

廉江市河唇镇龙田面村崩塌
地质灾害治理工程

监测报告

湛江粤西地质工程勘察院

二〇二一年九月



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沉降、位移监测报告

一、工程概况

1.1 地理位置

廉江市位于广东省西南部，雷州半岛北部，东接化州市，南与遂溪县交界，西毗北海市，北邻玉林市，西南濒临北部湾，隔海与越南相望，地理坐标：东经 $109^{\circ} 45' \sim 110^{\circ} 30'$ ，北纬 $20^{\circ} 25' \sim 21^{\circ} 55'$ ，地域宽阔，东西相距 79.5 公里，南北相距 60.2 公里，地域总面积 2835 平方公里。

龙田面村位于廉江市东部河唇镇，该崩塌地质灾害点位于龙田面村西侧山坡上，中心坐标：X=2398520.13，Y=429823.11（1980 西安坐标系）。有乡村水泥路从其南面通过，交通方便（图 1）。

1.2 岩土体工程地质类型及特征

边坡主要由残坡积土及全~强风化砂质泥岩、砂岩组成，按土层的结构、工程性质及埋藏分布条件等自上而下划分为 3 个层组其特征现分述如下：

第四系坡积层（ Q_4^{d1} ）

①层粉质黏性土：黄色，湿，可塑，以粉黏粒为主，含较多砂粒及砾石，遇水易软化。主要分布于边坡表层，厚度小，仅 ZK2 孔揭露，其它 2 个钻孔均没有揭露，揭露厚度 1.50。

泥盆系信都组粉砂质泥岩（D2x）

②全风化粉砂质泥岩：褐红色、杂黄色，原岩结构基本破坏，岩芯呈坚硬土状，遇水易崩解、软化。厚度较大，仅 ZK2 孔揭露，其它 2 个钻孔均没有揭露，揭露厚度 5.70m，埋深 7.20m，做标贯入试验 3 次，平均校正击数 14.7 击。

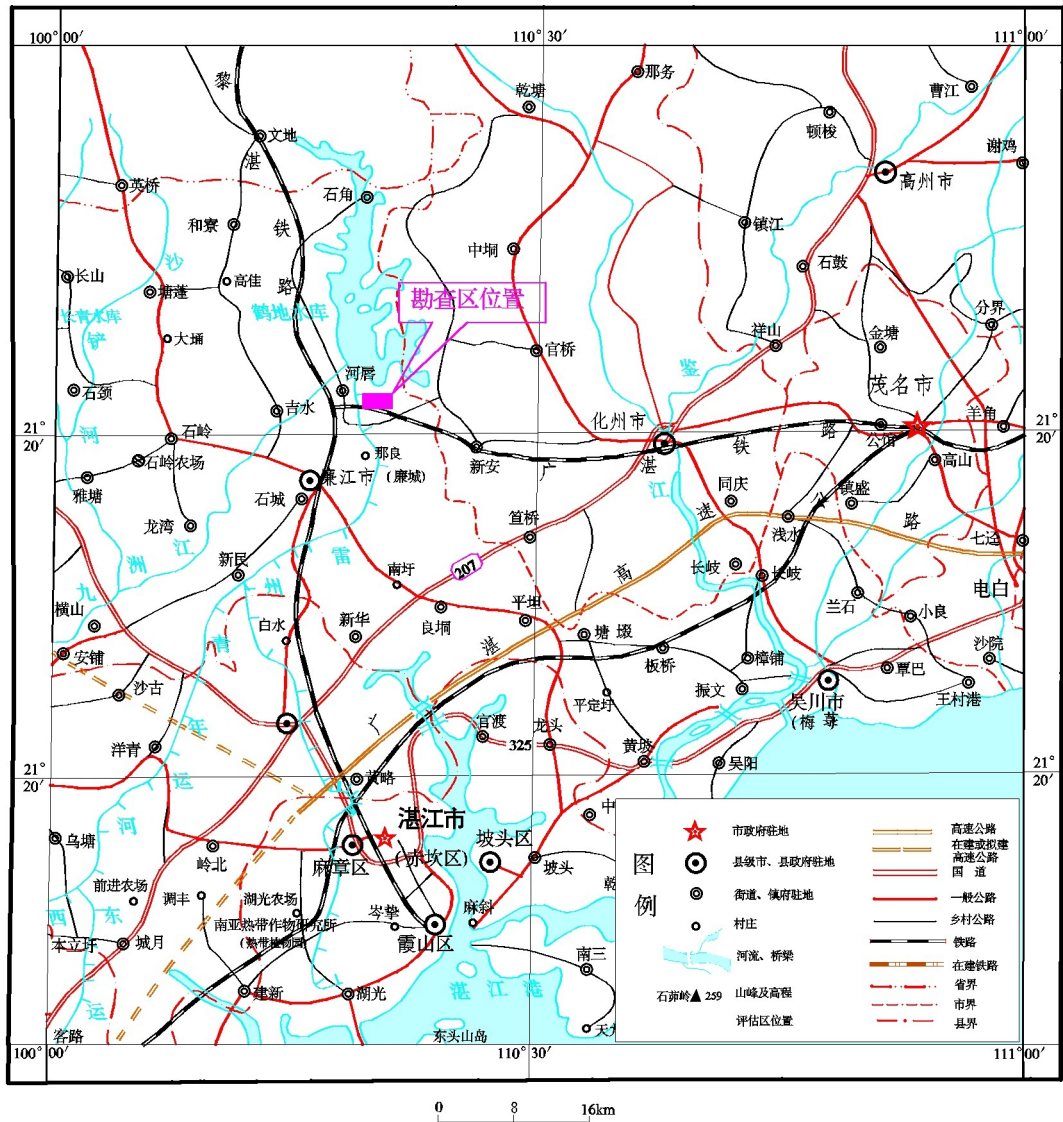


图 1 交通位置图

全风化粉砂质泥岩浸水后崩解、软化，取土样 8 组，主要物理力学指标如下：含水量 $W=26.1\%$ ，天然密度 $\rho_0=1.82\text{g/cm}^3$ ，液性指数 $IL=0.24$ ，孔隙比 $e=0.870$ ，压缩系数 $a_{1-2}=0.51\text{MPa}^{-1}$ ，压缩模量 $E_s=4.08\text{MPa}$ ，黏聚力 $C_q=14.3\text{kPa}$ ，内摩擦角 $\phi_q=18.2^\circ$ 。属高压缩性土。

建议地基承载力特征值采用 240kPa 。

③强风化粉砂质泥岩：灰色、黄色、紫色、褐红色等杂色，原岩结构破坏严重，岩芯多呈半岩半土状，少量呈坚硬土状，下部呈

碎块状，风化不均，局部或夹少量粉砂岩，岩芯浸水易崩解。所有孔均有揭露，未揭穿。

本次在野外调查，从边坡脚采取 2 份强风化岩体样本，其天然单轴抗压强度 $f_{cu}=1.01\sim 1.52\text{MPa}$ ，平均 1.26MP。属极软岩。岩体基本治理等级 V 级。

强风化粉砂质泥岩浸水后崩解、软化，取浸水样 7 组，主要物理力学指标如下：含水量 $W=24.1\%$ ，天然密度 $\rho_0=1.91\text{g/cm}^3$ ，液性直 属 $I_L=-0.17$ ，孔隙比 $e=0.748$ ，压缩洗 漱 $a_{1-2}=0.403\text{MPa}^{-1}$ ，压缩模量 $E_s=4.54\text{MPa}$ ，黏聚力 $C_q=15.8\text{kPa}$ ，内摩擦角 $\phi_q=24.2^\circ$ 。属中压缩粘土。

建议地基承载力特征值采用 300kPa。

1.3 地质构造与区域地壳稳定性

根据收集区域地质资料，治理区在区域上位于中垌-廉江复式向斜的西段，北东向及北西向断裂发育，构造活动剧烈。治理区外东北部龙田面村北和南东部平山附近分别有一条推测断裂呈北西-南东向展布。勘查区野外调查未见明显地质构造形迹，但岩体中节理裂隙非常发育，在节理密集处，抗剪强度显著下降，易构成软弱结构面，当软弱面的倾向和斜坡坡面倾向相同，而且斜坡的坡角大于软弱面的倾角时，易沿此面发生滑塌。

据《中国地震动参数区划图》（GB18306-2015），崩塌区地震基本烈度为 VII 度，评估区地震动峰值加速度为 0.10g，地震动反应谱特征周期为 0.35s。

1.4 水文地质条件

1、地下水类型及其特征

边坡主要由残坡积土及全~强风化岩组成，上部残坡积土及全风化岩均为弱透水地层，富水性弱。下部强风化岩为弱~中等透水性。调查期间，坡面、坡脚均未见泉水、渗水情况。因此一般（非雨天）情况下，地下水埋深较大，对边坡影响较小。

治理区内地下水补给来源为大气降雨。雨水大部分以地表径流形式自然排出勘察区，少量雨水渗入地下形成包气带水。包气带水主要以下降泉形式排出，部分以蒸发形式排泄。施工勘察期间测得坡脚水井水位埋深约 5.60m，地下水位变化主要与区内降雨密切相关，具有季节性和时段性变化，变化幅度较大，可能有 2~3m。

按环境类型，地下水对混凝土结构具微腐蚀性；按地层渗透性，地下水在强、弱透水层中对混凝土结构均具微腐蚀性；综合评价本场地地下水对混凝土结构具微腐蚀性。地下水对钢筋混凝土结构中的钢筋具微腐蚀性。

