NRA OI 447 Operational Investigation 447

2.

# River Glen:
# River Channel Assessment - Annex C

## An Assessment of the Low Flow Characteristics of The River Glen, Lincolnshire

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**Anglian Regional Operational Investigation 447**

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ANNEX C

# AN ASSESSMENT OF THE LOW FLOW CHARACTERISTICS OF THE RIVER GLEN, LINCOLNSHIRE

Undertaken for the National Rivers Authority, Anglian Region

By

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## SUMMARY

The River Glen, a tributary of the River Welland, lies within the Anglian region of the National Rivers Authority (NRA). The upstream section is made up of two principal tributaries *i.e.* the West Glen and East Glen which join to form the River Glen. Downstream, the River Glen possesses characteristics of a lowland river as it flows across the low gradient Fenland. The catchment geology is a mixture of Lincolnshire and Great Oolitic Limestone, Upper Estuarine Series and younger Jurassic strata. The Lincolnshire Limestone is an important aquifer in South Lincolnshire and has consequently been extensively developed for public water supply over a long period. Previous studies have highlighted the intrinsic links between the surface hydrology of the West and East Glen and the groundwater flow in the Lincolnshire Limestone.

From these previous studies, a number of sites were selected to provide a more detailed picture of the patterns of discharge and the extent of gains/losses experienced throughout the catchment. Discharge was monitored at 17 sites throughout the catchment. Measurements were taken in January, March and May 1990, and at approximate monthly intervals thereafter until November 1991 for a total of 21 surveys. Low rainfall during the period enabled the development of a detailed picture of the magnitude and extent of low flows throughout the catchment and delineate each river into a number of distinct reaches. These reaches can be split into two basic groups, *i.e.* perennial flow and ephemeral flow. Further subdivisions highlight which perennial sections experience consistent losses from the channel bed and whether the ephemeral sections become either totally dry or contain ponded water but with no flow.

It is clear that under such conditions, large stretches of both the West and East Glen suffer severe impacts. Surveys undertaken in July of 1990 and 1991 indicated zero flow for almost the entire length of the East Glen with the majority of the channel being totally dry. A similar picture was experienced through July to September in 1990 and 1991 upstream of Creeton on the West Glen. Consequently, the West Glen from the river Tham confluence downstream to the East Glen confluence and beyond is the only one that experiences adequate flow on a consistent basis to provide a realistic opportunity of being improved by instream enhancement works.

The discharge surveys also highlighted the interaction between the river and aquifer within the Glen catchment. In particular, the reach of the West Glen from Essendine to the confluence with the East Glen contained three types of sub reaches *i.e.* those that showed few gains or losses of water and hence little interaction between surface and groundwater, those that experienced consistent losses (influent conditions) and those that showed consistent gains (effluent conditions). Consequently, a study using intragravel temperature data to confirm the existence of the surface-groundwater interactions and determine the origin of water upwelling into the channel bed.

Six sites were monitored on two occasions along the West Glen from Essendine to the East Glen confluence. Temperature was measured using a steel probe encasing four thermistors located at 25 cm intervals and connected to a chart recorder. The probe was inserted into the channel bed to a depth of 60 cm on the downstream end of a riffle at each site.

Temperature profiles from Shillingthorpe and upstream of Greatford confirmed the influent nature of the channel and the surface origin of the intragravel water. The hydrological survey of discovered the channel downstream of Greatford to be effluent. Intragravel temperatures suggest that the intragravel water there originates from surface water draining from the channel upstream and not the upwelling of deeper groundwater. Indeed, none of the sites exhibited the temperature profiles that would be expected from a site with direct upwelling from deeper groundwater.

# ANNEX C. - AN ASSESSMENT OF THE LOW FLOW CHARACTERISTICS OF THE RIVER GLEN, LINCOLNSHIRE

## C.1 Introduction

The River Glen, a tributary of the River Welland, lies within the Anglian region of the National Rivers Authority (NRA). The catchment is made up of two distinct zones. The upstream section is made up of two principal tributaries *i.e.* the West Glen and East Glen which join to form the River Glen. Kates Bridge Gauging Station (GS) separates the two zones and the catchment area upstream is 342 $km^2$ (132 sq. miles). Downstream, the River Glen possesses characteristics of a lowland river as it flows across the low gradient Fenland.

Previous studies have highlighted the intrinsic links between the surface hydrology of the West and East Glen and the groundwater flow in the Lincolnshire Limestone. The catchment geology is a mixture of Lincolnshire and Great Oolitic Limestone, Upper Estuarine Series and younger Jurassic strata. The Lincolnshire Limestone which has been described in detail by Downing and Williams (1969) and Swinnerton and Kent (1976) is an important aquifer in South Lincolnshire and has consequently been extensively developed for public water supply over a long period. The limestone is generally about 30 m thick and dips gently eastwards at about one degree so that it outcrops along a five km tract between Grantham in the north and Stamford in the south.

The limestone is generally unconfined in the west of the Glen catchment where there is a varying degree of cover from Jurassic clays and Pleistocene boulder clays. In the confined region to the east, the limestone is overlain by clays and silts of the upper Estuarine Series. Relatively impermeable clays and silts of the Lower Estuarine Series, Northampton sands and Upper Lias clays tend to occur below the limestone.

