续A声级 Equivalent continuous A sound level	1 次/年，2 天/次 昼夜各测一次 1 time per year, Two days per time Once each on day and night
污染	大气污染源	主厂区厂界无组织监控点	NH_3、H_2S	1 次/半年，

监测类别 Monitoring type	监测内容 Monitoring contents	监测位置 Monitoring position	监测项目 Monitoring item	监测频次 Monitoring frequency
源监测（拟建项目） Pollution source monitoring (for the planned project)	Air pollution source	Unorganized discharge monitoring point on plant boundary		2天/次 Once/half a year, Two days/time
	固废清运 Solid waste cleaning	铁丝、塑料等 Iron wire, plastics, etc.	出售 Sold	每月监察一次 Monitoring once a month
		砂石、污泥等 Sand, sludge, etc.	送垃圾填埋场 Sent to refuse landfill	
		给水处理站污泥 Sludge in water supply treatment station	送垃圾填埋场 Sent to refuse landfill	
		生活垃圾 Household garbage	送垃圾填埋场 Sent to refuse landfill	
		废润滑油 Used lubricating oil	委托有资质单位安全处置 Disposed safely by qualified unit	
		其余固体废物 Other solid wastes	送锅炉燃烧 Sent to boiler for combustion	
环境质量监测（依托工程） Environmental quality monitoring (based on current project)	环境空气质量 Ambient air quality	厂区、角美镇区、沙坂村、杨厝村、吴宅村、玉江村、紫泥镇区等 Plant zone, Jiaomei Town, Shaban Village, Yangcuo Village, Wuzhai Village, Yujiang Village, Zini Town, etc.	SO_2、NO_2、TSP、PM_{10}	每年一次，每次7天 Once a year, seven days per time
	海域环境 Ocean environment	近期：九龙江北港，设2个监测点 Short-term: two monitoring points in North port of Jiulong River 远期：九龙江口角美港口，设2个监测点 Long-term: two monitoring points in Jiaomei Port, Jiulong	水温、盐度、pH、溶解氧、悬浮物、高锰酸盐指数、无机氮、总磷 Water temperature, salt, pH, dissolved oxygen, suspended solids, permanganate index, inorganic	1次/年，3天/次 Once/year, Three days/time

监测类别 Monitoring type	监测内容 Monitoring contents	监测位置 Monitoring position	监测项目 Monitoring item	监测频次 Monitoring frequency
		River Estuary	nitrogen, total phosphorus	
	海域沉积物 Ocean sediments	同海域环境现状监测点 The same as ocean environment monitoring point	pH、铜、铅、锌、镉、砷、有机质 pH, Cu, Pb, Zn, Cd, As, organic matter	1次/年，3天/次 Once/year, Three days/time
	声环境质量 Acoustic environmental quality	沙坂村、埔尾村、蔡店村、丁厝村 Shaban Village, Puwei Village, Caidian Village, Dingcuo Village	等效连续A声级 Equivalent continuous A sound level	1 次/年，2 天/次 昼夜各测一次 1 time per year, Two days per time Once each on day and night
环境质量监测（拟建项目）Environmental quality monitoring (for the planned project)	环境空气质量 Ambient air quality	沙坂村 Shanban Village	NH_3、H_2S、臭气浓度 NH_3, H_2S, odor concentration	每年一次 Once per year
	地下水环境质量 Underground water environment quality	地下水监测孔3眼 Three underground water monitoring holes	pH、色度、总硬度、高锰酸盐指数、氨氮、汞、铅、六价铬 pH, chromaticity, total hardness, permanganate index, ammonia nitrogen, Hg, Pb, Cr6+	每年三次 Three times per year

（3）事故应急监测与跟踪监测

(3) Accident emergency monitoring and follow-up monitoring

项目事故预案中需包括应急监测程序，项目运行过程中一旦发生事故，应立即启动应急监测程序，并跟踪监测污染物的迁移情况，直至事故影响根本消除。需准备主要污染物的监测仪器、设备、车辆，保证随时能够投入监测工作。事故应急监测方案应与监测单位共同制订和实施。

The project accident plan shall contain emergency monitoring procedure. Once accident occurs during project operation, the emergency monitoring procedure shall be launched immediately, and the migration of pollutants shall be followed and monitored till the accident impact is eradicated. The monitoring instruments, facilities and vehicles for major pollutants shall be prepared to guarantee monitoring may be applied at any time. The accident emergency plan shall be jointly formulated and implemented with the monitoring unit.

（4）监测机构

(4) Monitoring organ

委托项目所在地相关环境监测站定期监测。项目建成后，建议由项目所在地的环保局对项目的环境管理及监测的具体执行情况加以监督。

The local environmental monitoring station where the project locates shall be entrusted to carry out regular monitoring. After the project is completed, it is suggested local Environmental Protection Bureau supervise specific implementation of environmental management and monitoring in the project.

12.3 企业自主竣工环保验收要求

12.3 Requirements for Independent As-Built Acceptance of the Enterprise for Environmental Protection

根据《中华人民共和国环境保护法》、《建设项目环境保护管理条例》（国务院第 682 号令）和《关于发布《建设项目竣工环境保护验收暂行办法》的公告（国环规环评[2017]4 号）》等有关规定，拟建工程投入运营后，联盛纸业（龙海）有限公司组织对配套建设的环境保护设施进行验收，参照《建设项目竣工环境保护验收技术指南污染影响类》编制验收报告，公开相关信息，接受社会监督，确保建设项目需要配套建设的环境保护设施与主体工程同时投产或者使用，并对

验收内容、结论和所公开信息的真实性、准确性和完整性负责，不得在验收过程中弄虚作假。

In accordance with *Environmental Protection Law of People's Republic of China*, *Regulations on the Administration of Construction Project Environmental Protection* (No. 682 Decree of the State Council) and *Announcement on Releasing "Interim Measures for As-built Acceptance of Construction Project for Environmental Protection"* (GHGHP [2017] No. 4), after the planned project is put into operation, Liansheng Paper Industry (Longhai) Co., Ltd. will organize acceptance on environmental protection facilities built supportively, prepare acceptance report referring to *Technical Guidance on As-built Acceptance of Construction Project for Environmental Protection – Pollution Impact*, disclose relevant information, accept social supervision, and make sure the supporting environmental protection facilities are simultaneously put into production or operation with main project. The Company shall be responsible for authenticity, accuracy and integrity of acceptance contents, conclusion and information disclosed, and shall not play false during acceptance.