二、 监测方案

2.1 监测目的

(1) 实时监测龙田面村施工过程中填筑体自重、环境等因素对填筑稳定状态的影响，预警突变灾害；

(2) 监测龙田面村工过程中的填筑体实际变形，分析变形趋势，以期达到超前预报，为施工提供指导意见。

2.2 检测内容

本检测主要是针对龙田面村坡面垂直变形以及填筑体边坡的水平垂直变形，垂直变形以沉降监测为主，水平变形以位移监测为主，及时进行地质现象巡视，以监测填筑体实际变形。

主要任务：

(1)通过电子水准仪等高精度仪器对填筑体边坡及填筑体下部原地基沉降实时观测;

(2)通过人工巡视结合仪器监测,分析数据后获得龙田面村工地填筑体局部和整体变形及变形趋势,实时监测填筑体的稳定状况

(3)将各种监测到的原始数据汇总分析并与气候、现场施工情况变化等参数相联系,分析填筑体及原地基的变形及其相关性规律

(4)通过对工地填筑体及原地基的实际变形的监测,分析其变形趋势,以期达到超前预报,确保施工安全

(5)通过试验段填筑体及原地基的监测数据及分析成果,对今后设计提供参考数据。

2.3 监测实施依据

(1)《滑坡防治工程设计与施工技术规范》(DZ/T0219-2006);

(2)《崩塌、滑坡、泥石流监测规范》(DZ/T0221-2006);

(3)《工程测量规范》(GB50026-2007);

(4)《建筑变形测量规范》(JGJ8-2007)

(5)《民用机场飞行区技术标准》(M5001-2006);

(6)《建筑边坡工程技术规范》(GB50330-2002)

(7)《岩土工程监测规范》(YS5229-96);

(8)《民用机场飞行区土(石)方与道面基础施工技术规范》

2.4 监测仪器及布置

此次监测考虑了地表位移监测、沉降监测二种类型根据现场实际情况,结合设计文件布置如下观测点坡 JC1、JC2、JC3 JC4、JC5、JC6、JC7、JC8、JC9、JC10、JC11、JC12、JC13、JC14、

JC15、JC16、JC17。监测点的布置覆盖了边坡坡中、坡脚等关键部位,监测点的布置详见附件图(图 2)

其中对于沉降监测采用水准仪(SOKKIA-SDL30)、对于坡面位移采用全站仪(leica-TCR702)等监测仪器。

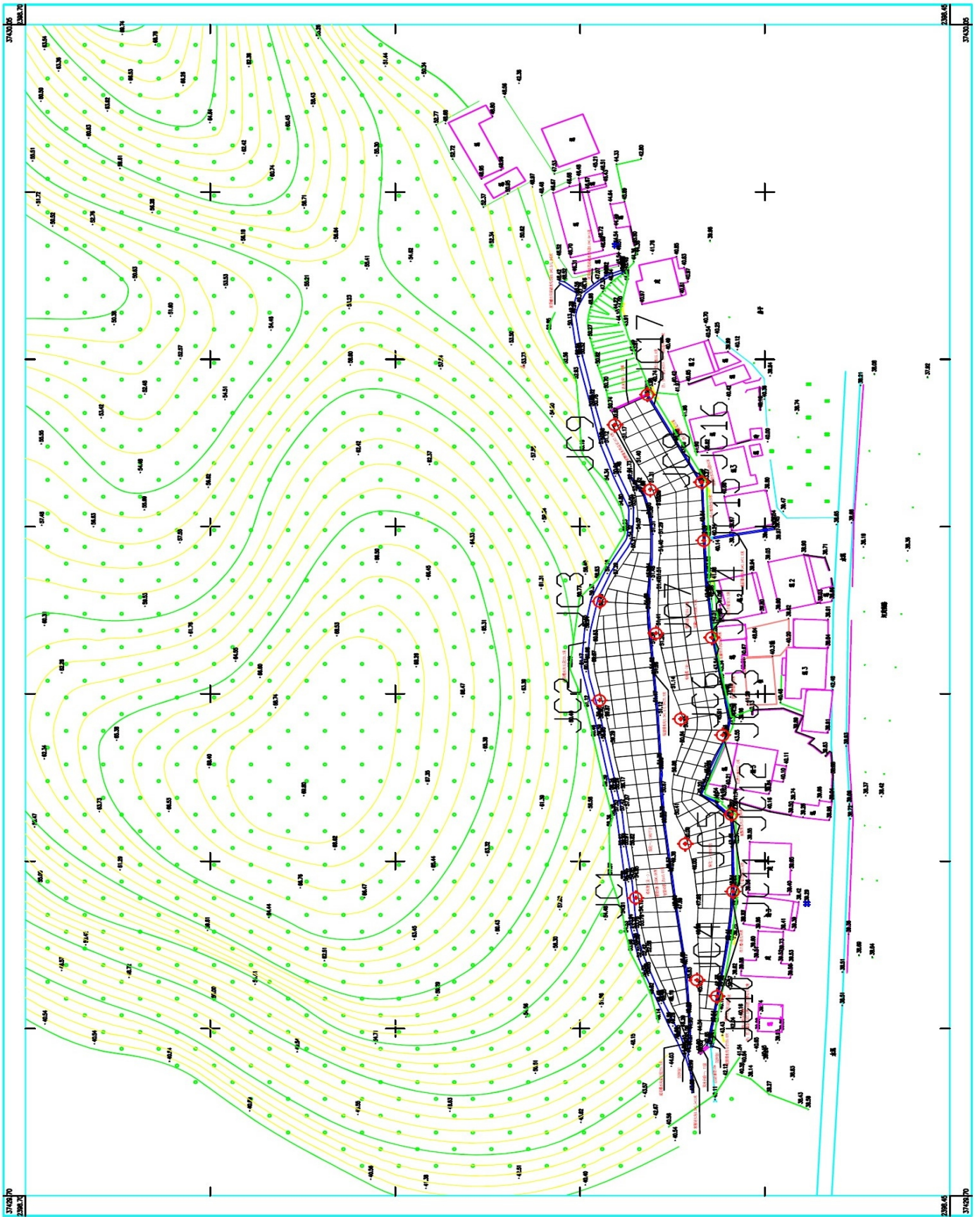


图2 监测点的布置图

2.5 监测频率

在监测初期,监测频率为1次/天,后视该填筑体的各个监测点的数据情况及其稳定状态再对监测频次进行调整。原则上按7天、10天、15天、30天的观测规律。当出现下列情况之一时,进一步加强监测,缩短监测时间间隔加密观测次数,并及时向业主和设计人员报告监测结果。

- (1) 监测项目的监测值变化量较大或速率加快;
- (2) 出现严重沉降或严重开裂。
- (3) 长时间连续降雨、有大量积水。

三、 监测成果

3.1 监测成果

序号	JC1	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398533.495	429905.468	433.607								
1	2020/9/3	2398533.495	429905.470	433.605	0	2	-2	0	2	-2		
2	2020/9/8	2398533.495	429905.471	433.604	0	1	-1	0	3	-3	1.0	1
3	2020/9/13	2398533.494	429905.471	433.604	-1	0	0	-1	3	-3	0.0	1
4	2020/9/18	2398533.494	429905.472	433.604	0	1	0	-1	4	-3	0.0	0
5	2020/9/23	2398533.494	429905.472	433.604	0	0	0	-1	4	-3	1.0	0
6	2020/9/26	2398533.494	429905.473	433.604	0	1	0	-1	5	-3	1.0	0
7	2020/10/1	2398533.494	429905.474	433.604	0	1	0	-1	6	-3	0.0	0
8	2020/10/6	2398533.494	429905.474	433.604	0	0	0	-1	6	-3	1.0	0
9	2020/10/10	2398533.494	429905.475	433.604	0	1	0	-1	7	-3	1.0	0
10	2020/10/20	2398533.494	429905.475	433.604	0	0	0	-1	7	-3	1.0	0
11	2020/10/24	2398533.494	429905.475	433.604	0	0	0	-1	7	-3	0.0	0
12	2020/10/26	2398533.494	429905.475	433.604	0	0	0	-1	7	-3	0.0	0
13	2020/10/28	2398533.494	429905.476	433.604	0	1	0	-1	8	-3	1.0	0
14	2020/11/3	2398533.494	429905.476	433.604	0	0	0	-1	8	-3	1.0	0
15	2020/11/8	2398533.494	429905.476	433.604	0	0	0	-1	8	-3	0.0	0
16	2020/11/13	2398533.494	429905.477	433.603	0	1	0	-1	9	-3	1.0	0
17	2020/11/17	2398533.493	429905.477	433.603	-1	0	0	-2	9	-3	0.0	0
18	2020/11/20	2398533.493	429905.477	433.602	0	0	-1	-2	9	-4	1.0	-1
19	2020/11/25	2398533.493	429905.477	433.602	0	0	0	-2	9	-4	0.0	1
20	2020/12/30	2398533.493	429905.477	433.601	0	0	-1	-2	9	-5	0.0	-1
21	2021/1/5	2398533.493	429905.477	433.601	0	0	0	-2	9	-5	0.0	1
22	2021/1/10	2398533.492	429905.478	433.601	-1	1	0	-3	10	-6	1.4	0
23	2021/1/15	2398533.492	429905.478	433.601	0	0	0	-3	10	-6	1.4	0
24	2021/1/29	2398533.492	429905.478	433.601	0	0	0	-3	10	-6	0.0	0
25	2021/2/5	2398533.491	429905.478	433.601	-1	0	0	-4	10	-6	1.0	0
26	2021/3/5	2398533.491	429905.478	433.600	0	0	0	-4	10	-7	1.0	0
27	2021/4/5	2398533.491	429905.478	433.600	0	0	0	-4	10	-7	0.0	0
28	2021/5/5	2398533.491	429905.478	433.600	0	0	0	-4	10	-7	0.0	0
29	2021/6/5	2398533.491	429905.478	433.600	0	0	0	-4	10	-7	0.0	0
30	2021/7/5	2398533.491	429905.478	433.600	0	0	0	-4	10	-7	0.0	0
31	2021/8/5	2398533.491	429905.478	433.600	0	0	0	-4	10	-7	0.0	0
32	2021/9/5	2398533.491	429905.478	433.600	0	0	0	-4	10	-7	0.0	0