Conditions of flow in the catchment in July 1967 and January 1968 were described by Downing and Williams (1969). This enabled them to present an overview of the downstream flow variations during high and low flow and to locate the influence of important sources and sinks of water. Interactions between surface and groundwater were clearly evident under three categories:

1. swallow-holes
2. springs
3. permeable reaches

The influence of the swallow-holes and springs is easily apparent but the permeable reaches produce a more complex pattern. Changes in discharge along a reach occur due to an exchange of water between the surface water and groundwater via the permeable substrate of the river bed. The pattern can be confused further by the same reach displaying both influent (water lost from the channel) and effluent (water gained) conditions depending on local groundwater levels. however it is important to note that these surveys were indertaken during an historically 'wet' period.

A total of nine gauging surveys were undertaken by Smith during the 1975-77 drought (Smith 1977). The object was to define flows sustained by baseflow/springflow in the catchment rather than the peak flows and to determine ephemeral and perennial water courses. This allowed a more detailed picture of the river to be constructed on a reach by reach scale and estimates of maximum gains and losses were also established.

From these previous studies, a number of sites were selected to provide a more detailed picture of the patterns of discharge and the extent of gains/losses experienced throughout the catchment. This was complimented by a study using intragravel temperature data to confirm the existence of the surface-groundwater interactions and determine the origin of water upwelling into the channel bed. The following section firstly describes the hydrological data collected throughout 1990 and 1991 and subsequently defines a number of distinct reaches based on their low flow hydrology. The final part outlines the research undertaken to assess the origin of upwelling water in parts of the West Glen.

## C.2 Hydrological Data Collection

Flows were monitored at 17 sites throughout the catchment of which eight sites lay on the West Glen, seven on the East Glen, one on a tributary of the East Glen and one on the main River Glen (figure C.1). These supplement the continuous data recorded by the network of seven NRA gauging stations. Sites were selected to give a detailed picture of the hydrological response of the catchment and the extent of the gains/losses that had been recognised by Downing and Williams (1969) and Smith (1977). Measurements were taken using a standard Ott current meter type C2"10.150" in January, March and May 1990, and at approximate monthly intervals thereafter until November 1991 for a total of 21 surveys. At each site, the most uniform cross section was selected which provided uniform flow conditions. Sections with large variations in speed or large areas of slow moving water were avoided. Marker pegs were fixed to each bank to form a permanent transect at right angles to the flow and velocities and depth recorded with the meter at regular intervals across the transect at 0.6 depth (from the surface). Discharges were calculated from these measurements using the mean section method (BSI 1980).

## C.3 Hydrological Results

Results are shown in tables C.1 and C.2. Low rainfall during the period enabled the development of a detailed picture of the magnitude and extent of low flows throughout the catchment. Figure C.2 shows the average monthly flows experienced at the five main river gauging stations over the period compared with the long-term averages measured since each station became operational (*i.e.* at Kates Bridge since 1960, Burton Coggles, Irnham and Manthorpe since 1969 and at Shillingthorpe since 1970). At each station, with the exception of Shillingthorpe, the flows were only greater than the long-term average during one of the 23 months *i.e.* February 1990. Shillingthorpe GS had above average levels during the latter part of 1991 as flows were augmented by the Gwash-Glen interbasin transfer.

From the flows measured by the stations and those from the current meter surveys it has been possible to establish the hydrological response of the East and West Glens and delineate each river into a number of distinct reaches. These reaches are shown in figure C.3 and have been split into two basic groups, *i.e.* perennial flow and ephemeral flow. Further subdivisions highlight which perennial sections experience consistent losses from the channel bed and whether the ephemeral sections become either totally dry or contain ponded water but with no flow. The Water Treatment Works on the main channel have been indicated due to their importance influence on the classification of selected reaches. The following section describes each reach in more detail in terms of its start and end point, sources of water and extent of any gains or losses. Reference is made to figures C.4 and C.5 which show the flows recorded at each site over the period in cubic metres per second (cumecs). Figures C.6 and C.10 are also used to highlight gains and/or losses along selected reaches. In both sets of figures, the discharges recorded during the highest flow on 1/3/91 have been removed in order to allow greater resolution when examining the extent of the low flows experienced at each site.

### C.3.1 Description Of Reaches.

#### C.3.1.1 West Glen

1. Old Somerby Water Treatment Works (WTW) (SK969337) to Boothby Pagnell WTW (SK974306).
This reach experiences ephemeral flow with only the uppermost 500 m actually containing water in the channel during summer due to the discharge from Old Somerby WTW.

2. Boothby Pagnell WTW (SK974306) to Burton Coggles Gauging Station (GS) (SK986262).
Flow can fall to zero as was recorded at Bitchfield during the 27/7/90 and 27/9/91 surveys but water remains ponded in the channel for the majority of the reach.