12.3.1排放口规范化管理

12.3.1 Normalized management of discharge outlet

排污口是企业排放污染物进入环境、污染环境的通道，强化排污口管理是实施污染物总量控制的基础工作之一，也是环境管理逐步实现污染物排放科学化、定量化的重要手段。

The sewage discharge outlet is the channel for the pollutants discharged by enterprises into environment and polluting the environment. Strengthening discharge outlet management is one of the basic jobs applying total pollutants control, and also an important approach for environmental management to gradually realize scientific and quantified pollutant discharge.

◆排污口管理原则

◆ Management principles of discharge outlets

（1）排污口实行规范化管理；

(1) The normalized management is applied to sewage discharge outlets;

（2）排污口应便于采样与计量监测，便于日常现场监督检查；

(2) The discharge outlet shall be convenient for sampling, measuring and monitoring, and for routine field supervision and inspection;

（3）如实向环保管理部门申报排污口数量、位置及所排放的主要污染物种类、数量、浓度、排放去向等情况；

(3) Situations such as discharge outlets quantity, position, and type, quantity, concentration and discharge direction of main pollutants discharged shall be applied and submitted to environmental protection management departments according to truth;

（4）废气排气装置应设置便于采样、监测的采样孔和采样平台，设置应符合《固定污染源烟气排放连续监测技术规范（试行）》（HJ/T75-2007）；

(4) The waste gas discharge device shall set sampling hole and sampling platform for the convenience of sampling and monitoring, and the setup shall comply with *Specifications for Continuous Emission Monitoring of Flue Gas Emitted from Stationary Source (on Trial)* (HJ/T75-2007);

（5）固体废物临时贮存场要有防扬散、防流失、防渗措施。

(5) The temporary storage site for solid wastes shall set raising, loss and seepage prevention measures;

◆排污口立标管理

◆ Signboard management of discharge outlets

（1）污水排放口、废气排放口和噪声排放源图形标志

(1) Graphical signs for sewage discharge outlets, waste gas discharge outlets and noise emission source

污水排放口、废气排放口和噪声排放源图形符号分为提示图形符号和警告图形符号两种，图形符号的设置按 GB 15562.1-1995 执行。

The graphic signs for sewage discharge outlets, waste gas discharge outlets and noise emission source are divided into graphic signs for prompt and warning. The setup shall follow GB 15562.1-1995.

（2）固体废物贮存（处置）场图形标志

(2) Graphical signals for solid waste storage (disposal) yard

固体废物贮存（处置）场图形符号分为提示图形符号和警告图形符号两种，图形符号的设置按 GB 15562.2-1995 执行。

The Graphical signs for solid waste storage (disposal) yard are divided into graphic signs for prompt and warning. The setup shall follow GB 15562.2-1995.

（3）排污口设标志牌

(3) Signboard for sewage discharge outlet

①污染物排放口的环保图形标志牌应设置在靠近采样点，并设在醒目处，标志牌设置高度为其上边缘距离地面约 2m；

① The graphical signboard for pollutant discharge outlet shall be set approaching to the sampling point and on striking area. The height of the signboard shall be set with upper edge 2m above the ground;

②重点排污单位的污染物排放口以设置立式标志牌为主，一般排污单位的污染物排放口，可根据情况设置立式或平面固定式标志牌。

② The floor-type signboards shall be set to pollutant discharge outlets of key pollutant discharging units, while floor-type or horizontally fixed signboard may be set to pollutant discharge outlets of common pollutant discharging units according to specific situations.

◆排污口建档管理

◆ Filing management of discharge outlets

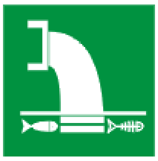
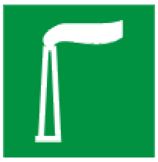
（1）本项目应使用原国家环保局统一印制的《中华人民共和国规范化排污口标志登记证》，并按要求填写有关内容；

(1) This project shall use the *Registration Certificate of the People's Republic of China for Signs of Normalized Sewage Discharge Outlet* uniformly printed by former National Bureau of Environmental Protection, and fill in relevant contents as required;

（2）根据排污口管理内容要求，项目建成投产后，应将主要污染物种类、数量、浓度、排放去向，立标情况及设施运行情况记录于档案。

(2) According to requirements of discharge outlet management contents, the type,

quantity, concentration, discharge direction of main pollutants, signboard setup situations and facility operations shall be recorded to the file after the project is put into production.