序号	JC2	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398543.358	429964.534	434.011								
1	2020/9/3	2398543.357	429964.536	434.008	-1	2	-3	-1	2	-3		
2	2020/9/8	2398543.357	429964.538	434.005	0	2	-3	-1	4	-6	0.2	0
3	2020/9/13	2398543.356	429964.539	434.003	-1	1	-2	-2	5	-8	0.6	1
4	2020/9/18	2398543.356	429964.540	434.003	0	1	0	-2	6	-8	0.4	2
5	2020/9/23	2398543.356	429964.540	434.002	0	0	0	-2	6	-9	1.0	0
6	2020/9/26	2398543.355	429964.541	434.002	-1	1	-1	-3	7	-9	1.4	0
7	2020/10/1	2398543.355	429964.542	434.002	0	1	0	-3	8	-9	0.4	1
8	2020/10/6	2398543.355	429964.542	434.002	0	0	0	-3	8	-9	1.0	0
9	2020/10/10	2398543.354	429964.543	434.002	-1	1	0	-4	9	-9	1.4	0
10	2020/10/20	2398543.354	429964.543	434.002	0	0	0	-4	9	-9	1.4	0
11	2020/10/24	2398543.353	429964.543	434.002	-1	0	0	-5	9	-10	1.0	0
12	2020/10/26	2398543.352	429964.544	434.002	-1	1	0	-6	10	-10	0.4	0
13	2020/10/28	2398543.352	429964.544	434.001	0	0	0	-6	10	-10	1.4	0
14	2020/11/3	2398543.352	429964.544	434.001	0	0	0	-6	10	-10	0.0	0
15	2020/11/8	2398543.352	429964.544	434.001	0	0	0	-6	10	-10	0.0	0
16	2020/11/13	2398543.352	429964.545	434.001	0	1	0	-6	11	-10	1.0	0
17	2020/11/17	2398543.352	429964.545	434.001	0	0	0	-6	11	-10	1.0	0
18	2020/11/20	2398543.352	429964.545	434.001	0	0	0	-6	11	-10	0.0	0
19	2020/11/25	2398543.352	429964.545	434.001	0	0	0	-6	11	-10	0.0	0
20	2020/12/30	2398543.352	429964.545	434.001	0	0	0	-6	11	-10	0.0	0
21	2021/1/5	2398543.352	429964.545	434.001	0	0	0	-6	11	-10	0.0	0
22	2021/1/10	2398543.352	429964.546	434.001	0	1	0	-6	12	-10	1.0	0
23	2021/1/15	2398543.352	429964.546	434.000	0	0	-1	-6	12	-11	1.0	-1
24	2021/1/29	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	1
25	2021/2/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0
26	2021/3/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0
27	2021/4/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0
28	2021/5/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0
29	2021/6/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0
30	2021/7/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0
31	2021/8/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0
32	2021/9/5	2398543.352	429964.546	434.000	0	0	0	-6	12	-11	0.0	0

序号	JC3	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398543.266	429994.084	433.404								
1	2020/9/3	2398543.265	429994.086	433.404	-1	2	0	-1	2	0		
2	2020/9/8	2398543.265	429994.087	433.404	0	1	0	-1	3	0	1.2	0
3	2020/9/13	2398543.265	429994.088	433.404	0	1	0	-1	4	0	0.0	0
4	2020/9/18	2398543.264	429994.089	433.403	-1	1	0	-2	5	-1	0.4	0
5	2020/9/23	2398543.263	429994.089	433.403	-1	0	0	-3	5	-1	0.4	0
6	2020/9/26	2398543.263	429994.090	433.403	0	1	0	-3	6	-1	0.0	0
7	2020/10/1	2398543.262	429994.090	433.403	-1	0	0	-4	6	-1	0.0	0
8	2020/10/6	2398543.262	429994.090	433.403	0	0	0	-4	6	-2	1.0	0
9	2020/10/10	2398543.262	429994.091	433.403	0	1	0	-4	7	-2	1.0	0
10	2020/10/20	2398543.262	429994.091	433.403	0	0	0	-4	7	-2	1.0	0
11	2020/10/24	2398543.262	429994.091	433.402	0	0	0	-4	7	-2	0.0	0
12	2020/10/26	2398543.262	429994.092	433.402	0	1	0	-4	8	-2	1.0	0
13	2020/10/28	2398543.262	429994.092	433.402	0	0	-1	-4	8	-3	1.0	-1
14	2020/11/3	2398543.262	429994.092	433.402	0	0	0	-4	8	-3	0.0	1
15	2020/11/8	2398543.262	429994.092	433.402	0	0	0	-4	8	-3	0.0	0
16	2020/11/13	2398543.262	429994.093	433.401	0	1	-1	-4	9	-3	1.0	-1
17	2020/11/17	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	1.0	1
18	2020/11/20	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
19	2020/11/25	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
20	2020/12/30	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
21	2020/1/5	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
22	2020/1/10	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
23	2020/1/15	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
24	2021/1/29	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
25	2021/2/5	2398543.262	429994.093	433.401	0	0	0	-4	9	-3	0.0	0
26	2021/3/5	2398543.262	429994.093	433.400	0	0	-1	-4	9	-4	0.0	-1
27	2021/4/5	2398543.262	429994.093	433.400	0	0	0	-4	9	-4	0.0	1
28	2021/5/5	2398543.262	429994.093	433.400	0	0	0	-4	9	-4	0.0	0
29	2021/6/5	2398543.262	429994.093	433.400	0	0	0	-4	9	-4	0.0	0
30	2021/7/5	2398543.262	429994.093	433.400	0	0	0	-4	9	-4	0.0	0
31	2021/8/5	2398543.262	429994.093	433.400	0	0	0	-4	9	-4	0.0	0
32	2021/9/5	2398543.262	429994.093	433.400	0	0	0	-4	9	-4	0.0	0

序号	JC4	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398516.980	429880.872	424.504								
1	2020/9/3	2398516.979	429880.874	424.504	-1	2	0	-1	2	0		
2	2020/9/8	2398516.979	429880.875	424.504	0	1	0	-1	3	0	0.9	0
3	2020/9/13	2398516.979	429880.876	424.504	0	1	0	-1	4	0	1.0	0
4	2020/9/18	2398516.979	429880.877	424.504	0	1	0	-1	5	0	1.0	0
5	2020/9/23	2398516.979	429880.877	424.504	0	0	0	-1	5	0	0.0	0
6	2020/9/26	2398516.979	429880.878	424.504	0	1	0	-1	6	0	1.0	0
7	2020/10/1	2398516.978	429880.878	424.503	-1	0	-1	-2	6	-1	0.2	-1
8	2020/10/6	2398516.978	429880.879	424.503	0	1	0	-2	7	-1	1.0	0
9	2020/10/10	2398516.978	429880.880	424.503	0	1	0	-2	8	-2	1.0	0
10	2020/10/20	2398516.978	429880.880	424.503	0	0	0	-2	8	-2	0.0	0
11	2020/10/24	2398516.978	429880.880	424.502	0	0	0	-2	8	-2	0.0	0
12	2020/10/26	2398516.978	429880.880	424.502	0	0	0	-2	8	-2	0.0	0
13	2020/10/28	2398516.977	429880.881	424.502	-1	1	0	-3	9	-2	1.2	0
14	2020/11/3	2398516.977	429880.881	424.502	0	0	0	-3	9	-2	0.0	0
15	2020/11/8	2398516.977	429880.881	424.502	0	0	0	-3	9	-2	0.0	0
16	2020/11/13	2398516.977	429880.882	424.502	0	1	0	-3	10	-2	1.0	0
17	2020/11/17	2398516.977	429880.882	424.502	0	0	0	-3	10	-2	0.0	0
18	2020/11/20	2398516.977	429880.883	424.502	0	1	0	-3	11	-2	1.0	0
19	2020/11/25	2398516.977	429880.883	424.502	0	0	0	-3	11	-3	0.0	0
20	2020/12/30	2398516.977	429880.883	424.501	0	0	0	-3	11	-3	0.0	0
21	2020/1/5	2398516.977	429880.884	424.501	0	1	0	-3	12	-3	1.0	0
22	2020/1/10	2398516.977	429880.884	424.501	0	0	0	-3	12	-3	0.0	0
23	2020/1/15	2398516.977	429880.884	424.501	0	0	0	-3	12	-3	0.0	0
24	2021/1/29	2398516.977	429880.885	424.501	0	1	-1	-3	13	-4	1.0	-1
25	2021/2/5	2398516.977	429880.885	424.500	0	0	-1	-3	13	-4	0.0	-1
26	2021/3/5	2398516.977	429880.885	424.500	0	0	0	-3	13	-4	0.0	0
27	2021/4/5	2398516.977	429880.886	424.500	0	1	0	-3	14	-4	1.0	0
28	2021/5/5	2398516.977	429880.886	424.500	0	0	0	-3	14	-4	0.0	0
29	2021/6/5	2398516.977	429880.886	424.500	0	0	0	-3	14	-4	0.0	0
30	2021/7/5	2398516.977	429880.886	424.500	0	0	0	-3	14	-4	0.0	0
31	2021/8/5	2398516.977	429880.886	424.500	0	0	0	-3	14	-4	0.0	0
32	2021/9/5	2398516.977	429880.886	424.500	0	0	0	-3	14	-4	0.0	0

