

SECTION 10
INSPECTION, TESTING AND ACCEPTANCE

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Table 10-1 Specification Time Required for a 1.0psig Pressure Drop

Table 10-2 Specification Time Required for a 0.5psig Pressure Drop

SECTION 10

INSPECTION, TESTING AND ACCEPTANCE

10.01 General

This section describes the minimum requirement and general procedures for the inspection, testing and acceptance of systems dedicated to the Town of Bargersville.

10.02 Inspection

Inspection of the construction shall occur for the duration of the project, including the installation of service connections.

A. General Requirements

1. Contractor and/or Owner shall provide notice to the Town and his representative of the planned commencement of construction thirty (30) days prior to such commencement.
 - 1A. Contact the Bargersville Plan Commission Secretary at 317-422-5115 ext. 104 for all construction planning.
2. Once the construction starts, the Contractor shall be responsible for informing and/or notifying the Town's Utility Inspector assigned of the following. The Town will require forty-eight (48) hours notice for the items listed below:
 - a. Daily work schedule, including any changes in schedule;
 - b. Prior notification if work is to be performed on weekends and/or holidays;
 - c. Date tests are to be performed; and
 - d. Date as-built verification is to be performed.
3. The Town, upon request of the Contractor and/or Owner, will schedule the Final Inspection.

All testing required shall be paid for by the Contractor and performed under the observation of the Town's Utility Inspector. It shall be the Contractor's responsibility to schedule the testing with the Town's Utility Inspector. Test results obtained in the absence of the presence of the Town's Utility Inspector will not be accepted.

10.03 Sewer System Testing

- A. Once constructed, all sanitary sewers and manholes shall be watertight and free from leakage. The rate of infiltration into the sanitary sewer system between any two (2) adjacent manholes or the entire system shall not be in excess of one hundred gallons per inch of pipe diameter per mile per day (100gpd/in/mi). The Contractor shall be required to repair all visible leaks.
- B. Any leakage found during the infiltration test shall be corrected at Contractor's expense. Grouting of the joint or crack to repair the leakage shall not be permitted for flexible or semi-rigid pipe. If the defective portion of the sanitary sewer cannot be located, the Contractor shall remove and reconstruct as much of the work as is necessary to obtain a system that passes infiltration requirements.

- C. All gravity sanitary sewers constructed of flexible pipe and Truss pipe shall be deflection tested no sooner than thirty (30) days after installation.
- D. The Contractor shall bear the complete cost and supply all equipment necessary to perform the tests required.
- E. All tests shall be conducted under the observation of the Engineer and/or Utility Inspector. It shall be the Contractor's responsibility to schedule testing. The first one thousand (1,000) feet shall be leakage tested within fifteen (15) days after installation and deflection tested within forty-five (45) days after installation.
 - 1. Low Pressure Air Test (all approved gravity sanitary sewer pipe materials except concrete)

All gravity sanitary sewers shall be tested for infiltration by means of a low pressure air test as generally described herein. Any other infiltration test procedure will only be allowed following the submittal of the procedure to the Engineer and/or Utility Inspector for review and upon written approval by the Engineer and/or Utility Inspector.

a. Equipment

The Contractor shall be responsible for providing all equipment and supplies necessary for the performance of a Low Pressure Air Test including, but not limited to, the following:

- Pneumatic plugs
- Air control panel
- Shut-off valve, pressure regulative valve, pressure relief valve and input pressure gauge – the pressure regulator or relief valve set shall be set no higher than ten (10) psig to avoid over pressurization
- Continuous monitoring pressure gauge having a range of zero (0) to ten (10) psig – the gauge shall be no less than four (4) inches in diameter with minimum divisions of 0.10psi and an accuracy of ± 0.04 psi.

To reduce the potential for sewer line over-pressurization, two (2) separate hoses shall be used to connect the control panel to the sealed line for introducing low pressure air, and a separate hose connection for constant monitoring of air pressure buildup in the line.

If pneumatic plugs are utilized, a separate hose shall be required to inflate the pneumatic plugs.

b. Groundwater Elevation and Air Pressure Adjustment

Groundwater monitoring methods shall require the approval of the Engineer and/or Utility Inspector. Groundwater depth shall be determined in the field by the Contractor.

➤ Air Pressure Adjustment

The air pressure correction, which must be added to the three-and-a-half (3.5) psig normal test starting pressure, shall be calculated by dividing the average vertical height, in feet of groundwater above the invert of the

sewer pipe to be tested, by 2.31. The result gives the air pressure correction in pounds per square inch to be added.

The allowable pressure drop of 1.0psig and the timing in Table 10-1 are not affected and shall remain the same.