	标志名称：污水排放口 Name of Sign: Sewage discharge outlet 国标代码：GB 15562.1－1995 National Standard Code: GB 15562.1-1995	简介： Introduction: 提示图形符号 Graphic sign for prompt 污水排放口 Sewage discharge outlet 表示污水向水体排放 Mean the sewage is discharged to water body
	标志名称：污水排放口 Name of Sign: Sewage discharge outlet 国标代码：GB 15562.1－1995 National Standard Code: GB 15562.1-1995	简介： Introduction: 警告图形符号 Graphic sign for warning 污水排放口 Sewage discharge outlet 表示污水向水体排放 Mean the sewage is discharged to water body
	标志名称：废气排放口 Name of Sign: Waste gas emission outlet 国标代码：GB 15562.1－1995 National Standard Code: GB 15562.1-1995	简介： Introduction: 提示图形符号 Graphic sign for prompt 废气排放口 Waste gas emission outlet 表示废气向大气环境排放 Mean the waste gas is emitted to ambient air environment
	标志名称：废气排放口 Name of Sign: Waste gas emission outlet 国标代码：GB 15562.1－1995 National Standard Code: GB 15562.1-1995	简介： Introduction: 警告图形符号 Graphic sign for warning 废气排放口 Waste gas emission outlet 表示废气向大气环境排放 Mean the waste gas is emitted to ambient air environment
	标志名称：噪声排放源 Name of Sign: Noise emission source 国标代码：GB 15562.1－1995 National Standard Code: GB 15562.1-1995	简介： Introduction: 提示图形符号 Graphic sign for prompt 噪声排放源 Noise emission source 表示噪声向外环境排放 Mean the noise is emitted to

		external environment
	标志名称：噪声排放源 Name of Sign: Noise emission source 国标代码：GB 15562.1－1995 National Standard Code: GB 15562.1-1995	简介： Introduction: 警告图形符号 Graphic sign for warning 噪声排放源 Noise emission source 表示噪声向外环境排放 Mean the noise is emitted to external environment
	标志名称：固体废物提示 Name of Sign: Hints of solid wastes 国标代码：GB/15562.2-1995 National Standard Code: GB 15562.2-1995	简介： Introduction: 固体废物提示 Hints of solid wastes
	标志名称：一般固体废物 Name of Sign: Common solid wastes 国标代码：GB/15562.2-1995 National Standard Code: GB 15562.2-1995	简介： Introduction: 一般固体废物 Common solid wastes
	标志名称：危险废物 Name of Sign: Hazardous wastes 国标代码：GB/15562.2-1995 National Standard Code: GB 15562.2-1995	简介： Introduction: 危险废物 Hazardous wastes

图 0-1 污染源排放地图形标志

Fig. 12.3-1 Graphical signs for pollutant source emission

12.3.2环境信息公开

12.3.2 Disclosure of environmental information

参考《国家重点监控企业自行监测及信息公开办法（试行）》的有关规定，企业应对自行监测结果和委托检测结果进行信息公开。公开内容应包括：

Referring to Independent Monitoring of National Key Monitoring Enterprises and Information Disclosure Methods (on Trial), the enterprise shall disclose information of independent monitoring results and entrusted inspection results. The contents of disclosure shall contain:

（1）基础信息：企业名称、法人代表、所属行业、地理位置、生产周期、联系方式、委托监测机构名称等；

(1) Basic information: enterprise name, legal representative, industry, geographical position, production period, contact information, and name of entrusted monitoring institution, etc.;

（2）监测方案（自行监测方案、委托监测方案）；

(2) Monitoring plan (independent monitoring plan and entrusted monitoring plan);

（3）监测结果：全部监测点位、监测时间、污染物种类及浓度、标准限值、达标情况、超标倍数、污染物排放方式及排放去向；

(3) Monitoring results: all monitoring points, monitoring time, type and concentration of pollutants, standard limit, up-to-standard discharge, excess multiple, pollutant discharge way and discharge orientation;

（4）污染源监测年度报告。

(4) Annual monitoring report of pollution sources;

企业可通过对外网站、报纸、广播等便于公众知晓的方式公开监测信息。

The enterprise shall disclose monitoring information by means of external website, newspaper and broadcast which are convenient for the public to know.

12.3.3污染物排放清单

12.3.3 Pollutant discharge list

项目废气、废水、固废拟采取的环境保护措施、运行参数、污染物排放种类、排放浓度、总量指标、排污口信息、执行标准等见表 0-1。

The environmental protection measures, operating parameters, pollutant discharge types, discharge concentration, total amount index, pollutant discharge outlet information, and implementation standards to be adopted for waste gas, wastewater and solid wastes of the project can be seen in Table 12.3-1.

表 0-1 污染物排放清单一览表

Table 12.3-1 List of Pollutants Discharge

序号 No.	污染物排放清单 List of pollutant discharge	管理要求 Management requirements					
1	工程组成 Project composition	建设一条年产60万吨高档箱板纸生产线（PM10） Production of one annual output 600,000t high-grade cardboard paper production line (PM10)					
2	原辅料及燃料 Raw materials, auxiliaries and fuel	原料组分控制要求 Raw material component control requirements					
		年最大用量 Annual maximum consumption	计量单位 Unit of measurement	硫元素占比 Sulfur element proportion	灰分/挥发分 Ash/volatile matter	有毒有害成份及占比 Poisonous components and proportion	其他（如重金属含量） Others (such as heavy metal content)
2.1	NUPK	60000	t/a	/	/	/	/
2.2	OCC（风干） OCC (air drying)	635300	t/a	/	/	/	/
2.3	AKD	7200	t/a				
2.4	硫酸铝 Aluminum sulfate	21600	t/a				
2.5	阳离子淀粉 Cationic starch	12000	t/a				
2.6	助留剂 Retention aid	720	t/a				
2.7	聚酯网 Polyester mesh	12000	t/a				
2.8	毛布 Felt	18	t/a				
2.9	干网 Dry fabric	13200	t/a				
2.10	打包带 Packing strap	1200	t/a				
3	污染物控制要求 Pollutant control requirements	污染因子及污染防治措施 Pollution factors and pollution prevention measures					