序号	JC5	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398520.135	429921.570	424.706								
1	2020/9/3	2398520.134	429921.572	424.706	-1	2	0	-1	2	0		
2	2020/9/8	2398520.134	429921.573	424.706	0	1	0	-1	3	0	0.9	0
3	2020/9/13	2398520.134	429921.574	424.705	0	1	-1	-1	4	-1	1.0	-1
4	2020/9/18	2398520.133	429921.575	424.705	-1	1	0	-2	5	-1	1.3	0
5	2020/9/23	2398520.133	429921.576	424.704	0	1	0	-2	6	-1	0.9	0
6	2020/9/26	2398520.133	429921.576	424.704	0	0	0	-2	6	-2	0.0	0
7	2020/10/1	2398520.132	429921.576	424.704	-1	0	0	-3	6	-2	0.4	0
8	2020/10/6	2398520.132	429921.577	424.704	0	1	0	-3	7	-2	0.9	0
9	2020/10/10	2398520.132	429921.577	424.704	0	0	0	-3	7	-2	0.0	0
10	2020/10/20	2398520.132	429921.578	424.703	0	1	0	-3	8	-2	0.9	0
11	2020/10/24	2398520.132	429921.578	424.703	0	0	0	-3	8	-3	0.0	0
12	2020/10/26	2398520.132	429921.578	424.702	0	0	0	-3	8	-3	0.0	0
13	2020/10/28	2398520.132	429921.579	424.702	0	1	0	-3	9	-3	0.9	0
14	2020/11/3	2398520.132	429921.579	424.702	0	0	0	-3	9	-4	0.0	0
15	2020/11/8	2398520.132	429921.579	424.702	0	0	0	-3	9	-4	0.0	0
16	2020/11/13	2398520.132	429921.580	424.701	0	1	-1	-3	10	-4	1.0	-1
17	2020/11/17	2398520.132	429921.580	424.701	0	0	0	-3	10	-4	0.0	0
18	2020/11/20	2398520.132	429921.580	424.701	0	0	0	-3	10	-4	0.0	0
19	2020/11/25	2398520.132	429921.581	424.701	0	1	0	-3	11	-4	1.0	0
20	2020/12/30	2398520.132	429921.581	424.701	0	0	0	-3	11	-4	0.0	0
21	2020/1/5	2398520.132	429921.582	424.701	0	1	0	-3	12	-5	1.0	0
22	2020/1/10	2398520.132	429921.582	424.701	0	0	0	-3	12	-5	0.0	0
23	2020/1/15	2398520.132	429921.582	424.701	0	0	0	-3	12	-5	0.0	0
24	2021/1/29	2398520.132	429921.582	424.700	0	0	0	-3	12	-5	0.0	0
25	2021/2/5	2398520.132	429921.582	424.700	0	0	0	-3	12	-5	0.0	0
26	2021/3/5	2398520.132	429921.582	424.700	0	0	0	-3	12	-5	0.0	0
27	2021/4/5	2398520.132	429921.583	424.700	0	1	0	-3	13	-6	1.0	0
28	2021/5/5	2398520.132	429921.583	424.700	0	0	0	-3	13	-6	0.0	0
29	2021/6/5	2398520.132	429921.583	424.700	0	0	0	-3	13	-6	0.0	0
30	2021/7/5	2398520.132	429921.583	424.700	0	0	0	-3	13	-6	0.0	0
31	2021/8/5	2398520.132	429921.583	424.700	0	0	0	-3	13	-6	0.0	0
32	2021/9/5	2398520.132	429921.583	424.700	0	0	0	-3	13	-6	0.0	0

序号	JC6	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398521.375	429958.948	425.014								
1	2020/9/3	2398521.375	429958.949	425.011	0	1	-3	0	1	-3		
2	2020/9/8	2398521.375	429958.950	425.009	0	1	-2	0	2	-5	1.0	-2
3	2020/9/13	2398521.375	429958.950	425.008	0	0	-1	0	2	-6	0.0	-1
4	2020/9/18	2398521.374	429958.951	425.006	-1	1	-2	-1	3	-8	1.2	-2
5	2020/9/23	2398521.373	429958.951	425.006	-1	0	0	-2	3	-8	0.4	0
6	2020/9/26	2398521.373	429958.951	425.006	0	0	0	-2	3	-8	0.0	0
7	2020/10/1	2398521.373	429958.951	425.005	0	0	-1	-2	3	-9	0.0	-1
8	2020/10/6	2398521.373	429958.951	425.005	0	0	0	-2	3	-9	0.0	0
9	2020/10/10	2398521.373	429958.951	425.005	0	0	0	-2	3	-9	0.0	0
10	2020/10/20	2398521.373	429958.952	425.004	0	0	0	-2	3	-10	0.0	0
11	2020/10/24	2398521.373	429958.952	425.004	0	0	0	-2	3	-10	0.0	0
12	2020/10/26	2398521.372	429958.952	425.004	-1	0	0	-3	3	-10	0.6	0
13	2020/10/28	2398521.372	429958.952	425.003	0	0	0	-3	3	-10	0.0	0
14	2020/11/3	2398521.372	429958.952	425.003	0	0	0	-3	3	-11	0.0	0
15	2020/11/8	2398521.371	429958.952	425.002	-1	0	0	-4	3	-11	0.8	0
16	2020/11/13	2398521.371	429958.953	425.002	0	1	0	-4	4	-12	0.7	0
17	2020/11/17	2398521.371	429958.953	425.002	0	0	0	-4	4	-12	0.0	0
18	2020/11/20	2398521.371	429958.953	425.002	0	0	0	-4	4	-12	0.0	0
19	2020/11/25	2398521.371	429958.953	425.002	0	0	0	-4	4	-12	0.0	0
20	2020/12/30	2398521.371	429958.954	425.002	0	1	0	-4	5	-12	0.7	0
21	2020/1/5	2398521.371	429958.954	425.002	0	0	0	-4	5	-12	0.0	0
22	2020/1/10	2398521.371	429958.954	425.002	0	0	0	-4	5	-12	0.0	0
23	2020/1/15	2398521.371	429958.954	425.001	0	0	0	-4	5	-12	0.0	0
24	2021/1/29	2398521.371	429958.955	425.001	0	1	0	-4	6	-13	0.8	0
25	2021/2/5	2398521.371	429958.956	425.001	0	1	0	-4	7	-13	0.9	0
26	2021/3/5	2398521.371	429958.956	425.000	0	0	0	-4	7	-13	0.0	0
27	2021/4/5	2398521.371	429958.956	425.000	0	0	0	-4	7	-13	0.0	0
28	2021/5/5	2398521.371	429958.956	425.000	0	0	0	-4	7	-14	0.0	0
29	2021/6/5	2398521.371	429958.956	425.000	0	0	0	-4	7	-14	0.0	0
30	2021/7/5	2398521.371	429958.956	425.000	0	0	0	-4	7	-14	0.0	0
31	2021/8/5	2398521.371	429958.957	425.000	0	1	0	-4	8	-14	0.9	0
32	2021/9/5	2398521.371	429958.957	425.000	0	0	0	-4	8	-14	0.0	0