➤ Maximum Test Pressure

In no case should the starting test pressure exceed 9.0psig. If the average vertical height of groundwater above the pipe invert is more than 12.7 feet, the section so submerged may be tested using 9.0psig as the starting test pressure. The nine (9) psig limit is intended to further ensure workman safety and falls within the range of the pressure monitoring gauges normally used.

2. Test Procedure

Following are general procedures to be employed in the performance of the test.

a. Plug Installation and Testing

After a segment of pipe has been backfilled to final grade, prepared for testing, and the specified waiting period has elapsed, the plugs shall be securely placed in the line at the ends of each segment to be tested.

It is advisable to seal test all plugs before use. Seal testing may be accomplished by laying one (1) length of pipe on the ground and sealing it at both ends with the plugs to be checked. The sealed pipe should be pressurized to nine (9) psig. The plugs shall hold against this pressure without bracing and without any movement of the plugs out of the pipe. No persons shall be allowed in the alignment of the pipe during plug testing.

It is advisable to plug the upstream end of the line first to prevent any upstream water from collecting in the test line. This is particularly important in high groundwater situations.

When plugs are being placed, the pipe adjacent to the manhole shall be visually inspected to detect any evidence of shear in the pipe due to differential settlement between the pipe and the manhole. A probable point of leakage is at the junction of the manhole and the pipe. This fault may be covered by the pipe plug and thus not revealed by the air test.

b. Line Pressurization

Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches the “starting air pressure” of 4.0psig greater than the average back pressure of any groundwater above the pipe, but not greater than 9.0psig. If groundwater is present, refer to Section 10, Page 10-2, *Groundwater Elevation and Air Pressure Adjustment* to determine the internal pressure to be applied.

c. Pressure Stabilization

After the starting air pressure is reached, the air supply shall be throttled to maintain that internal pressure for at least two (2) minutes. This time permits the temperature of the entering air to equalize with the temperature of the pipe wall.

d. Timing Pressure Loss

When temperatures have been equalized and the starting pressure stabilized, the air hose from the control panel to the air supply shall be shut off or disconnected. The continuous monitoring pressure gauge shall then be observed while the pressure is decreased to no less than 0.5psig from the starting air pressure. At a convenient reading between 0.5psig less than starting air and starting air pressure, timing shall commence with a stop watch.

A predetermined required time for a specified pressure drop shall be used to determine the lines acceptability. A pressure drop of 1.0psig shall be used.

e. Determination of Line Acceptance

If the time shown Table 10-1, for the designated pipe size and length elapses before the air pressure drops 1.0psig, the section undergoing test shall have passed and shall be presumed to be free of defects. The test may be discontinued once the prescribed time has elapsed even though the 1.0psig drop has not occurred.

f. Determination of Line Failure

If the pressures drops 1.0psig before the appropriate time shown in Table 10-1 has elapsed, the air loss rate shall be considered excessive and the section of pipe shall be determined to have failed the test.

3. Test Times

a. Test Time Criteria

The Ramseier test time criteria requires that not test section shall be accepted if it loses more than “Q” cubic foot per minute per square foot of internal pipe surface area for any portion containing less than six hundred twenty-five (625) square feet internal pipe surface area. The total leakage from any test section shall not exceed (625 x Q) cubic feet per minute.

b. Allowable Air Loss Rate

A “Q” value of 0.0015 cubic feet per minute per square foot shall be utilized to assure the OWNER of quality pipe materials, good workmanship, and tight joints.

c. Test Time Calculation

All test times shall be calculated using Ramseier’s equation:

$$T = 0.085 \frac{D \times K}{Q}$$

Where: T = Shortest time, in seconds, allowed for the air pressure to drop 1.0psig
K = 0.000419DL, but not less than 1.0
Q = 0.0015 cubic feet/minute/square feet of internal surface
D = Nominal pipe diameter in inches and
L = Length of pipe being tested in feet

For more efficient testing of long test sections and/or sections of larger diameter pipes, a timed pressure drop of 0.5psig may be used in lieu of the 1.0psig time pressure drop upon approval of the Engineer and/or Utility Inspector. If a 0.5psig pressure drop is used, the appropriate required test times shall be exactly half as long as those obtained using Ramseier’s equation for “T” cited above.

d. Testing Main Sewers with Building Sewers

In general, the Engineer and/or Utility Inspector will only approve the construction of the main line sewer and wye connections with the lateral stubbed-off to the property line. Building sewers will be allowed to be installed during the construction of the main line sewer only upon the written request to and written approval of the Engineer and/or Utility Inspector. This shall be clearly delineated on the design plans and standards submitted for approval by the Engineer and/or Utility Inspector.