控制要求Control requirements 污染物种类Pollutant type			污染因子 Pollution factor	对应产污环节 Corresponding pollutant generating link	污染治理措施 Pollution treatment measures			排放形式及排放去向 Discharge form and orientation	排污口信息 Discharge outlet information	执行的环境标准 Environmental standards implemented		总量指标t/a Total amount indicator t/a
					污染治理设施名称 Name of pollution treatment facilities	工艺/运行参数 Process/operating parameters	是否为可行技术 Feasible technology or not			污染物排放标准 Pollutant discharge standards	环境质量标准 Environmental quality standards	
3.1	废水	生活污水+生	COD	/	厂内现有污水处	处理规模为	是	目前暂时排放至九龙江北		DB35/1310-2013	GB3097-1997	COD：389.616

	Wastewater	产废水 Domestic sewage + production wastewater	NH_3-N	/	理站 Current sewage treatment station in the plant	80000m^3/d，采用厌氧处理+好氧处理+深度处理工艺 Processing scale is 80000m^3/d; adopt anaerobic treatment + aerobic treatment + deep treatment process	Yes	港；待排海管道建设完成后，统一纳入角美污水处理厂的尾水排海管道（25万t/d），统一深海排放 Now the sewage is drained to Jiulong River North Port temporarily; uniformly discharged to tail water drainage pipeline of Jiaomei Sewage Treatment Station (250,000t/d) after the ocean-oriented drainage pipeline is completed, and uniformly discharged to deep sea		第二类和第三类 Class II and III in GB3097-1997	氨氮：12.495 Ammonia nitrogen: 12.495
3.2	废气 Waste gas		烟尘 Smoke	燃煤锅炉 Coal-fired boiler	双室五电场静电除尘器 Five electric fields electrostatic precipitator	/	是 Yes	150m烟囱 150m Chimney	GB13223-2011	GB3095-2012 二级标准 Grade II standard in GB3095-2012	/
			SO_2	燃煤锅炉 Coal-fired boiler	石灰石-石膏炉外湿法脱硫 Limestone-gypsum outer-furnace wet desulfurization method	/					/
			NOx	燃煤锅炉 Coal-fired boiler	低氮燃烧 Low-nitrogen combustion	/					/
			NH_3	碎浆车间、污水处理站 Pulping workshop, sewage treatment station	密闭微负压运行 Closed operation under micro negative pressure	--		无组织排放 Unorganized emission	GB14554-1993 表1中二级新扩改标准 Grade II newly built and expanded project standard in Table 1 of GB14554-1993	TJ36-79中居住区最高允许浓度限值 Maximally allowable concentration in residential district in TJ36-79	/
			H_2S			/					/
			粉尘 Dust	煤炭破碎工序 Coal crashing procedure	静电除尘器 Electrostatic precipitator	/	是 Yes	15m排气筒 15m Exhaust funnel	GB16297-1996	GB3095-2012 二级标准 Grade II standard in GB3095-201	/
3.3	噪声 Noise		连续A声级 Continuous sound	生产设备 Production	减震措施等 Damping measures, etc.		是 Yes	/	GB12348-2008 3类	GB3096-2008 3类	/

		level A	equipment				Class 3 in GB12348-2008	Class 3 in GB3096-2008	
3.4	固废 Solid waste	①制浆造纸车间产生的浆渣（木片、纤维束等）送锅炉焚烧处置； ① The pulp residues (wood chips and fiber bundles) generated by pulping and papermaking workshop shall be sent to the boiler for combustion; ②制浆造纸车间产生的铁丝塑料等经收集后进入联盛纸业的年处理55万吨造纸废渣厂区进行清洗、筛分后铁丝出售给物资回收部门 The iron wire and plastics generated in the pulping and papermaking workshop will be collected and sent to annual processing 550,000t papermaking residue workshop of Liansheng Paper Industry for cleaning and screening; then, the iron wire will be set to material recovery department; ③制浆造纸车间产生的砂石污泥等环卫部门清运处理 ③ The sand and sludge generated by pulping and papermaking workshop shall be cleaned and transported by the sanitary department; ④污水处理站污泥送锅炉焚烧处置 ④ The sludge in sewage treatment station shall be sent to the boiler for combustion; ⑤给水处理站污泥环卫部门清运处理 ⑤ The sludge in water supply treatment station shall be cleaned and transported by the sanitary department; ⑥生活垃圾环卫部门清运处理 ⑥ The household garbage shall be cleaned and transported by the sanitary department; ⑦废润滑油暂存于危废仓库，委托给漳州联办环保产业有限公司进行处置 ⑦ The useless lubricating oil shall be stored in hazardous waste warehouse, and be disposed by Zhangzhou Lianban Environmental Protection Industry Co., Ltd. upon entrustment.					GB18599-2001及其修改单 GB18599-2001 and its amendments GB18597-2001		/

12.4 加强落实事中事后监管要求

12.4 Strengthening Implementation of Requirements for Interim and Post-Event Monitoring

建设单位从依法依规履行环评程序、开展公众参与、在项目设计、施工、验收、投入生产或使用中落实环境保护“三同时”及各项环境管理规定情况，积极配合并落实环境保护部门对拟建工程的事中事后监督管理要求。

The project owner implements “simultaneous design, construction and commissioning” for environmental protection and various environmental protection management regulations in terms of environmental impact assessment procedures, public participation, project design, construction, acceptance, commissioning or use; actively cooperates and implements requirements for interim and post-event monitoring of environmental protection department on the planned project.

1、落实排污许可制度

1. Implementing pollutant discharge permission system

拟建工程调试运营或投产前，即发生实际排污行为之前应获得排污许可证，无证排污或不按证排污的，根据环境保护设施验收条件有关规定，建设单位不得出具环境保护设施验收合格意见。

The planned project shall acquire pollutant discharge permit prior to debugging, operation or commissioning, i.e. prior to actual pollutant discharge behavior. The project owner shall not issue opinions about qualified environmental protection facilities according to regulations on acceptance conditions of environmental protection facilities to those who discharged pollutant without or not pursuant to the permit.