序号	JC7	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398528.083	429984.567	424.909								
1	2020/9/3	2398528.082	429984.567	424.905	-1	0	-4	-1	0	-4		
2	2020/9/8	2398528.082	429984.567	424.905	0	0	0	-1	0	-4	0.0	0
3	2020/9/13	2398528.082	429984.567	424.905	0	0	0	-1	0	-4	0.0	0
4	2020/9/18	2398528.082	429984.567	424.905	0	0	0	-1	0	-4	0.0	0
5	2020/9/23	2398528.082	429984.567	424.905	0	0	0	-1	0	-4	0.0	0
6	2020/9/26	2398528.082	429984.567	424.905	0	0	0	-1	0	-4	0.0	0
7	2020/10/1	2398528.082	429984.568	424.905	0	0	0	-1	0	-4	0.0	0
8	2020/10/6	2398528.081	429984.568	424.905	-1	1	0	-2	1	-4	1.2	0
9	2020/10/10	2398528.080	429984.568	424.905	-1	0	0	-3	1	-5	0.9	0
10	2020/10/20	2398528.080	429984.568	424.904	0	0	0	-3	1	-5	0.0	0
11	2020/10/24	2398528.080	429984.568	424.904	0	0	0	-3	1	-6	0.0	0
12	2020/10/26	2398528.079	429984.568	424.904	-1	0	0	-4	1	-6	1.0	0
13	2020/10/28	2398528.078	429984.568	424.904	-1	0	0	-5	1	-6	1.0	0
14	2020/11/3	2398528.078	429984.569	424.904	0	1	0	-5	2	-6	0.3	0
15	2020/11/8	2398528.078	429984.569	424.903	0	0	0	-5	2	-6	0.0	0
16	2020/11/13	2398528.078	429984.569	424.903	0	0	0	-5	2	-6	0.0	0
17	2020/11/17	2398528.078	429984.569	424.903	0	0	0	-5	2	-7	0.0	0
18	2020/11/20	2398528.077	429984.570	424.903	-1	0	0	-6	2	-7	0.9	0
19	2020/11/25	2398528.076	429984.570	424.903	-1	0	0	-7	2	-7	1.0	0
20	2020/12/30	2398528.075	429984.570	424.903	-1	0	0	-8	2	-7	1.0	0
21	2020/1/5	2398528.075	429984.570	424.903	0	0	0	-8	2	-7	0.0	0
22	2020/1/10	2398528.075	429984.570	424.901	0	0	-2	-8	2	-9	0.0	-2
23	2020/1/15	2398528.075	429984.570	424.901	0	0	0	-8	2	-9	0.0	0
24	2021/1/29	2398528.075	429984.571	424.900	0	1	0	-8	3	-9	0.3	0
25	2021/2/5	2398528.075	429984.572	424.900	0	1	0	-8	4	-9	0.4	0
26	2021/3/5	2398528.075	429984.572	424.900	0	0	0	-8	4	-9	0.0	0
27	2021/4/5	2398528.075	429984.573	424.900	0	1	0	-8	5	-9	0.5	0
28	2021/5/5	2398528.075	429984.573	424.900	0	0	0	-8	5	-9	0.0	0
29	2021/6/5	2398528.075	429984.573	424.900	0	0	0	-8	5	-9	0.0	0
30	2021/7/5	2398528.075	429984.573	424.900	0	0	0	-8	5	-9	0.0	0
31	2021/8/5	2398528.075	429984.573	424.900	0	0	0	-8	5	-9	0.0	0
32	2021/9/5	2398528.075	429984.573	424.900	0	0	0	-8	5	-9	0.0	0

序号	JC8	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398529.578	430027.452	414.810								
1	2020/9/3	2398529.577	430027.454	414.807	-1	2	-3	-1	2	-3		
2	2020/9/8	2398529.577	430027.456	414.806	0	2	-1	-1	4	-4	1.9	2
3	2020/9/13	2398529.577	430027.457	414.806	0	1	0	-1	5	-4	1.0	1
4	2020/9/18	2398529.577	430027.457	414.806	0	0	0	-1	5	-4	0.0	0
5	2020/9/23	2398529.577	430027.457	414.805	0	0	0	-1	5	-4	0.0	0
6	2020/9/26	2398529.577	430027.458	414.805	0	0	0	-1	5	-5	0.0	0
7	2020/10/1	2398529.577	430027.458	414.805	0	0	0	-1	5	-5	0.0	0
8	2020/10/6	2398529.577	430027.458	414.804	0	0	0	-1	5	-5	0.0	0
9	2020/10/10	2398529.577	430027.458	414.804	0	1	-1	-1	6	-6	1.0	0
10	2020/10/20	2398529.577	430027.458	414.804	0	0	0	-1	6	-6	0.0	0
11	2020/10/24	2398529.576	430027.459	414.803	-1	1	0	-2	7	-6	1.2	0
12	2020/10/26	2398529.576	430027.459	414.803	0	0	0	-2	7	-6	0.0	0
13	2020/10/28	2398529.576	430027.459	414.803	0	0	0	-2	7	-6	0.0	0
14	2020/11/3	2398529.576	430027.459	414.803	0	0	0	-2	7	-6	0.0	0
15	2020/11/8	2398529.576	430027.459	414.803	0	0	0	-2	7	-6	0.0	0
16	2020/11/13	2398529.576	430027.460	414.803	0	0	-1	-2	7	-7	0.0	-1
17	2020/11/17	2398529.576	430027.460	414.803	0	0	0	-2	7	-7	0.0	1
18	2020/11/20	2398529.576	430027.461	414.803	0	1	0	-2	8	-7	1.0	0
19	2020/11/25	2398529.576	430027.461	414.802	0	0	0	-2	8	-7	0.0	0
20	2020/12/30	2398529.576	430027.461	414.802	0	1	0	-2	9	-7	1.0	0
21	2020/1/5	2398529.576	430027.462	414.802	0	1	0	-2	10	-7	1.0	0
22	2020/1/10	2398529.576	430027.463	414.801	0	1	-1	-2	11	-8	1.0	-1
23	2020/1/15	2398529.576	430027.464	414.801	0	1	0	-2	12	-8	1.0	1
24	2021/1/29	2398529.576	430027.464	414.801	0	0	-1	-2	12	-9	0.0	-1
25	2021/2/5	2398529.576	430027.465	414.801	0	0	0	-2	12	-9	0.0	1
26	2021/3/5	2398529.576	430027.465	414.800	0	0	-1	-2	12	-10	0.0	-1
27	2021/4/5	2398529.576	430027.465	414.800	0	0	0	-2	12	-10	0.0	1
28	2021/5/5	2398529.576	430027.465	414.800	0	0	0	-2	12	-10	0.0	0
29	2021/6/5	2398529.576	430027.465	414.800	0	0	0	-2	12	-10	0.0	0
30	2021/7/5	2398529.576	430027.465	414.800	0	0	0	-2	12	-10	0.0	0
31	2021/8/5	2398529.576	430027.465	414.800	0	0	0	-2	12	-10	0.0	0
32	2021/9/5	2398529.576	430027.465	414.800	0	0	0	-2	12	-10	0.0	0

序号	JC9	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398539.176	430046.823	414.807								
1	2020/9/3	2398539.177	430046.826	414.807	1	3	0	1	3	0		
2	2020/9/8	2398539.177	430046.829	414.806	0	3	-1	1	6	-1	2.9	-1
3	2020/9/13	2398539.177	430046.831	414.806	0	2	0	1	8	-1	2.0	0
4	2020/9/18	2398539.177	430046.831	414.806	0	0	0	1	8	-1	0.0	0
5	2020/9/23	2398539.178	430046.832	414.806	1	0	0	2	8	-1	0.2	0
6	2020/9/26	2398539.178	430046.832	414.805	0	0	0	2	8	-2	0.0	0
7	2020/10/1	2398539.178	430046.832	414.805	0	0	0	2	8	-2	0.0	0
8	2020/10/6	2398539.178	430046.832	414.804	0	0	0	2	8	-2	0.0	0
9	2020/10/10	2398539.179	430046.833	414.804	1	0	0	3	8	-2	0.3	0
10	2020/10/20	2398539.179	430046.833	414.804	0	0	0	3	8	-2	0.0	0
11	2020/10/24	2398539.179	430046.833	414.804	0	0	0	3	8	-3	0.0	0
12	2020/10/26	2398539.179	430046.833	414.804	0	0	0	3	8	-3	0.0	0
13	2020/10/28	2398539.179	430046.833	414.804	0	0	0	3	8	-3	0.0	0
14	2020/11/3	2398539.180	430046.834	414.803	1	1	-1	4	9	-3	1.3	-1
15	2020/11/8	2398539.180	430046.834	414.803	0	0	0	4	9	-3	0.0	0
16	2020/11/13	2398539.180	430046.834	414.803	0	1	0	4	10	-3	0.9	0
17	2020/11/17	2398539.180	430046.835	414.803	0	1	-1	4	11	-4	0.9	-1
18	2020/11/20	2398539.180	430046.836	414.802	0	1	-1	4	12	-5	0.9	-1
19	2020/11/25	2398539.180	430046.836	414.802	0	0	0	4	12	-5	0.0	0
20	2020/12/30	2398539.180	430046.836	414.801	0	0	0	4	12	-6	0.0	0
21	2020/1/5	2398539.180	430046.836	414.801	0	1	0	4	13	-6	1.0	0
22	2020/1/10	2398539.180	430046.836	414.800	0	0	0	4	13	-6	0.0	0
23	2020/1/15	2398539.180	430046.836	414.800	0	0	0	4	13	-6	0.0	0
24	2021/1/29	2398539.180	430046.836	414.800	0	0	0	4	13	-6	0.0	0
25	2021/2/5	2398539.180	430046.837	414.800	0	1	0	4	14	-7	1.0	0
26	2021/3/5	2398539.180	430046.837	414.800	0	0	0	4	14	-7	0.0	0
27	2021/4/5	2398539.180	430046.837	414.800	0	0	0	4	14	-7	0.0	0
28	2021/5/5	2398539.180	430046.837	414.800	0	0	0	4	14	-7	0.0	0
29	2021/6/5	2398539.180	430046.837	414.800	0	0	0	4	14	-7	0.0	0
30	2021/7/5	2398539.180	430046.837	414.800	0	0	0	4	14	-7	0.0	0
31	2021/8/5	2398539.180	430046.837	414.800	0	0	0	4	14	-7	0.0	0
32	2021/9/5	2398539.180	430046.837	414.800	0	0	0	4	14	-7	0.0	0