If building sewers are approved for construction by the Engineer and/or Utility Inspector as part of the main line sewer, they shall be included in the test and their lengths may generally be ignored for computing the required test times. This can be done because in practice, ignoring the branch, lateral, or house sewers will normally increase the severity of the air test whenever the tested surface area is less than six hundred twenty-five (625) square feet so that the total rate of rejection may only be increased approximately two (2) percent. If the total tested surface area is greater than six hundred twenty-five (625) square feet, ignoring the lateral sewers will only slightly decrease the severity of the test.

e. Specified Time Tables

To facilitate the proper use of this recommended practice for air testing, the following tables are provided. **Table 10-1** contains the specified minimum times required for a 1.0psig pressure drop from a starting pressure of at least 3.5psig greater than the average back pressure of any groundwater above the pipe's invert. **Table 10-2** contains specified minimum times for required for a 0.5psig pressure drop from a starting pressure of at least 3.5 psig greater than the average back pressure of any groundwater above the pipe's invert.

4. Water Infiltration Test for Air Test Failures (and for Concrete Gravity Sanitary Sewer Pipes)
The Contractor may conduct a water infiltration test (weir test) when an air test fails to establish whether the one hundred (100) gal/in/mi/day maximum allowable infiltration rate is being exceeded. Water infiltration test may also be used for concrete pipe. If field conditions do not allow for infiltration test, an exfiltration test may be used upon written approval from the Engineer and/or Utility Inspector.

If the air test on the sewer system or any segment thereof fails, but the water infiltration or exfiltration test on the sewer system or any segment thereof passes, the sewer system or segment thereof shall be deemed acceptable. However, the Contractor shall be responsible for repairing all visible leaks regardless of ability of the sewer system or segment thereof to pass any established test criteria enumerated in these standards.

The infiltration test shall not be considered a valid leakage test unless the top surface of the groundwater is at least two (2) feet above the pipe during the test measurement. The Contractor may simulate this condition by flooding the trenches.

The rate of infiltration of water into the sewer, including appurtenances, shall not exceed one hundred (100) gallons per day, per inch diameter, per mile of sewer. The infiltration between any two (2) adjacent manholes shall not be greater than two hundred (250) percent of the allowable infiltration rate.

The infiltration allowance for manholes shall be completed using the total number of vertical feet of manhole expressed as the equivalent diameter sewer.

The maximum allowable infiltration, expressed in gallons per hour, is shown below for various pipe and manhole sizes.

Dia Of Sewer (inches)	Infiltration per Ft/per Hr (gals)	Dia Of Sewer (inches)	Infiltration per Ft/per Hr (gals)
4	0.0032	21	0.0166
6	0.0048	24	0.0189
8	0.0063	27	0.0213
10	0.0079	30	0.0237
12	0.0095	36	0.0284
15	0.0119	42	0.0332
18	0.0142	48	0.0379

Forty-eight (48) inch diameter manhole = 0.0379 gal per vertical foot per hour

5. Deflection Test for Select Pipe

A five (5) percent vertical Mandrel Deflection Test shall be performed on all PVC and Truss Pipe gravity sanitary sewer pipe.

These pipes shall be Mandrelled with a rigid devise sized to pass five (5) percent or less vertical deflection (or deformation) of the base inside diameter of the pipe. This value shall include pipe manufacturer’s tolerance. The Mandrel test shall be conducted no earlier than thirty (30) days after reaching final trench backfill grade.

Each pipe material/type required to be Mandrel tested shall be tested with a Mandrel approved by the pipe manufacturer and meeting the requirements of this Section.

The Mandrel shall be pulled by hand through all sewer lines in a manner acceptable to the Engineer and/or Utility Inspector and any section of sewer not passing the Mandrel shall be uncovered, replaced or repaired to the Engineer’s and/or Utility Inspector’s satisfaction and re-tested.

The Contractor shall provide proving rings to check the Mandrel. Drawings of Mandrels with complete dimensions shall be furnished to the Engineer and/or Utility Inspector upon request for each diameter and standard type.

The vacuum test shall be conducted by plugging all incoming and outgoing sewer lines in the manhole at a location beyond the connection of the sewer pipe with the manhole. All plugs shall be blocked in place so as not to move during the test. The vacuum testing collar shall be inflated in the frame in accordance with the equipment manufacturer's recommendations. A vacuum of ten (10) inches of mercury shall be drawn and the vacuum pump turned off and the valve between the vacuum pump and the vacuum gauge shall be turned off.