2、严守“三线一单”的管控要求

2. Sticking to the management and control requirements of “three-line and one-list”

拟建项目在施工和运营期间，严格落实环境保护部门生态保护红线、环境质量底线、资源利用上线和环境准入负面清单（简称“三线一单”）环境管控要求。

The planned project shall strictly implement the environmental management and control requirements of ecological protection redline, environmental quality baseline, resource utilization line and negative list of environmental access of the environmental protection department ("three-line and one-list" for short) during construction and operation period.

3、环境保护设施"三同时"审查验收的监管

3. Supervision on "simultaneous design, construction and commissioning" review and acceptance for environmental protection facilities

拟建工程投入运营后，建设单位组织对配套建设的环境保护设施进行验收，公开相关信息，接受社会监督，确保建设项目需要配套建设的环境保护设施与主体工程同时投产或者使用，并接受环境保护部门的监督检查。

After the planned project is put into operation, the project owner shall organize acceptance for the supporting environmental protection facilities, disclose relevant information, accept social supervision, guarantee the simultaneous commissioning or utilization between supporting environmental protection facilities and main project, and accept supervision and inspection of environmental protection department.

4、清洁生产审核的监管要求

4. Supervisory requirements for clean production audit

依据《中华人民共和国清洁生产促进法》，加快落实企业全过程的清洁生产审核制度，从淘汰、事中和事后做到严格控制，提高资源利用效率，减少和避免污染物的产生、保护和改善环境。

In accordance with *Cleaner Production Promotion Law of the People's Republic of China*, the clean production audit system during entire process of enterprises shall be speeded up to strictly control elimination, interim and post-event process, improve resource utilization efficiency, reduce and avoid pollutant generation, and protect and improve environment.

5、企事业单位环境突发事件应急预案备案的监管要求

5. Supervision requirements for contingency plan filing of environmental emergency in enterprises and public institutions

根据建设单位在突发环境事件应急管理工作中的职责定位，从风险控制、应急准备、应急处置和事后恢复等 4 个环节构建全过程突发环境事件应急管理体系，规范工作内容，理顺工作机制，并根据突发事件应急管理的特点和需求，充分发挥舆论宣传和媒体监督作用。

In accordance with responsibility orientation of the project owner in emergent environmental events management, the emergency management system shall be established during four links of risk control, emergency preparation, emergency disposal and post-event recovery to normalize job contents, sort out working mechanism, and sufficiently bring the public opinion propaganda and media supervision role into full play according to features and demands of emergency management.

6、公众投诉监管要求

6. Supervisory requirements for public complaint

（1）落实环评信息公开机制方案。建设单位落实建设项目环评信息的全过程、全覆盖公开，确保公众能够方便获取建设项目环评信息。畅通公众参与和社会监督渠道，保障可能受建设项目环境影响公众的环境权益。

(1) Implementing environmental impact assessment information disclosure mechanism plan: the project owner shall implement whole-process and full-coverage disclosure of environmental impact assessment information, and guarantee the public may conveniently acquire environmental impact assessment of the construction project; unblock the channels for public participation and social supervision, and guarantee environmental rights of public who may suffer environmental impact of the construction project.

（2）发挥公众参与环评的监督作用。建设单位在建设项目环境影响报告书报送审批前，应采取适当形式，遵循依法、有序、公开、便利的原则，公开征求公众意见并对公众参与的真实性和结果负责。

(2) Bringing the supervisory role of public participation and environmental impact assessment: the project owner shall adopt proper way to solicit public comments according to law-based, ordered, public and convenient principles and be

responsible for authenticity and results of public participation before the EIA report is sent for approval.

（3）拟建工程运营过程接受当地居民的监督，及时处理环保投诉。

(3) The planned project shall accept supervision of local residents during operation and handle complaints about environmental protection.

当公司的任何员工及任何部门接收到有关环保方面的外部或内部电话、信件和其他方面的投诉时，必须记录包括投诉时间、发生何种环保问题等内容，并及时反馈至公司环保负责人以作解决。

Any employee or department receiving external or internal phone call, correspondences regarding environmental protection and complains in other aspects must record contents including complaint time and type of environmental problem, and feed back to person in charge of environmental protection fir solution.

公司环保负责人接到有关的电话或其他方面的投诉时，必须立即根据相关的内容进行全面的调查，并查阅有关的监测数据，通知相关领导小组。如果情况属实，必须立即召集相关的人员解决，并且在 48 小时内提出问题处理方案，把整改结果告知上级部门和投诉人。

The person in charge of environmental protection shall immediately carry out comprehensive investigation according to relevant contents after receiving phone call concerned or complaints in other aspects, inquire relevant monitoring data, and notify relevant leading group. If the case is true, the person in charge must immediately convene relevant personnel to solve, and propose solutions within 48 hours. The rectification results shall be notified to superior department and the complainer.

7、积极开展环境影响后评价监管

7. Actively carrying out environmental impact post-assessment supervision

建设单位应及时开展工作，对其实际产生的环境影响以及污染防治、生态保护和风险防范措施的有效性进行跟踪监测和验证评价，并提出补救方案或者改进措施。纳入排污许可管理的建设项目排污许可证执行报告、台账记录和自行监测等情况应作为环境影响后评价的重要依据。

The project owner shall work in time, follow up to supervise, verify and evaluate actual environmental impact incurred and validity of pollution prevention, ecological protection and risk precautionary measures, and put forward remedy plan or improvement measures. The pollutant discharge license implementation report, ledger record and independent monitoring of construction items under pollutant discharge license management shall be used as important reference of environmental impact post-assessment.