序号	JC10	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398511.534	429876.039	415.610								
1	2020/9/3	2398511.535	429876.039	415.610	1	1	0	1	1	0		
2	2020/9/8	2398511.535	429876.040	415.610	0	0	0	1	1	0	0.0	0
3	2020/9/13	2398511.536	429876.040	415.609	1	0	0	2	1	0	0.8	0
4	2020/9/18	2398511.536	429876.040	415.609	0	0	-1	2	1	-1	0.0	-1
5	2020/9/23	2398511.537	429876.041	415.608	1	0	-1	3	1	-2	0.9	-1
6	2020/9/26	2398511.537	429876.041	415.607	0	0	-1	3	1	-3	0.0	-1
7	2020/10/1	2398511.537	429876.042	415.607	0	1	0	3	2	-3	0.4	0
8	2020/10/6	2398511.537	429876.043	415.607	0	1	0	3	3	-3	0.6	0
9	2020/10/10	2398511.538	429876.044	415.607	1	1	0	4	4	-3	1.4	0
10	2020/10/20	2398511.538	429876.044	415.606	0	0	0	4	4	-4	0.0	0
11	2020/10/24	2398511.538	429876.045	415.605	0	1	-1	4	5	-4	0.7	-1
12	2020/10/26	2398511.538	429876.045	415.605	0	0	0	4	5	-4	0.0	0
13	2020/10/28	2398511.538	429876.046	415.605	0	0	0	4	5	-5	0.0	0
14	2020/11/3	2398511.539	429876.046	415.605	1	0	0	5	5	-5	0.7	0
15	2020/11/8	2398511.539	429876.047	415.605	0	1	0	5	6	-5	0.7	0
16	2020/11/13	2398511.539	429876.047	415.604	0	0	0	5	6	-5	0.0	0
17	2020/11/17	2398511.539	429876.047	415.604	0	0	0	5	6	-6	0.0	0
18	2020/11/20	2398511.539	429876.047	415.604	0	0	0	5	6	-6	0.0	0
19	2020/11/25	2398511.539	429876.047	415.603	0	0	0	5	6	-7	0.0	0
20	2020/12/30	2398511.539	429876.048	415.603	0	1	0	5	7	-7	0.8	0
21	2020/1/5	2398511.539	429876.049	415.602	0	1	-1	5	8	-8	0.8	-1
22	2020/1/10	2398511.539	429876.050	415.601	0	1	-1	5	9	-8	0.9	-1
23	2020/1/15	2398511.539	429876.050	415.601	0	0	0	5	9	-8	0.0	0
24	2021/1/29	2398511.539	429876.050	415.601	0	0	0	5	9	-8	0.0	0
25	2021/2/5	2398511.539	429876.051	415.601	0	1	0	5	10	-8	0.9	0
26	2021/3/5	2398511.539	429876.051	415.601	0	0	0	5	10	-8	0.0	0
27	2021/4/5	2398511.539	429876.051	415.601	0	0	0	5	10	-9	0.0	0
28	2021/5/5	2398511.539	429876.051	415.600	0	0	-1	5	10	-10	0.0	-1
29	2021/6/5	2398511.539	429876.051	415.600	0	0	0	5	10	-10	0.0	0
30	2021/7/5	2398511.539	429876.051	415.600	0	0	0	5	10	-10	0.0	0
31	2021/8/5	2398511.539	429876.051	415.600	0	0	0	5	10	-10	0.0	0
32	2021/9/5	2398511.539	429876.051	415.600	0	0	0	5	10	-10	0.0	0

序号	JC11	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398507.207	429907.353	415.809								
1	2020/9/3	2398507.208	429907.353	415.809	1	1	0	1	1	0		
2	2020/9/8	2398507.208	429907.354	415.809	0	1	0	1	2	0	0.8	0
3	2020/9/13	2398507.208	429907.355	415.809	0	1	0	1	3	0	0.9	0
4	2020/9/18	2398507.208	429907.355	415.808	0	0	0	1	3	-1	0.0	0
5	2020/9/23	2398507.208	429907.356	415.808	0	0	0	1	3	-1	0.0	0
6	2020/9/26	2398507.209	429907.356	415.807	1	0	-1	2	3	-2	0.4	0
7	2020/10/1	2398507.209	429907.357	415.807	0	1	0	2	4	-2	0.9	1
8	2020/10/6	2398507.209	429907.357	415.807	0	0	0	2	4	-2	0.0	0
9	2020/10/10	2398507.209	429907.358	415.806	0	1	-1	2	5	-3	0.9	0
10	2020/10/20	2398507.209	429907.358	415.806	0	0	0	2	5	-3	0.0	1
11	2020/10/24	2398507.209	429907.358	415.805	0	0	-1	2	5	-4	0.0	-1
12	2020/10/26	2398507.210	429907.358	415.805	1	0	0	3	5	-4	0.4	1
13	2020/10/28	2398507.210	429907.359	415.804	0	1	-1	3	6	-5	0.9	-1
14	2020/11/3	2398507.210	429907.359	415.804	0	0	0	3	6	-5	0.0	1
15	2020/11/8	2398507.210	429907.359	415.804	0	0	0	3	6	-5	0.0	0
16	2020/11/13	2398507.210	429907.359	415.803	0	0	-1	3	6	-6	0.0	-1
17	2020/11/17	2398507.210	429907.360	415.803	0	1	0	3	7	-6	0.9	1
18	2020/11/20	2398507.210	429907.360	415.803	0	0	0	3	7	-6	0.0	0
19	2020/11/25	2398507.210	429907.360	415.803	0	0	0	3	7	-6	0.0	0
20	2020/12/30	2398507.210	429907.360	415.803	0	0	0	3	7	-6	0.0	0
21	2020/1/5	2398507.210	429907.361	415.802	0	1	-1	3	8	-7	0.9	-1
22	2020/1/10	2398507.210	429907.361	415.802	0	0	0	3	8	-7	0.0	1
23	2020/1/15	2398507.210	429907.361	415.802	0	0	0	3	8	-7	0.0	0
24	2021/1/29	2398507.210	429907.361	415.802	0	0	0	3	8	-8	0.0	0
25	2021/2/5	2398507.210	429907.362	415.801	0	1	0	3	9	-8	0.9	0
26	2021/3/5	2398507.210	429907.362	415.800	0	0	-1	3	9	-9	0.0	0
27	2021/4/5	2398507.210	429907.362	415.800	0	0	0	3	9	-9	0.0	1
28	2021/5/5	2398507.210	429907.362	415.800	0	0	0	3	9	-9	0.0	0
29	2021/6/5	2398507.210	429907.362	415.800	0	0	0	3	9	-9	0.0	0
30	2021/7/5	2398507.210	429907.362	415.800	0	0	0	3	9	-9	0.0	0
31	2021/8/5	2398507.210	429907.362	415.800	0	0	0	3	9	-9	0.0	0
32	2021/9/5	2398507.210	429907.362	415.800	0	0	0	3	9	-9	0.0	0

序号	JC12	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398507.643	429930.387	416.508								
1	2020/9/3	2398507.642	429930.387	416.508	-1	1	0	-1	1	0		
2	2020/9/8	2398507.642	429930.388	416.507	0	0	0	-1	1	0	0.0	0
3	2020/9/13	2398507.642	429930.389	416.507	0	1	0	-1	2	-1	0.8	0
4	2020/9/18	2398507.641	429930.389	416.507	-1	0	0	-2	2	-1	0.6	0
5	2020/9/23	2398507.641	429930.390	416.506	0	1	0	-2	3	-1	0.8	0
6	2020/9/26	2398507.641	429930.390	416.506	0	0	0	-2	3	-2	0.0	0
7	2020/10/1	2398507.640	429930.390	416.506	-1	0	0	-3	3	-2	0.6	0
8	2020/10/6	2398507.640	429930.391	416.505	0	1	-1	-3	4	-3	0.8	-1
9	2020/10/10	2398507.640	429930.391	416.505	0	0	0	-3	4	-3	0.0	0
10	2020/10/20	2398507.640	429930.392	416.505	0	1	0	-3	5	-3	0.8	0
11	2020/10/24	2398507.640	429930.392	416.505	0	0	0	-3	5	-3	0.0	0
12	2020/10/26	2398507.640	429930.392	416.504	0	0	-1	-3	5	-4	0.0	-1
13	2020/10/28	2398507.640	429930.393	416.503	0	1	-1	-3	6	-5	0.9	-1
14	2020/11/3	2398507.640	429930.393	416.503	0	0	0	-3	6	-5	0.0	0
15	2020/11/8	2398507.640	429930.393	416.502	0	0	-1	-3	6	-5	0.0	-1
16	2020/11/13	2398507.640	429930.394	416.502	0	1	0	-3	7	-6	0.9	0
17	2020/11/17	2398507.640	429930.394	416.502	0	0	0	-3	7	-6	0.0	0
18	2020/11/20	2398507.640	429930.394	416.502	0	0	0	-3	7	-6	0.0	0
19	2020/11/25	2398507.640	429930.395	416.501	0	1	0	-3	8	-6	0.9	0
20	2020/12/30	2398507.640	429930.395	416.501	0	0	0	-3	8	-6	0.0	0
21	2020/1/5	2398507.640	429930.395	416.501	0	0	0	-3	8	-7	0.0	0
22	2020/1/10	2398507.640	429930.395	416.501	0	0	0	-3	8	-7	0.0	0
23	2020/1/15	2398507.640	429930.395	416.501	0	0	0	-3	8	-7	0.0	0
24	2021/1/29	2398507.640	429930.396	416.500	0	1	0	-3	9	-7	0.9	0
25	2021/2/5	2398507.640	429930.397	416.500	0	1	0	-3	10	-7	1.0	0
26	2021/3/5	2398507.640	429930.397	416.500	0	0	0	-3	10	-7	0.0	0
27	2021/4/5	2398507.640	429930.397	416.500	0	0	0	-3	10	-8	0.0	0
28	2021/5/5	2398507.640	429930.397	416.500	0	0	0	-3	10	-8	0.0	0
29	2021/6/5	2398507.640	429930.397	416.500	0	0	0	-3	10	-8	0.0	0
30	2021/7/5	2398507.640	429930.397	416.500	0	0	0	-3	10	-8	0.0	0
31	2021/8/5	2398507.640	429930.397	416.500	0	0	0	-3	10	-8	0.0	0
32	2021/9/5	2398507.640	429930.397	416.500	0	0	0	-3	10	-8	0.0	0