3. Burton Coggles GS (SK986262) to Corby Glen (SK995249).
The upper part of this reach becomes dry under extreme conditions. However, downstream of the potholes located in the stream bed at SK988260 the channel remains dry for long periods. The potholes themselves are described in more detail by Hindley (1965). Discharge measurements suggest that they can be responsible for a reduction in flow by upto 0.0250 cumecs. For instance, flows at Burton Coggles GS on 7/4/91 was 0.0250 which had been reduced to zero at the next site downstream. Similarly on 15/3/90, flows decreased by 0.0215 cumecs from 0.0370 at the GS to 0.0155 downstream. Under low flows, the small swallow-holes in the channel bed consume the entire flow. As discharge increases, then larger sinks that have been ring-fenced on the margins of the channel become active and hence the capacity to decrease discharge becomes greater.

4. Corby Glen (SK995249) to Eager Farm road bridge (SK997234).
Flow from a drain in Corby Glen and downstream at the WTW combine to maintain pools of water in the channel along this reach although flow can be undetectable in the lower part.

5. Eager Farm road bridge (SK997234) to Creeton Springs (TF010203).
This section remains totally dry for long periods, only flowing when the capacity of the potholes at Burton Coggles is exceeded. The uppermost section contains water when the flows from Corby Glen WTW are sufficient. Discharges recorded near Swayfield (TF007223) in the middle of this reach indicated flow on only 4 out of 21 occasions.

6. Creeton Springs (TF010203) to 2 km downstream (TF016190).
Although for long periods no flow enters this reach from the main channel upstream, flow only ceases under extreme conditions (*e.g.* 25/10/90) due to the inputs from Creeton Springs. Even in these circumstances water remains ponded along the majority of the channel.

7. 2 km downstream of Creeton Springs (TF016190) to River Tham confluence (TF016180).
As flow recedes from Creeton Springs, then this stretch becomes totally dry. This was the case when flows fell to 0.007 cumecs at Creeton springs on 21/6/90 and remained dry until the 25/1/91 survey. Similarly it was dry again by 28/5/91 when flows upstream were 0.0025 cumecs and remained so to the end of the period.

8. River Tham confluence (TF016180) to Essendine (TF050127).
This reach experiences perennial flow supplied by the River Tham and the ephemeral Holywell Brook. Figure C.6 shows the amount of gains/losses during the recording period. The vertical axis represents time with the beginning of 1990 at the top and the latter part of 1991 at the bottom. The horizontal scale indicates the amount of water that is gained or lost along the stretch in cumecs after taking contributions from Holywell Brook into account. Clearly, for the majority of the time the channel experiences a small loss in the range of 0.005 to 0.02 cumecs. The large gains that occurred under high flow probably represent inputs from field drains and low order tributaries which are normally dry.

9. Essendine (TF050127) to Shillingthorpe Gravel Pit (TF059111).
Flow is perennial although total discharge decreases along the reach as water drains from the bed. This is evident in figure C.6. Losses during the first half of the recording period were largely consistent around 0.02 cumecs. The gains in the latter part of the period are due to the operation of the Gwash-Glen transfer scheme augmenting discharge along the reach.

10. Shillingthorpe Gravel Pit (TF059111) to downstream of Greatford (TF088121).
Totally dry conditions prevailed under the extreme conditions between 25/9/90 and 19/12/90 before the Gwash-Glen transfer scheme came into operation. Losses occur for the majority of the period as evident in figure C.6. Similar to reach 8, large gains occurred during high flow due to the contributions from low order tributaries.

11.Downstream of Greatford (TF088121) to the East Glen confluence (TF095133).
Perennial flow occurs with gains along the channel before and after the transfer scheme became operational. Even under extreme conditions when the upstream reach was dry, this stretch

experienced a small amount of flow with no tributary inputs. Figure C.6 highlights these small gains with much higher gains during high flow.

Two further flow surveys were completed in more detail on reaches 9 to 11. One was undertaken on 29/3/90 when the entire reach was experiencing flow and another on 25/9/90 when a large proportion was dry with the results shown in figure C.7.

A disused gravel pit is evident at TF058110 and is connected to the main channel in two ways. Two buried metal pipes connect the top level of the pit to the channel just upstream of the bridleway at TF060110. Consequently, when water levels in the pit reach a maximum, these drain water from the pit into the river and augment flow. This is evident in figure C.7 where an increase in flow is evident during the survey of 29/3/90. Conversely, when the water level drops, there is clear evidence of seeps along the side of the pit nearest the river where water is draining through the permeable gravels. Indeed, a survey of the heights of the river bed, seeps and water level in the pit indicated these seeps were over 2 m below the river bed (shown in figure C.8).

The survey undertaken on 25/9/90 shown in figure C.7 indicates a contrasting picture to that of 29/3/90. On this occasion, flowing water only occupies the channel downstream to Banthorpe Lodge (TF062109) and in the lowermost stretch down to the East Glen confluence. Furthermore, the entire upper reach exhibited influent conditions. Discharge in the lowermost reach downstream of Greaford was characterised by a steady increase in flow with distance downstream and no evidence of a single point source. This also reiterates the conclusions presented in figure C.6 for reach 11 where consistent gains have been recorded throughout the period.

#### C.3.1.2 East Glen

1. Ropsley (SK992337) to Ropsley WTW (TF002337).
This short stretch is characterised by ephemeral flow with the channel becoming totally dry.