13 环境影响评价结论

13. Conclusion of Environmental Impact Assessment

13.1 项目概况

13.1 Project Overview

本项目为联盛纸业（龙海）有限公司年产 60 万吨高档箱板纸工程，建设地点位于联盛纸业（龙海）有限公司现有厂址内，项目总用地面积 105.67 亩，总建筑面积 78107m^2。项目总投资 158667 万元，环保投资 1290 万元人民币，占项目总投资 0.81%。拟建项目主要建设内容包括 PM10 造纸联合厂房（包括碎浆工段、制浆工段、造纸工段、完成工段）、PM10 成品仓库、辅料制备及仓库、综合仓库等。项目给水、排水、供汽及供电均依托现有厂区。

The planned project is annual output 600,000t high-grade cardboard paper project and located on current plant site of Liansheng Paper Industry (Longhai) Co., Ltd. The total land area of the project is 105.67Mu, and total floor area is 78107m^2. The total investment in this project shall be RMB 1.58667 Billion, in which investment in construction shall be RMB 1.41622 Billion, accounting for 0.81% of total investment. The main construction contents of the planned project are PM10 joint papermaking workshop (including crashing section, pulping section, papermaking section and completion section), PM10 finished product warehouse, auxiliary preparation and warehouse, and comprehensive warehouse, etc.. The water supply, water drainage, gas supply and electricity supply of the project depend on current system in the plant.

13.2 环境质量现状

13.2 Current Situations of Environmental Quality

（1）环境空气

(1) Ambient air

项目区域各监测点 SO_2、NO_2、PM_{10}、TSP 监测值均符合 GB3095-2012《环境空气质量标准》二级标准浓度限值；监测点的 NH_3、H_2S 满足 TJ36-79《工业

企业设计卫生标准》浓度限值要求；厂界监测点臭气浓度满足 GB14554-1993《恶臭污染物排放标准》标准要求。

The monitoring values of SO_2, NO_2, PM_{10} and TSP on each monitoring point of the project region all comply with Grade II concentration limit in GB3095-2012 *Ambient air quality standards*; the NH_3 and H_2S on the monitoring points meets concentration limit requirements in TJ36-79 *Health Standard for Design of Industrial Enterprises*; the odor concentration on monitoring points on plant boundary meets requirements in GB14554-1993 *Emission standard for odor pollutants*.

（2）海域水环境

(2) Seawater environment

九龙江北港各监测断面水质指标符合《海水水质标准》（GB3097-1997）中的第二类标准。

The water quality index on each monitoring section of Jiulong River North Port complies with Class II standard in *Sea Water quality standard* (GB3097-1997).

（3）地下水

(3) Underground water

本次评价共布设 3 个水质监测点，地下水水质各评价因子标准指数均小于 1，各项监测指标均符合 GB/T14848-2017《地下水质量标准》中III类标准，区域地下水环境质量现状较好。

Totally three water quality monitoring points are arranged in this evaluation. The evaluation factor standard indexes of underground water quality are all smaller than 1. Each monitoring index complies with Class III standard in GB/T14848-2017 *Standard for groundwater quality*. The regional underground water environmental quality has favorable conditions.

（4）声环境

(4) Acoustic environment

项目厂界各监测点昼、夜间噪声监测值均达到 GB3096-2008《声环境质量标准》中 3 类及 4a 类标准的要求；厂界周边敏感点各监测点昼、夜间声环境监测值均达到 GB3096-2008《声环境质量标准》中 2 类标准的要求。拟建项目所在地

及周边声环境质量较好。

The day and night noise monitoring value on each monitoring point on project boundary reaches Class 3 and Class 4a standard in GB3096-2008 *Environmental quality standard for noise*; the monitoring value on each sensitivity point around the plant boundary reaches Class 2 standard in GB3096-2008 *Environmental quality standard for noise*. The acoustic environment quality in and around the planned project site is favorable.

13.3 环境影响预测与评价

13.3 Environmental Impact Prediction and Evaluation

（1）大气环境影响预测与评价

(1) Prediction and evaluation of air environment impact

通过对项目主要大气污染源锅炉废气的有组织排放，污水处理站及制浆间的无组织排放恶臭气体进行预测分析，结论如下：

The organized emission of main air pollution source waste gas, unorganized emission of odor in sewage treatment station and pulping room are predicted and analyzed. The conclusion is as follows:

正常工况下，本项目排放的 SO_2、NO_2、PM_{10} 均未导致评价范围内的环境保护目标和最大落地浓度出现超标情况。叠加拟建和在建项目后，未导致环境保护目标出现超标情况。

Under normal conditions, the SO_2, NO_2 and PM_{10} discharged from the project do not exceed standard of environmental protection target and maximum concentration. After the planned project and the project under construction are overlapped, they will not lead to out-of-limit emission of environmental protection objective.

综上，拟建项目大气污染物排放对评价区域及各敏感点空气质量影响不大。

To sum up, the air pollutant emission of the planned project affects little on air quality in the assessment zone and on each sensitive point.

（2）海域水环境影响预测与评价

(2) Prediction and evaluation of seawater environment impact

在正常排污的条件下，排污口主要影响附近贴岸的水体，而对九龙江口中心河道区域影响较小，对周边敏感区域的影响也有限，其中在小潮期间的影响略大于大潮期间。值得一提的是，由于海沧港区的泊位工程对航道的疏浚作业，使得排污口附近海域的水动力条件得到改善，污染物分布扩散范围相对减小。可以预期，随着航道的进一步疏浚，拟建项目排污的影响范围，特别是对角美#1~2 泊位以西的九龙江北港的影响将更加减小。而在事故排放条件下，排污对于周边海域的影响范围和程度都急剧加大。对于拟建项目，生产线等生产运行系统若发生泄漏事故，一般都将该异常废水排至厂内事故池，事故经处理后，该废水逐步调节回抽到污水处理站处理达标后排放。总体而言，在保证安全生产、不发生排污事故的情况下，拟建项目的排污对附近海域环境影响较小。