序号	JC13	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398509.976	429954.147	408.707								
1	2020/9/3	2398509.978	429954.147	408.707	2	0	0	2	0	0		
2	2020/9/8	2398509.979	429954.148	408.706	1	1	0	3	1	0	1.2	0
3	2020/9/13	2398509.980	429954.148	408.706	1	0	0	4	1	0	1.0	0
4	2020/9/18	2398509.980	429954.148	408.706	0	0	0	4	1	-1	0.0	0
5	2020/9/23	2398509.981	429954.148	408.705	1	0	0	5	1	-1	1.0	0
6	2020/9/26	2398509.981	429954.148	408.705	0	1	0	5	2	-2	0.3	0
7	2020/10/1	2398509.982	429954.148	408.705	1	0	0	6	2	-2	0.9	0
8	2020/10/6	2398509.982	429954.149	408.704	0	1	-1	6	3	-3	0.4	-1
9	2020/10/10	2398509.982	429954.150	408.704	0	1	0	6	4	-3	0.5	0
10	2020/10/20	2398509.982	429954.150	408.703	0	0	-1	6	4	-4	0.0	-1
11	2020/10/24	2398509.982	429954.150	408.702	0	0	-1	6	4	-5	0.0	-1
12	2020/10/26	2398509.983	429954.150	408.702	1	0	0	7	4	-5	0.9	0
13	2020/10/28	2398509.983	429954.150	408.702	0	0	0	7	4	-5	0.0	0
14	2020/11/3	2398509.983	429954.150	408.701	0	0	0	7	4	-5	0.0	0
15	2020/11/8	2398509.984	429954.151	408.701	1	1	0	8	5	-6	1.4	0
16	2020/11/13	2398509.984	429954.151	408.701	0	0	0	8	5	-6	0.0	0
17	2020/11/17	2398509.984	429954.151	408.701	0	0	0	8	5	-6	0.0	0
18	2020/11/20	2398509.984	429954.151	408.701	0	0	0	8	5	-6	0.0	0
19	2020/11/25	2398509.984	429954.151	408.701	0	0	0	8	5	-6	0.0	0
20	2020/12/30	2398509.985	429954.151	408.701	1	0	0	9	5	-6	0.9	0
21	2020/1/5	2398509.985	429954.151	408.701	0	0	0	9	5	-6	0.0	0
22	2020/1/10	2398509.985	429954.152	408.701	0	1	0	9	6	-6	0.5	0
23	2020/1/15	2398509.985	429954.152	408.701	0	0	0	9	6	-6	0.0	0
24	2021/1/29	2398509.985	429954.152	408.701	0	0	0	9	6	-6	0.0	0
25	2021/2/5	2398509.985	429954.152	408.700	0	0	0	9	6	-6	0.0	0
26	2021/3/5	2398509.986	429954.152	408.700	1	0	0	10	6	-7	0.8	0
27	2021/4/5	2398509.986	429954.152	408.700	0	0	0	10	6	-7	0.0	0
28	2021/5/5	2398509.986	429954.152	408.700	0	0	0	10	6	-7	0.0	0
29	2021/6/5	2398509.986	429954.152	408.700	0	0	0	10	6	-7	0.0	0
30	2021/7/5	2398509.986	429954.152	408.700	0	0	0	10	6	-7	0.0	0
31	2021/8/5	2398509.986	429954.152	408.700	0	0	0	10	6	-7	0.0	0
32	2021/9/5	2398509.986	429954.152	408.700	0	0	0	10	6	-7	0.0	0

序号	JC14	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398512.970	429983.247	410.907								
1	2020/9/3	2398512.972	429983.247	410.906	2	0	-1	2	0	-1		
2	2020/9/8	2398512.973	429983.247	410.906	1	0	0	3	0	-1	1.0	0
3	2020/9/13	2398512.975	429983.247	410.906	2	0	0	5	0	-1	2.0	0
4	2020/9/18	2398512.975	429983.248	410.906	0	0	0	5	0	-1	0.0	0
5	2020/9/23	2398512.976	429983.248	410.906	1	0	0	6	0	-2	1.0	0
6	2020/9/26	2398512.976	429983.248	410.905	0	0	0	6	0	-2	0.0	0
7	2020/10/1	2398512.977	429983.248	410.905	1	0	0	7	0	-2	1.0	0
8	2020/10/6	2398512.977	429983.248	410.905	0	0	0	7	0	-3	0.0	0
9	2020/10/10	2398512.977	429983.248	410.904	0	0	0	7	0	-3	0.0	0
10	2020/10/20	2398512.978	429983.248	410.904	1	0	-1	8	0	-4	1.0	-1
11	2020/10/24	2398512.978	429983.248	410.903	0	0	0	8	0	-4	0.0	0
12	2020/10/26	2398512.978	429983.248	410.903	0	0	0	8	0	-4	0.0	0
13	2020/10/28	2398512.979	429983.248	410.903	1	0	0	9	0	-4	1.0	0
14	2020/11/3	2398512.979	429983.248	410.903	0	0	0	9	0	-4	0.0	0
15	2020/11/8	2398512.980	429983.248	410.903	1	0	0	10	0	-4	1.0	0
16	2020/11/13	2398512.980	429983.248	410.903	0	0	0	10	0	-4	0.0	0
17	2020/11/17	2398512.980	429983.248	410.903	0	0	0	10	0	-4	0.0	0
18	2020/11/20	2398512.980	429983.248	410.903	0	0	0	10	0	-5	0.0	0
19	2020/11/25	2398512.980	429983.248	410.903	0	0	0	10	0	-5	0.0	0
20	2020/12/30	2398512.981	429983.248	410.902	1	0	0	11	0	-5	1.0	0
21	2020/1/5	2398512.981	429983.249	410.902	0	0	0	11	0	-5	0.0	0
22	2020/1/10	2398512.981	429983.249	410.902	0	0	0	11	0	-6	0.0	0
23	2020/1/15	2398512.982	429983.249	410.902	1	0	0	12	0	-6	1.0	0
24	2021/1/29	2398512.982	429983.249	410.902	0	0	0	12	0	-6	0.0	0
25	2021/2/5	2398512.982	429983.249	410.902	0	0	0	12	0	-6	0.0	0
26	2021/3/5	2398512.983	429983.249	410.901	1	0	0	13	0	-6	1.0	0
27	2021/4/5	2398512.983	429983.249	410.901	0	0	0	13	0	-6	0.0	0
28	2021/5/5	2398512.983	429983.249	410.901	0	0	0	13	0	-6	0.0	0
29	2021/6/5	2398512.984	429983.249	410.900	1	0	0	14	0	-7	1.0	0
30	2021/7/5	2398512.984	429983.249	410.900	0	0	0	14	0	-7	0.0	0
31	2021/8/5	2398512.984	429983.249	410.900	0	0	0	14	0	-7	0.0	0
32	2021/9/5	2398512.984	429983.249	410.900	0	0	0	14	0	-7	0.0	0

序号	JC15	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398515.074	430012.222	410.906								
1	2020/9/3	2398515.075	430012.223	410.906	1	1	0	1	1	0		
2	2020/9/8	2398515.076	430012.223	410.905	1	1	-1	2	2	-1	1.4	-1
3	2020/9/13	2398515.077	430012.224	410.904	1	0	-1	3	2	-2	0.8	-1
4	2020/9/18	2398515.077	430012.224	410.904	0	0	0	3	2	-2	0.0	0
5	2020/9/23	2398515.078	430012.224	410.904	1	0	0	4	2	-2	0.9	0
6	2020/9/26	2398515.078	430012.224	410.904	0	1	0	4	3	-2	0.5	0
7	2020/10/1	2398515.079	430012.224	410.904	1	0	0	5	3	-2	0.8	0
8	2020/10/6	2398515.079	430012.224	410.903	0	-1	0	5	2	-3	0.4	0
9	2020/10/10	2398515.079	430012.224	410.903	0	0	0	5	2	-3	0.0	0
10	2020/10/20	2398515.080	430012.224	410.903	1	0	0	6	2	-3	0.9	0
11	2020/10/24	2398515.080	430012.224	410.902	0	0	0	6	2	-4	0.0	0
12	2020/10/26	2398515.081	430012.224	410.902	1	0	0	7	2	-4	1.0	0
13	2020/10/28	2398515.081	430012.224	410.902	0	0	0	7	2	-4	0.0	0
14	2020/11/3	2398515.081	430012.224	410.902	0	0	0	7	2	-4	0.0	0
15	2020/11/8	2398515.082	430012.225	410.902	1	1	0	8	3	-4	1.3	0
16	2020/11/13	2398515.082	430012.225	410.902	0	0	0	8	3	-4	0.0	0
17	2020/11/17	2398515.083	430012.225	410.902	1	0	0	9	3	-4	0.9	0
18	2020/11/20	2398515.083	430012.225	410.901	0	0	0	9	3	-5	0.0	0
19	2020/11/25	2398515.083	430012.225	410.901	0	1	-1	9	4	-5	0.4	-1
20	2020/12/30	2398515.084	430012.225	410.901	1	0	0	10	4	-5	0.9	0
21	2020/1/5	2398515.084	430012.226	410.901	0	1	0	10	5	-5	0.4	0
22	2020/1/10	2398515.084	430012.227	410.901	0	1	0	10	6	-5	0.5	0
23	2020/1/15	2398515.084	430012.227	410.901	0	0	0	10	6	-5	0.0	0
24	2021/1/29	2398515.085	430012.228	410.900	1	1	0	11	7	-6	1.4	0
25	2021/2/5	2398515.085	430012.228	410.900	0	0	0	11	7	-6	0.0	0
26	2021/3/5	2398515.085	430012.228	410.900	0	0	0	11	7	-6	0.0	0
27	2021/4/5	2398515.085	430012.228	410.900	0	0	0	11	7	-6	0.0	0
28	2021/5/5	2398515.085	430012.228	410.900	0	0	0	11	7	-6	0.0	0
29	2021/6/5	2398515.086	430012.228	410.900	1	0	0	12	7	-6	0.9	0
30	2021/7/5	2398515.086	430012.228	410.900	0	0	0	12	7	-6	0.0	0
31	2021/8/5	2398515.086	430012.228	410.900	0	0	0	12	7	-6	0.0	0
32	2021/9/5	2398515.086	430012.228	410.900	0	0	0	12	7	-6	0.0	0