2. Ropsley WTW (TF002337) to 1.5 km downstream (TF013337).
Flow is ephemeral depending on the discharge from the WTW which maintains the ponded water in the channel.

3. 1.5 km downstream of Ropsley WTW (TF013337) to Lenton WTW (TF023303).
Similar to reach 2, flow is ephemeral although because it is beyond the influence of Ropsley WTW, the channel becomes totally dry.

4. Lenton WTW (TF023303) to Irnham GS (TF037273).
The WTW maintains water in the channel although flow decreases to zero under dry conditions. Zero discharge was recorded on one occasion in each year of the recording period.

5. Irnham GS (TF037273) to Edenham WTW (TF066216).
As discharge declines upstream, influent conditions result in the channel becoming totally dry. This was the case for three consecutive months during 1990 and 1991.

6. Edenham WTW (TF066216) to Pasture Hill Farm road bridge (TF064204).
Flow is ephemeral under extreme conditions although water levels are maintained by the WTW.

7. Pasture Hill Farm road bridge (TF064204) to just downstream of Manthorpe GS (TF066156).
As flows decline, the water front migrates upstream until the whole reach becomes totally dry. From the discharge data, the reach has been split into two sections. In the upper reach from Edenham to the confluence with Grimsthorpe Park Brook, gains do occur under high flows such as those experienced during early 1990 but under low flow conditions, losses are great enough to consume the entire flow (figure C.9). The large gain on 1/3/91 was supplied by Grimsthorpe Park Brook flowing out of the lake in the grounds of Grimsthorpe Castle. This was the only occasion during the period when this tributary was flowing. The losses experienced in the lower reach, which extends down to Toft, are shown in figure C.9. The values of zero represent the periods when there was no flow entering the reach at the upstream end. Therefore the channel was influent on all occasions.

8. Just downstream of Manthorpe GS (TF066156) to Braceborough (TF082134).
This stretch also becomes totally dry but only under more extreme conditions than the reach upstream. This is due to flows being maintained for longer periods by tributaries at Bowthorpe Park Farm (TF066155) and TF079138. Figure C.10 highlights the flow variation downstream on the East Glen from Edenham to the West Glen confluence for the periods March-June 1990 and April-July 1991. During both periods, it is clear that flows are considerably higher at Braceborough than upstream. A more detailed survey undertaken on 22/3/90 was carried out to establish the source of these inputs and figure C.11 highlights the results. The first area of

increase occurred at TF067155 just downstream of Manthorpe GS where three sources were discovered. The first, supplying 0.009 cumecs arose from springs in a small woodland next to the channel. Immediately downstream, approximately 0.005 cumecs was draining in from a tributary whose source rises just south of Witham on the Hill. The third was emerging from a bankside field drain on the opposite bank. These three combined resulted in the elevated discharge of 0.285 further downstream. The next main tributary was at TF076144 where water rising at Braceborough Spa fed a flow of 0.135 cumecs into the channel. The final source was located at TF079138 where a tributary originating near Monk's Wood, north east of Carlby, supplied 0.011 cumecs.

These sources however have tended to decline rapidly over a short period in both years as shown in figure C.10. Flows at Braceborough were entirely fed by them by the 24/5/90 survey as the site at Manthorpe GS had dried up. However, by 27/7/90 Braceborough had virtually suffered the same fate. Similarly in 1991, flows at Manthorpe GS had ceased by 26/4/91 but 0.1472 cumecs was recorded at Braceborough but by 29/7/91 flows had also ceased at Braceborough as these tributaries had dried up.

9. Braceborough (TF082134) to the West Glen confluence (TF095133).
Flow is ephemeral and declines at the same rate as reach 8 although water remains in some deeper pools and in the channel at the confluence supplied by the West Glen which backs up along the East Glen.

### C.3.2 Summary of hydrological results

The flow gaugings undertaken during 1990 and 1991 coupled with the low rainfall that was experienced, enabled a detailed picture to be constructed of the nature and extent of low flows experienced within the Glen catchment. It is clear that under such conditions, large stretches of both the West and East Glen suffer severe impacts. Surveys undertaken in July of 1990 and 1991 indicated zero flow for almost the entire length of the East Glen with the majority of the channel being totally dry. A similar picture was experienced through July to September in 1990 and 1991 upstream of Creeton on the West Glen. Consequently, figure C.12 has been constructed to highlight those reaches in the catchment that experience adequate flow on a consistent basis and hence provide a realistic opportunity of being improved by instream enhancement works. Historical information suggests that this map describes the natural situation of the modern river (see Annex A).

## C.4 Comparison Of Gains/Losses Between Reaches

### C.4.1 Calculation of gains/losses

The previous section described the discharge variations along the West and East Glen during 1990 and 1991 and defined a number of distinct reaches. From the results it has also been possible to compare the amount of water that is gained or lost along some of these reaches. Consequently, table C.3 highlights the amount of water being gained or lost along selected reaches of the West and East Glen. The points that delineate each reach are based on the gauging sites which are given along with their associated grid references in tables C.1 and C.2. The discharge measurements from which the gains/losses calculations are based are also shown in these tables. The variations in gains/losses have already been highlighted for these reaches in figures C.6 and C.10 over the gauging period. However, to allow a true comparison between each stretch in terms of the actual amounts of water that is migrating between the surface water and the channel bed, the reaches have been standardised based on their total bed area.