Under normal sewage discharge conditions, the sewage drainage exits mainly affect water body near the bank, while affect little on central river channel of Jiulong River Estuary and nearby sensitive areas. The impact during neap tides is slightly larger than that during the sprint tide period. It is worth mentioning that since the hydrodynamic conditions in sea area near the sewage drainage exits are improved through the navigation channel dredging by berthing project in Haicang Port Zone, the pollutant distribution and scattering scope is reduced relatively. The impact scope of sewage drainage in the planned project is expected to minimize, especially in Jiulong River North Port to the west of Jiaomei #1~2 Berths with further dredging of the navigation channel. While under the condition of accident discharge, the sewage drainage may suddenly enlarge impact scope and degree of nearby sea area. For the planned project, in case of leakage of production and operation system such as production lines, the abnormal wastewater will be drained to accident pool of the plant, gradually pumped back to sewage treatment station after accident treatment, and discharged after reaching standard. In general, when safe production is guaranteed and no sewage drainage accident is generated, the sewage drainage of the planned project affects little on nearby seawater environment.

（3）地下水环境影响预测与评价

(3) Prediction and evaluation of underground water environment impact

选取污水处理厂在非正常状况下特征污染物渗漏量较大的场景进行预测评价。当泄漏状况发生时，第 1010 天时，泄漏点下游 1 米范围内出现地下水高锰酸盐指数不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求的情况，污水处理厂下游厂界处（200 米处）不会出现各类污染物不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求的情况。

The scenes with larger featured pollutant leakage in sewage treatment plant under abnormal conditions are selected for prediction and evaluation. In case of leakage, on the 1010th day, the permanganate index in underground water within 1m downstream the leaking point fails to meet Class III water quality standard in *Standard for groundwater quality* (GB/T14848-2017); the boundary downstream (200m) the sewage treatment plant will not generate the circumstance that various pollutants do not meet Class III water quality standard in *Standard for groundwater quality* (GB/T14848-2017).

非正常状况发生后 100d，下游 11m 范围内，地下水高锰酸盐指数不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求；非正常状况发生后 1000d，下游 40m 范围内，地下水高锰酸盐指数不能满足《地下水质量标准》（GB/T14848－2017）中的III类水质标准要求。

Within 11m downstream 100d after abnormal condition is incurred, the permanganate index in underground water within 1m downstream the leaking point fails to meet Class III water quality standard in *Standard for groundwater quality* (GB/T14848-2017); within 40m downstream 1000d after the abnormal condition is incurred, the permanganate index in underground water within 1m downstream the leaking point fails to meet Class III water quality standard in *Standard for groundwater quality* (GB/T14848-2017).

由上述预测结果可知，项目正常状况下，采取了严格的防渗措施，不会对地下水环境造成影响；非正常状况下，在小范围内会出现高锰酸盐指数超标的情况，但超标范围未超出厂界。

Aforesaid prediction results show strict seepage prevention measures are adopted under normal conditions, and no impact will be caused to underground water environment; under abnormal conditions, the permanganate index may exceed standard within small scope, but the scope does not exceed the plant boundary.

（4）声环境影响预测与评价

(4) Prediction and evaluation of acoustic environment impact

拟建项目建成后，厂界最大贡献值叠加背景值后均能满足《工业企业厂界环境噪声排放标准》（GB12348-2008）中的 3 类及 4 类标准限值要求。拟建项目建成后对周边敏感点叠加现状背景值后昼间和夜间噪声值均能满足 GB3096-2008《声环境质量标准》2 类标准限值的要求。

After the planned project is completed, the maximum contribution value with background value on the plant boundary may meet Class 3 and 4 standard limit requirements in Emission standard for industrial enterprises noise at boundary (GB12348-2008). After the planned project is completed, the day and night noise values on nearby sensitive points by overlapping with background value may meet Class 2 standard limit in GB3096-2008 *Environmental quality standard for noise*.

（5）固体废物影响分析

(5) Analysis on solid waste impact

拟建项目产生的固体废物主要包括制浆车间的浆渣、铁丝、塑料，污水处理厂污泥，生活垃圾及少量的废润滑油（危废类别 HW08），以上固体废物均进行了综合利用或合理的安全处置。

The solid wastes generated by the planned project are mainly pulp residue, iron wire and plastics in the pulping workshop, sludge in sewage treatment plant, household garbage and little useless lubricating oil (Hazard Type HW08), which have all been comprehensively utilized or reasonably and safely disposed.

13.4 环境保护措施及其可行性论证

13.4 Environmental Protection Measures and Feasibility Demonstration

（1）拟建项目产生的废水污染源主要为制浆造纸车间废水及少量生活废水，进入厂内污水处理厂进行处理，目前厂内已经建成污水处理站处理规模

$80000m^3/d$，采用“预处理+厌氧（IC）+好氧+深度处理”处理工艺，废水经过处理后满足 DB35/1310-2013《制浆造纸工业水污染物排放标准》表 1 要求，纳入角美污水处理厂的尾水排海管道（25 万 t/d），统一深海排放。

(1) The wastewater sources of the planned project are mainly wastewater from pulping workshop and little domestic sewage, and shall be drained to and processed in sewage treatment plant inside the project plant. Currently, the processing scale of sewage treatment plant which has been built in the project plant is $80000m^3/d$. The treatment process of “pre-treatment + anaerobic (IC) + aerobic + deep treatment” is adopted. After treatment, the wastewater shall meet requirements in Table 1 of DB35/1310-2013 *Discharge standard of water pollutants for pulp and paper industry*. The wastewater will be drained to deep sea uniformly through wastewater sea-oriented drainage pipeline (250,000t/d) of Jiaomei Sewage Treatment Plant.