The time period which is taken for the vacuum to fall from ten (10) inches of mercury to nine (9) inches of mercury shall be determined. If the time taken for the vacuum to reduce the ten inches (10") of mercury to nine inches (9") of mercury is less than the time indicated in the following Table, then the manhole work shall be considered not acceptable and shall be rejected. If the time is equal to or exceeds the time indicated below, the manhole work shall be accepted.

Manhole Depth (ft.)	Diameter =	Time (sec)		
		48"	60"	72"
8		20	26	33
10		25	33	41
12		30	39	49
14		35	46	57
16		40	52	65
18		45	59	73
20		50	65	81
22		55	72	89
24		59	78	97
26		64	85	105
28		69	91	113
30		74	98	121
For each additional two (2) feet add:		5	7	8

Contractor shall submit to the Town the results of each manhole vacuum test. Such reports shall include a description of the location of the manhole, the time, date and weather of the test, a list of all persons present, the diameter and depth of the manhole and the allowable test results, and the actual test results to be compared with Utility Inspector's results.

All manholes shall be repaired by Contractor and retested as described above until a successful test is made. After each test, the temporary plugs shall be removed.

Once all manholes have been tested, the manholes will be given a field visual inspection. The inspection shall be performed at the discretion of the Town's Utility Inspector during the warranty period following a rainfall sufficient enough to raise the groundwater table above the problem areas. All leakage problems determined by this inspection shall be corrected by

the Contractor within an agreed upon time to the satisfaction of the Town. Where necessary to complete the work, the Contractor shall be responsible for the bypassing and/or blocking of the flow in the manholes and must have prior approval by the Town. It will be the Contractor's responsibility to supply his own traffic control as required by the particular location and/or jurisdiction.

- F. Lift station pump testing will be performed by the Town's Utility Inspector during the lift station's final inspection. The Contractor shall be responsible for providing the clean water to run the pumps and perform the test(s).

1. Manufacturer's Start-Up

Prior to the Town's final inspection of the lift station equipment, the Contractor shall be responsible for coordinating start-up activities with the pump manufacturer's representative in accordance with the manufacturer's requirements. The Town's Utility Inspector must be present at the time of manufacturer's start-up.

Any deficiencies in equipment and/or workmanship noted during the manufacturer's start-up shall be remedied by the Contractor prior to final inspection.

Upon successful completion of the manufacturer's start-up, the manufacturer shall deliver to the Contractor:

- a. Three (3) copies of a letter certifying that all pumping and electrical equipment has been installed and is operating in accordance with manufacturer's requirements;
- b. Two (2) sets of Operation and Maintenance Manuals; and
- c. One (1) complete set of Spare Parts as specified.

2. Final Inspection

The Contractor shall provide the following pump test equipment and materials:

- a. Water to conduct test;
- b. Amp/volt meter;
- c. Stop watch;
- d. Calibrated test gauge to measure operating head. The gauge shall be calibrated in feet of water from 0 to 100 feet in one foot increments; and
- e. Manufacturer's pump performance curves.

The Town's Utility Inspector attending the final inspection shall re-check any deficiencies. The Town's Utility Inspector shall then complete a cursory final inspection checklist and perform pump down tests, which shall include the following:

- a. Manual check of all level ON-OFF operation, alarm and run lights;
- b. Determination of inflow rate (if any);
- c. Determination of pump capacity for each pump individually and both/all pumps simultaneously;
- d. Determination of pump capacity with force main full. Verification of full force main shall be determined by pressure gauge provided by Contractor. Force main shall be considered full when the line pressure stabilizes; and
- e. Plot performance of each pump or pump curves provided by Contractor.

Contractor shall provide all water necessary to conduct the pumping tests, and shall provide a connection for the test gauge on the blind-flanged tee in the valve vault. The stem connection shall be equipped with a plug valve to close the connection after testing is complete. The connection shall be left in place and shall be suitable for use as an air bleed off.

The pumping test results must meet or exceed the design pumping criteria approved by the Town to successfully pass the final inspection. Any deficiencies noted during the final inspection shall be repaired/replaced by the Contractor to the satisfaction of the Town and re-inspected/retested prior to final acceptance.

10.04 Testing of Pavement Materials

A. Sub-grade Testing

The Contractor shall be responsible for providing soil Proctor analyses for all soils to be tested on the project. All test results shall be reviewed and a recommendation given by a qualified and licensed geotechnical engineer or geologist. At least one copy of each geotechnical report shall be submitted to the Town. The AASHTO Method T-99 (Standard Proctor Analysis) is to be the preferred test used.