Reach lengths were calculated from the 1:2500 main river maps. Average channel widths were calculated from the measurements taken during the physical habitat survey (described in Annex E) which recorded width to the nearest 10 cm at every 50 m or every riffle, whichever was the closer. Total bed area for each stretch was calculated by simply multiplying the first column by the second. The fourth and fifth columns show the gains/losses in **cubic metres of water per metre squared of channel bed per day ($m^3/m^2/d^{-1}$)** and were calculated from the amount of flow change along the reach and the bed area. Averages values in column four were calculated based on those occasions when water was both flowing into the upstream end and out of the downstream end of the reach. For instance, flow had reached zero at a point upstream of Shillingthorpe on 25/10/90 and so it would be inappropriate to use the whole bed area in working out losses for the Essendine - Shillingthorpe reach on this date as the reach had the capacity to lose more water. Column five highlights the maximuma over the recording period for each reach. The maximum gain for the Greatford - Confluence stretch utilised the 1/7/91 data as although this was not the date when the greatest gains occured, it was the time when the greatest gains occurred without any visible tributaries augmenting flow along the reach.

### C.4.2 Results

Table C.3. - Gains/losses along selected reaches of the West and East Glen

| Reach | Total Length (m) | Average Width (m) | Bed Area ($m^2$) | Average Gains/ Losses ($m^3/m^2/d^{-1}$) | Maximum Gains/ Losses ($m^2/m^3/d^{-1}$) |
|---|---|---|---|---|---|
| WEST GLEN | | | | | |
| Careby - Essendine | 6650 | 5.66 | 37639 | -0.02 | -0.10 |
| Essendine - Shillingthorpe | 3348 | 6.82 | 22833 | -0.11 | -0.21 |
| Shillingthorpe - Greatford | 3614 | 7.16 | 25876 | -0.09 | -0.14 |
| Greatford - Confluence | 1692 | 5.59 | 9458 | +0.07 | +0.29 |
| EAST GLEN | | | | | |
| Edenham - GPB Confluence | 4936 | 4.33 | 21373 | -0.05 | -0.10 |
| GPB Confluence - Toft | 5090 | 4.54 | 23109 | -0.08 | -0.12 |

The results show how the greatest losses occur along the Essendine - Shillingthorpe reach for both average and maximum values in terms of amounts of water per unit bed area over time. Similar but slightly smaller losses are evident in the next reach downstream followed by gains in the subsequent reach from Greatford to the confluence with the East Glen. Upstream of Essendine, average losses tend to be small. The two reaches on the East Glen also exhibit losses with the Grimsthorpe Park Brook (GPB) confluence - Toft reach having the slightly higher values. However, in comparison they are lower than the levels along the two reaches between Essendine and Shillingthorpe on the West Glen.

The rate of average gains along the Greatford-Confluence reach are similar to the rate of loss in the two reaches upstream. However, the origin of this upwelling water was not clear. It has been hypothesized that the influent nature of the channel between Essendine and Shillingthorpe was due to the presence of aridity cracks that had opened up during previous drought periods and subsequently conveyed rapid recharge into the confined zone of the aquifer (Booker 1977). However, figure C.13 highlights how the river in this area flows over permeable gravels masked by a veneer of alluvium. Indeed the presence of permeable gravels in this reach has already been discussed in connection with respect to the disused gravel pit at TF058110. Therefore an alternative suggestion is that the water re-emerging into the channel downstream of Greatford may have its origin in this area. In order to examine these alternatives, an investigation was undertaken using intragravel temperature profiles.

The following section outlines the concept of using temperature profiles to determine the origin of intragravel water followed by a description of its use on the lower reaches of the West Glen.

## C.5 Determination Of The Origin Of Intragravel Water Using Temperature Profiles

### C.5.1 Background

Growing attention has been directed towards the study of streams and their interaction with the underlying groundwater. This has been fuelled by the attention given to the distribution of sediment dwelling organisms (hyporheos) (*e.g*. Bishop 1973, Godbout and Hynes 1982) the contribution of contaminated groundwater as a source of non-point pollution (Lee and Hynes 1977), the importance of groundwater-fed areas for spawning (ADFG 1985) and in the transport and storage of solutes and particulate substances (Bencala *et al* 1984, Kennedy *et al* 1984).

Very deep groundwaters can be ancient and are often saline but are unlikely to interact with the stream bed. However, even shallow waters remain for long periods which can on average be measured in tens of years (Hynes 1983). For instance the age of the groundwater in the unconfined zone of the Lincolnshire Limestone aquifer varies from recent to 9000 years before present (B.P.) and in the confined zone from recent to 25000 years B.P. (Downing *et al* 1977). This catchment is also characterised by rapid recharge which occurs when water enters the Lincolnshire Limestone aquifer through swallow holes and moves rapidly towards the confined region. Even thus, water takes a minimum of 35 weeks to travel from swallow holes in the north to the southern reaches (Booker 1977) and hence along with mixing, is likely to adjust to the temperatures of the older groundwater.