（2）拟建项目废气污染源主要为锅炉废气及少量无组织排放废气，锅炉烟气经过静电除尘、石灰石-石膏炉外湿法脱硫及低氮燃烧控制后，均能满足《火电厂大气污染物排放标准》（GB13223-2011）限值要求；煤炭破碎工段产生的粉尘经静电除尘后由 15m 排气筒排放，排放浓度及速率符合《大气污染物综合排放标准》（GB16297-1996）表 2 二级标准限值要求；少量的无组织排放废气主要包括污水处理站及生产车间（主要是制浆间）产生少量恶臭气体，通过加强管理，对于污水处理厂污泥等及时进行清运，对于池底的积泥及时通过清理，尽量减少废气污染物的无组织排放的影响。

(2) The waste gas sources of the planned project area boiler waste gas and little unorganized emitting waste gas. The boiler flue gas may meet the limit value requirements in *Emission standard of air pollutants for thermal power plants* (GB13223-2011) after electrostatic precipitator, limestone-gypsum outer-furnace wet desulfurization method and low nitrogen combustion control; the dusts generated by the coal crushing section will be discharged from 15m exhaust funnel after electrostatic precipitator, and the discharge concentration and speed complies with Class 2 standard limit requirements in Table 2 of *Integrated emission standard of air pollutants* (GB16297-1996); little unorganized discharged waste gas may generate

little odor gas in sewage treatment station and production workshop (mainly pulping room); the sludge in the sewage treatment plant shall be cleaned through strengthened management, and the sludge deposit on the pool bottom shall be removed to try to reduce impact of unorganized emission of waste gas pollutants.

（3）对于产生噪声的主要设备通过布置在车间内，采取隔声减振的措施，项目完成后厂界噪声可满足《工业企业厂界环境噪声排放标准》（GB11748-2008）3 类及 4a 标准要求，污染防治措施可行。

(3) The main equipment generating noise shall be arranged in workshop, and adopt sound insulation and vibration reduction measures. After the project is finished, the noise on the plant boundary may meet Class 3 and Class 4a standard in *Emission standard for industrial enterprises noise at boundary* (GB12348-2008) and pollution prevention measures are feasible.

（4）项目产生的固体废物主要有：制浆车间的浆渣、铁丝、塑料，污水处理厂污泥，生活垃圾及少量的废润滑油（危废类别 HW08），以上固体废物均进行了综合利用或合理的安全处置。

(4) The solid wastes generated by the planned project are mainly pulp residue, iron wire and plastics in the pulping workshop, sludge in sewage treatment plant, household garbage and little useless lubricating oil (Hazard Type HW08), which have all been comprehensively utilized or reasonably and safely disposed.

13.5 污染物总量控制

13.5 Total Pollution Load Control

拟建项目需要购买总量为：COD：389.616t/a、氨氮：12.495t/a。

The total purchase amount of the planned project shall be COD: 389.616t/a and ammonia nitrogen: 12.495t/a.

13.6 公众参与

13.6 Public Participation

本次公众参与自第一次网上公示及第二次网上公示以来，建设单位和环评单位均未收到任何单位和个人的有关反馈信息。此次公众参与共发放个人调查问卷

65 份，单位调查问卷 6 份，调查结果表示 98.5%个人被访者支持本项目的建设，1.5%个人被访者表示无所谓；100%的被访单位表示支持本项目建设。

Since the first online disclosure and the second online disclosure, neither project owner nor environmental impact assessment unit has received feedback information from any unit and individual for public participation. In the public participation, totally 65 individual questionnaires, and 6 unit questionnaires are released. The investigation results show 98.5% individual respondents support the project construction, and 1.5% individual respondents show indifference; 100% unit respondents show support of the project construction.

13.7 项目环境可行性结论

13.7 Conclusion of Feasibility Study on Project Environmental Protection

综上所述，拟建工程符合相关产业政策及规划的要求，按照先进水平配备相应的工艺、技术和设备；在严格落实各项污染治理措施后，可保证各污染物达标排放，对周围的环境影响在允许的范围之内，区域接纳项目污染物后仍可满足区域环境功能区划要求。拟建工程按照环评报告书提出的要求建设实施，从环境的角度分析该项目是可行的。

In conclusion, the planned project complies with relevant industrial policies and planning, and will be equipped with corresponding advanced process, technology and equipment; after various pollution treatment measures are implemented strictly, the up-to-standard discharge of various pollutants may be guaranteed to affect nearby environment within allowable scope. After the pollutants of the project are received, the functional zoning requirements of regional environment may be satisfied. It is feasible from the angle of environment for the planned project to construct and implement pursuant to requirements put forward by EIA report.

13.8 建议

13.8 Suggestions

（1）严格执行“三同时”制度，加强环保治理设施的管理，确保污染物达标排放。

(1) Strictly implementing the “simultaneous design, construction and commissioning” system, and strengthening management of environmental protection and control facilities to guarantee up-to-standard discharge of pollutants;

（2）积极推行环境管理体系认证，按照 ISO14001 环境管理体系等先进的环境管理模式对生产全过程进行管理，对污染物排放及处置进行全程控制，提高清洁生产水平。

(2) Actively pushing environmental management system certification, and managing the entire production process pursuant to advanced environmental management modes including ISO14001 environmental management system to control full process of pollutant discharge and disposal and improve clean production level;

（3）采取有效措施防止发生各种事故、制定好各种事故风险防范和应急措施，增强事故防范意识，在发生事故后应停产检修，待一切正常后再生产。

(3) Adopting effective measures to prevent from various accidents, formulate various accident and risk prevention and emergency measures, and enhance awareness of accident prevention; repairing after shutdown after the accident, and producing again after everything returns to normal;

（4）加强对防护距离范围内的规划控制，禁止商业用房和居民住宅等敏感目标的建设，控制好厂界周围土地利用性质。

(4) Strengthening planning and control within the scope of protection distance, prohibiting construction of sensitive objectives such as commercial house and residences, and controlling nature of land utilization within the plant boundary.