Should sub-grades not meet minimum compaction requirements (minimum 95%), other forms of soil modification shall be employed. This shall include but not be limited to scarifying and aerating, undercutting and aeration, total replacement of soils, or the installation of geotextiles such as woven or non-woven filter fabrics or geogrid soil reinforcing systems. A qualified and licensed geotechnical engineer or geologist shall be provided by the Contractor to give such recommendations.

B. Pavement Materials Testing

The Contractor shall furnish evidence to the Town as necessary to show that the materials to be furnished for a project conform to the requirements specified.

In addition, the Town may have any of the materials tested at any time to show compliance with the standards. In connection with this requirement, the Contractor shall provide such facilities as the Town may require for collecting and forwarding samples and shall hold the materials represented by the samples until tests have been made and such materials found to have qualities required by the standards. All samples required shall be furnished and tested by the Contractor utilizing the services of a qualified and licensed geotechnical engineer or geologist without charge to the Town of Bargersville, Bargersville Utilities.

The frequency of sampling and testing shall be based on the number of tests required for each quantity of materials placed for a particular item of work as specified by the Town. Where no criteria for sampling and testing is given for a particular item or items of work by the Town, the Contractor shall adhere with the schedules and instructions specified in the Indiana Department of Transportation, Division of Materials and Tests Manual For Frequency of Sampling and Testing and Basis for Use of Materials, latest edition.

10.05 Documentation, Dedication and Acceptance Procedures

A. Documentation Requirements

In order for the Town Council to accept dedicated facilities, the following items shall be completed and on file:

1. Copies of all testing reports and data;
2. Copies of all O&M Manuals and lift station(s) (if applicable);
3. Pump manufacturer's certification letter (if applicable);
4. Lift station final inspection checklist (if applicable);
5. Final payment for inspection services;
6. As-built drawings;
7. Performance and/or maintenance bonds (if required);
8. Daily inspection reports;
9. Legal description of the land to be dedicated to the Town;
10. Copy of final recorded easements executed by the property owner(s), if easements are required; and
10. A written statement of facilities present on those lands. The written statement shall include:
 - a. Identification of the type and nature of facilities present
 - b. Dimensions of the facilities present
 - c. Totals for each type of facility present (example: 1,000 ft. of roadway, 1,000 ft. of sanitary sewer, 1,000 ft. of residential curbing, etc.)
 - d. Statement of actual cost of construction, breaking out the cost of easements and cost of facilities.

B. Dedication

The Town's engineering representative shall review the above-mentioned requirements and prepare a document stating that the work has been completed, the requirements have been met, and all items are in proper form. The Town's engineering representative shall include in the statement a recommendation on acceptance/denial of the facilities and may also include comments regarding the project. The Town's engineering representative shall present to the Town Council its findings in a public meeting for their consideration.

C. Acceptance of Facilities

The Town will assume responsibility of the sanitary sewer when construction is **fully** completed in accordance with the plans and standards, and when all requirements in these standards are met.

The Town Council shall receive the recommendation from the Town's engineering representative, and upon review by the Town Attorney, Wastewater Superintendent, and Utility Inspector, shall make a determination as to acceptance of the facilities. A majority approval of the Council members present at the meeting is required for acceptance. The Town Council shall accept dedicated facilities by resolution.

Sewer taps will not be issued until the sewer main at the tap location is substantially complete, including all testing.

Proposed sanitary sewer construction shall be bonded by the owner at one hundred percent (100%) of the projected cost to construct the proposed system. The Town's engineering representative must approve the cost estimate. "Bond" shall mean corporate surety bond as is acceptable to the Town. Upon acceptance of the sewer system by the Town, the owner shall bond the three (3) year post acceptance period at twenty-five percent (25%) of the original cost to construct the system. The owner is responsible to assure that its bond instrument is current and shall request extensions of time before the instrument expiration date. Bonds shall be called before their date of expiration.

Table 10-1
Specification Time Required for a 1.0psig Pressure Drop for Size and Length of Pipe Indicated for Q = 0.0015

Pipe Dia. (in)	Min. Time (min:sec)	Length for Min. Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100ft	150ft	200ft	250ft	300ft	350ft	400ft	450ft
4	3:46	597	0.380L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520L	7:34	7:34	7:34	7:36	7:36	8:52	10:08	11:24
10	9:26	239	2.374L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692L	17:00	17:00	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470L	19:50	19:50	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

Table 10-2
Specification Time Required for a 0.5psig Pressure Drop for Size and Length of Pipe Indicated for Q =
0.0015

Pipe Dia. (in)	Min. Time (min:sec)	Length for Min. Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100ft	150ft	200ft	250ft	300ft	350ft	400ft	450ft
4	1:53	597	0.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.472L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10.683L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23