Numerous studies have been undertaken to compare intragravel and surface water temperature regimes ( *e.g*. Wilson *et al* 1980, Hartman and Leahy 1983, Shepherd 1984, Shepherd *et al* 1986, White *et al* 1987. Results suggest that intragravel temperatures appear to be buffered by the substrate and can influence temperature patterns to more than 50 cm deep in places.

Laboratory flume experiments undertaken by Vaux (1968) indicated that streamwater downwelling occurred where the longitudinal bed profile was convex or where there was an increase in streambed elevation *i.e*. the transition from an upstream pool to a riffle. Where the shape of the bed was concave or where there was a decrease in streambed elevation, *i.e*. the transition from a riffle to a downstream pool, water upwelling in the substratum occurred.

From the studies described above, a more detailed picture has been constructed on the patterns of upwelling, downwelling and underflow that occur along streambeds depending on water pressure, stream elevation and bed permeability and their associated temperature profiles.

This is summarised in figure C.14 which shows the situations in which the stream or groundwater is likely to be the source of intragravel water and the resultant temperature patterns.

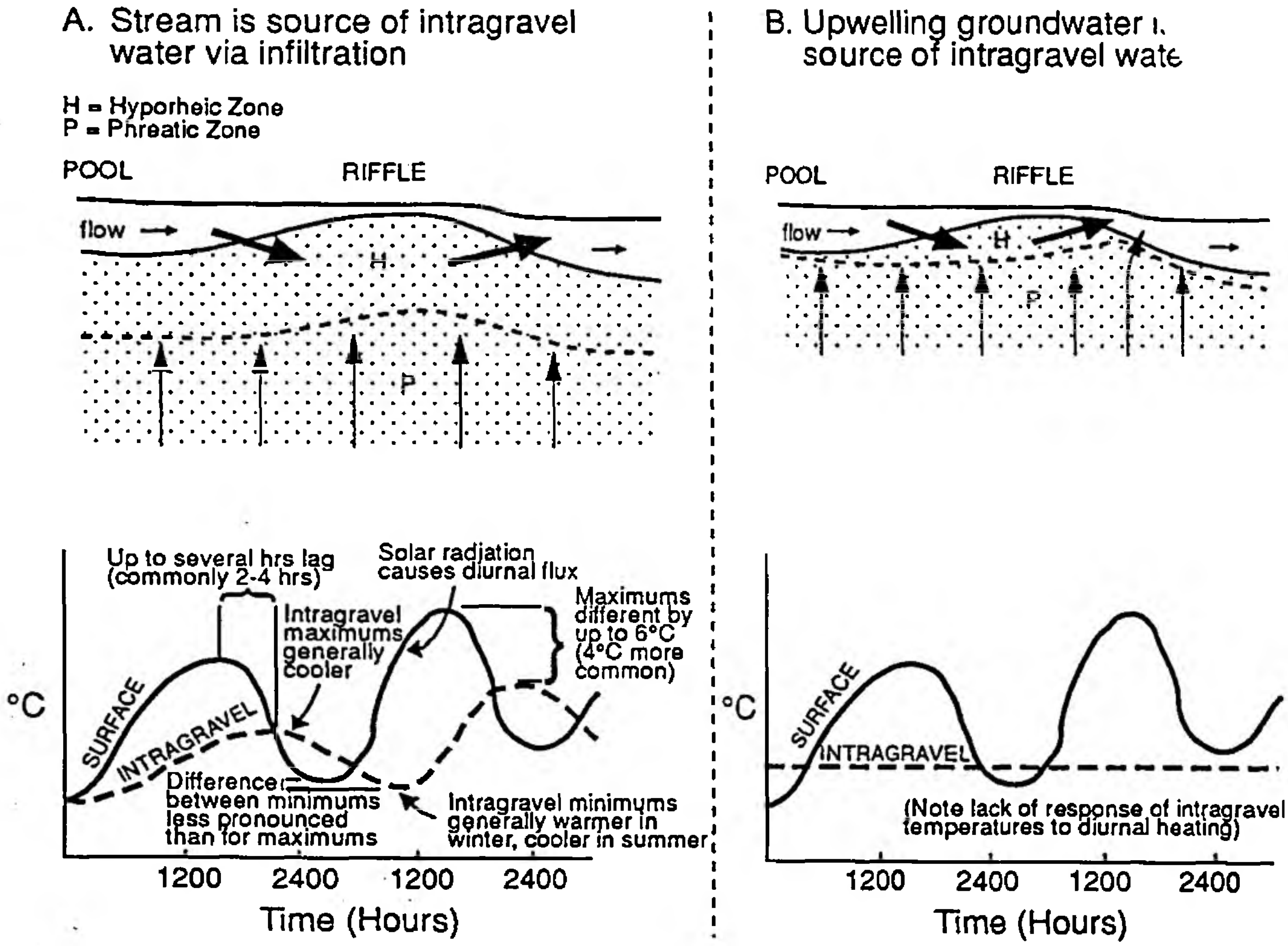


Figure C.14. - General summer diurnal surface and intragravel water temperature patterns (after Shepherd *et al* 1986 and des Chatelliers and Reygrobellet 1990).