序号	JC16	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398515.696	430029.693	410.812								
1	2020/9/3	2398515.695	430029.695	410.812	-1	2	0	-1	2	0		
2	2020/9/8	2398515.695	430029.696	410.812	0	1	0	-1	3	0	0.9	0
3	2020/9/13	2398515.695	430029.697	410.812	0	1	-1	-1	4	-1	1.0	-1
4	2020/9/18	2398515.695	430029.698	410.811	0	1	0	-1	5	-1	1.0	0
5	2020/9/23	2398515.695	430029.698	410.811	0	0	0	-1	5	-2	0.0	0
6	2020/9/26	2398515.695	430029.699	410.810	0	1	-1	-1	6	-3	1.0	-1
7	2020/10/1	2398515.694	430029.699	410.810	-1	0	0	-2	6	-3	0.2	0
8	2020/10/6	2398515.694	430029.700	410.810	0	1	0	-2	7	-3	1.0	0
9	2020/10/10	2398515.694	430029.701	410.809	0	1	-1	-2	8	-3	1.0	-1
10	2020/10/20	2398515.694	430029.701	410.808	0	0	-1	-2	8	-4	0.0	-1
11	2020/10/24	2398515.694	430029.701	410.808	0	0	0	-2	8	-4	0.0	0
12	2020/10/26	2398515.694	430029.701	410.808	0	0	0	-2	8	-4	0.0	0
13	2020/10/28	2398515.694	430029.702	410.807	0	1	-1	-2	9	-5	1.0	-1
14	2020/11/3	2398515.694	430029.702	410.807	0	0	0	-2	9	-5	0.0	0
15	2020/11/8	2398515.694	430029.702	410.807	0	0	0	-2	9	-5	0.0	0
16	2020/11/13	2398515.694	430029.703	410.806	0	1	-1	-2	10	-6	1.0	-1
17	2020/11/17	2398515.694	430029.703	410.805	0	0	-1	-2	10	-7	0.0	-1
18	2020/11/20	2398515.694	430029.704	410.805	0	1	0	-2	11	-7	1.0	0
19	2020/11/25	2398515.694	430029.704	410.804	0	0	-1	-2	11	-8	0.0	-1
20	2020/12/30	2398515.694	430029.704	410.803	0	0	-1	-2	11	-9	0.0	-1
21	2020/1/5	2398515.694	430029.705	410.803	0	1	0	-2	12	-9	1.0	0
22	2020/1/10	2398515.694	430029.705	410.802	0	0	-1	-2	12	-10	0.0	-1
23	2020/1/15	2398515.694	430029.705	410.802	0	0	0	-2	12	-10	0.0	0
24	2021/1/29	2398515.694	430029.706	410.802	0	1	0	-2	13	-10	1.0	0
25	2021/2/5	2398515.694	430029.706	410.802	0	0	0	-2	13	-10	0.0	0
26	2021/3/5	2398515.694	430029.706	410.801	0	0	-1	-2	13	-11	0.0	-1
27	2021/4/5	2398515.694	430029.707	410.801	0	1	0	-2	14	-11	1.0	0
28	2021/5/5	2398515.694	430029.707	410.800	0	0	-1	-2	14	-12	0.0	-1
29	2021/6/5	2398515.694	430029.707	410.800	0	0	0	-2	14	-12	0.0	0
30	2021/7/5	2398515.694	430029.707	410.800	0	0	0	-2	14	-12	0.0	0
31	2021/8/5	2398515.694	430029.707	410.800	0	0	0	-2	14	-12	0.0	0
32	2021/9/5	2398515.694	430029.707	410.800	0	0	0	-2	14	-12	0.0	0

序号	JC17	坐标 (m)		高程 (m)	本次位移 (mm)		本次沉降 (mm)	累计位移 (mm)		累计沉降 (mm)	位移变化率 (mm)	沉降变化率 (mm)
	日期	X	Y	H	Δx	Δy	Δh	$\Sigma (\Delta X)$	$\Sigma (\Delta Y)$	$\Sigma (\Delta H)$		
0	2020/9/1	2398530.369	430055.886	411.313								
1	2020/9/3	2398530.368	430055.886	411.313	-1	0	0	-1	0	0		
2	2020/9/8	2398530.368	430055.887	411.312	0	1	0	-1	1	0	0.4	0
3	2020/9/13	2398530.368	430055.887	411.312	0	0	0	-1	1	-1	0.0	0
4	2020/9/18	2398530.368	430055.888	411.312	0	0	0	-1	1	-1	0.0	0
5	2020/9/23	2398530.368	430055.888	411.312	0	0	0	-1	1	-1	0.0	0
6	2020/9/26	2398530.368	430055.888	411.311	0	1	-1	-1	2	-2	0.8	-1
7	2020/10/1	2398530.368	430055.889	411.311	0	1	0	-1	3	-2	0.9	0
8	2020/10/6	2398530.368	430055.889	411.310	0	0	-1	-1	3	-3	0.0	-1
9	2020/10/10	2398530.367	430055.890	411.309	-1	1	-1	-2	4	-3	1.3	-1
10	2020/10/20	2398530.367	430055.890	411.309	0	0	0	-2	4	-4	0.0	0
11	2020/10/24	2398530.367	430055.891	411.308	0	0	-1	-2	4	-4	0.0	-1
12	2020/10/26	2398530.367	430055.891	411.308	0	0	0	-2	4	-4	0.0	0
13	2020/10/28	2398530.367	430055.891	411.308	0	1	-1	-2	5	-5	0.9	-1
14	2020/11/3	2398530.367	430055.892	411.307	0	1	-1	-2	6	-6	0.9	-1
15	2020/11/8	2398530.367	430055.892	411.306	0	0	0	-2	6	-7	0.0	0
16	2020/11/13	2398530.367	430055.893	411.305	0	1	-1	-2	7	-8	1.0	-1
17	2020/11/17	2398530.367	430055.894	411.305	0	1	-1	-2	8	-8	1.0	-1
18	2020/11/20	2398530.367	430055.895	411.305	0	1	0	-2	9	-8	1.0	0
19	2020/11/25	2398530.367	430055.895	411.304	0	0	-1	-2	9	-9	0.0	-1
20	2020/12/30	2398530.367	430055.896	411.303	0	1	0	-2	10	-10	1.0	0
21	2021/1/5	2398530.367	430055.897	411.303	0	1	0	-2	11	-10	1.0	0
22	2021/1/10	2398530.367	430055.898	411.302	0	1	0	-2	12	-10	1.0	0
23	2021/1/15	2398530.367	430055.898	411.302	0	0	0	-2	12	-10	0.0	0
24	2021/1/29	2398530.367	430055.899	411.302	0	1	-1	-2	13	-11	1.0	-1
25	2021/2/5	2398530.367	430055.900	411.302	0	1	0	-2	14	-11	1.0	0
26	2021/3/5	2398530.367	430055.900	411.301	0	0	-1	-2	14	-12	0.0	-1
27	2021/4/5	2398530.367	430055.901	411.301	0	1	0	-2	15	-12	1.0	0
28	2021/5/5	2398530.367	430055.901	411.300	0	0	-1	-2	15	-12	0.0	-1
29	2021/6/5	2398530.367	430055.902	411.300	0	1	0	-2	16	-12	1.0	0
30	2021/7/5	2398530.367	430055.902	411.300	0	0	0	-2	16	-13	0.0	0
31	2021/8/5	2398530.367	430055.902	411.300	0	0	0	-2	16	-13	0.0	0
32	2021/9/5	2398530.367	430055.902	411.300	0	0	0	-2	16	-13	0.0	0

四. 结论与建议

4.1 结论

经过 12 个月变形观测,可获得如下基本结论:

(1). 除极个别观测数据波动较大,整体上数据有基本趋于稳定的趋势,分析原因可能是因雨雾天气等综合因素的影响。

(2). 原地面地基沉降已有基本稳定的趋势。

(3). 深沉沉降(排除雨水等自然因素影响外)已有基本稳定的趋势

(4). 边坡位移已有基本稳定的趋势。

4.2 建议

(1). 原地基沉降监测继续至雨季末。

(2). 边坡位移监测继续监测 12 月。

(3). 建议建设单位督促施工单位加强观测点保护,对破坏观测点的行为予以相应处罚。