In situation A, streamwater enters the substrate at the upstream end of the riffle and re-emerges at the downstream end. Temperature patterns within the streambed show a different response to the surface water variations in two main ways:

1. a clear timelag is apparent between maximums and minimums of surface water temperatures and those of the interstitial water,
2. intragravel water temperature displays much less variation than surface water.

In situation B, surface water still filters into the riverbed at the upstream end of the riffle and re-emerges at the downstream end. However, groundwater is also much closer to the streambed and enters the stream where the riffle merges with the pool. Intragravel temperatures at this point show no diurnal variation but mirror the constant temperature of their source, *i.e.* the deep groundwater. It is important to note that des Chatelliers and Reygrobellet (1990) suggest these groundwater discharge areas occur at discrete points rather than along the whole reach. Consequently, any study undertaken to determine the location of such areas must focus on the downstream end of riffles.

### C.5.2 Study Sites

The discharge surveys discussed earlier highlighted the interaction between the river and aquifer within the Glen catchment. In particular, the reach of the West Glen from Essendine to the confluence with the East Glen contained three types of sub reaches:

1. those that showed few gains or losses of water and hence little interaction between surface and groundwater,
2. those that experienced consistent losses (influent conditions) and
3. those that showed consistent gains (effluent conditions).

Six sites were selected along the reach, the locations of which are shown in figure C.15. Site 1, located upstream of Essendine (TF051135), was chosen because the discharge data indicated that there was little interaction between the river and aquifer here. Site 2 was located in the reach that had displayed consistent losses from the channel bed. The exact location, near Banthorpe Lodge (TF062109), was chosen as this was where the water front ceased flowing during the detailed survey undertaken on 25/9/90 shown in figure C.7 and hence influent conditions were evident. Influent conditions have also been demonstrated along the reach between Shillingthorpe and Greatford (figure C.6) and so site 3 was located at TF067113. The reach downstream of Greatford had demonstrated gains in flow on a consistent basis (figure C.6). Therefore, three sites were located along this reach to try to establish the location of any groundwater discharge zones. Site 4 was located at the point where detectable flow commenced during the detailed 25/9/90 survey (TF091124). Site 5 was chosen midway between here and the confluence (TF094127) and site 6 just upstream of the confluence itself (TF095133).

### C.5.3 Method

Temperature was measured using a steel probe encasing four thermistors located at 25 cm intervals and connected to a chart recorder. The probe was inserted into the channel bed to a depth of 60 cm on the downstream end of a riffle at each site. Consequently, the uppermost thermistor recorded water temperature 15 cm above the channel bed, the second was positioned 10 cm within the substrate, the third at 35 cm depth and the lowest at a depth of 60 cm (referred to as +15, -10, -35 and -60 respectively). At each site, the datum was set at the streambed and not the stream water surface in order to make the results easier to interpretate. Also, the streambed was a more stable reference point as the water surface fluctuated between sampling dates.

The six sites were monitored on two occasions *i.e.* once during June - October 1991 when surface water temperature variations were relatively high and once during October - December 1991 when water temperatures were lower. The probe was left recording for five to seven days. Figures C.16 to C.21 show the results for each site during the two recording periods. In each case, results from the first two days of the record have not been used in any analysis to allow the river bed time to settle after inserting the probe. From the remaining data, the three consecutive days that displayed the greatest variation in surface water temperature were extracted for analysis (except during the first period at site 1 when only two days were available). This was done to make any response of intragravel temperatures to changes in surface water temperatures easier to detect.

### C.5.4 Results And Discussion

Sites that have groundwater discharging into the stream will be characterised by stable intragravel temperatures of approximately 8°C. Alternatively, intragravel water originating from the crest of the riffle will mirror surface water temperature fluctuations but with a buffered response.

Figures C.16 to C.21 show the results of the temperature surveys undertaken at each site with temperature in °C on the vertical axis and time on the horizontal axis. Two diagrams are shown for each site, one for the summer survey and one for the autumn/winter survey. The raw data is shown in Appendix B and tables C.4a and C.4b give a statistical summary of the temperatures recorded at each level during both surveys.

Examining all sites, surface water temperatures ranged from 12.1-20.2°C during the first survey. During the same period, intragravel temperatures at -60 cm ranged from 11.6-18.2°C. In comparison, surface water temperatures during the second period varied between 2.8-12.6°C and 6.8-11.0°C at -60 cm depth. At each site during the first survey, a progressive decline is apparent in the average temperatures from streamwater down through the substrate except at site 3. A general reverse trend is noted during the second surveys, particularly where streamwater temperatures were lowest. For instance, the coldest average streamwater temperature was recorded at site 1 (4.3°C) and a clear pattern of increasing temperature with depth was apparent. However, during the second survey at sites 3 and 4, streamwater temperatures were still relatively high (10.5 and 11.3°C respectively) and the trend matched that of the first recording period. The standard deviation (sd) has also been calculated for each trace to provide a description of the variability of the results at each point. Again, a clear pattern is evident with the greatest variability occurring in surface water temperatures and decreasing with depth. For instance, during both surveys at site 1, the sd of the streamwater was in the range 0.719-0.786, decreasing through the substrate to 0.380-0.391 at -10 cm, 0.219-0.254 at -35 cm and 0.119 at -60 cm.

From the results it is clear that the most notable difference occurs between the traces from sites 2 and 3 and those from sites 5 and 6. The first surveys from sites 2 and 3 exhibit a similar pattern in that the peaks and troughs in the surface water temperature can be traced down through the gravel with a timelag and buffered response. These results are characterised by only a small decrease in average temperature with depth (*i.e.* 1°C at site 2 and 0.3°C at site 3) but a much greater decrease in the sd (*i.e.* from 0.983 to 0.154 at site 2 and from 1.058 to 0.501 at site 3). The sd values show a similar decrease for the first surveys at sites 5 and 6 (*i.e.* from 0.706 to 0.277 at site 5 and from 0.856 to 0.161 at site 6). However, in contrast to sites 2 and 3 the average temperature of the intragravel water is clearly lower (as shown in figures C.20a and C.21a), with values 2.1°C less than surface water at site 5 and 3.3°C lower at site 6.

The temperature profiles from sites 2 and 3 confirm the influent nature of the channel there and suggest intragravel water is moving directly down through the substrate at those points. Sites

Table C.4a. - Summary of temperature results for each site during the first survey.

| Site No. | Date Started | Vert. Dist. From Bed (cm) | No.of Data Points | Average Temp. °C | Standard Deviation | Min. Temp. °C | Max. Temp. °C |
|---|---|---|---|---|---|---|---|
| 1. | 9/10/91 | +15 | 182 | 14.1 | .719 | 13.0 | 15.6 |
| | " | -10 | " | 13.4 | .391 | 13.0 | 14.2 |
| | " | -35 | " | 12.1 | .254 | 11.5 | 12.4 |
| | " | -60 | " | 11.9 | .119 | 11.6 | 12.0 |
| 2. | 17/7/91 | +15 | 289 | 17.2 | .983 | 15.3 | 19.0 |
| | " | -10 | " | 17.0 | .498 | 16.1 | 17.9 |
| | " | -35 | " | 16.6 | .264 | 16.2 | 17.0 |
| | " | -60 | " | 16.2 | .154 | 16.0 | 16.5 |
| 3. | 8/8/91 | +15 | 289 | 17.9 | 1.058 | 16.0 | 19.8 |
| | " | -10 | " | 17.6 | .751 | 16.1 | 19.0 |
| | " | -35 | " | 17.9 | .638 | 16.9 | 18.9 |
| | " | -60 | " | 17.6 | .501 | 16.6 | 18.2 |
| 4. | 14/6/91 | +15 | 289 | 13.0 | .409 | 12.1 | 13.8 |
| | " | -10 | " | 12.9 | .097 | 12.6 | 13.0 |
| | " | -35 | " | 12.7 | .154 | 12.4 | 12.9 |
| | " | -60 | " | 11.8 | .116 | 11.6 | 12.0 |
| 5. | 14/8/91 | +15 | 289 | 18.1 | .706 | 16.5 | 19.3 |
| | " | -10 | " | 17.7 | .587 | 16.5 | 18.8 |
| | " | -35 | " | 17.0 | .248 | 16.3 | 17.3 |
| | " | -60 | " | 16.0 | .277 | 15.4 | 16.3 |
| 6. | 26/7/91 | +15 | 289 | 18.3 | .856 | 17.1 | 20.2 |
| | " | -10 | " | 18.3 | .839 | 17.0 | 20.0 |
| | " | -35 | " | 16.6 | .326 | 16.0 | 17.1 |
| | " | -60 | " | 15.0 | .161 | 14.7 | 15.3 |

Table C.4b. - Summary of temperature results for each site during the second survey.

| Site No. | Date Started | Vert. Dist. From Bed(cm) | No.of Data Points | Average Temp. °C | Standard Deviation | Min. Temp. °C | Max. Temp. °C |
|---|---|---|---|---|---|---|---|
| 1. | 14/11/91 | +15 | 289 | 4.3 | .786 | 2.8 | 5.9 |
| | " | -10 | " | 5.9 | .380 | 5.1 | 6.4 |
| | " | -35 | " | 7.6 | .219 | 7.2 | 7.9 |
| | " | -60 | " | 8.7 | .119 | 8.5 | 9.0 |
| 2. | 17/10/91 | +15 | 289 | 7.4 | .751 | 6.1 | 9.0 |
| | " | -10 | " | 7.5 | .570 | 6.5 | 8.8 |
| | " | -35 | " | 7.0 | .330 | 6.3 | 7.8 |
| | " | -60 | " | 7.5 | .504 | 6.8 | 8.5 |
| 3. | 23/10/91 | +15 | 289 | 10.5 | .332 | 10.0 | 11.1 |
| | " | -10 | " | 10.2 | .284 | 9.7 | 10.7 |
| | " | -35 | " | 9.4 | .362 | 8.7 | 10.0 |
| | " | -60 | " | 9.3 | .390 | 8.6 | 9.9 |
| 4. | 28/10/91 | +15 | 289 | 11.3 | .544 | 10.3 | 12.6 |
| | " | -10 | " | 11.0 | .362 | 10.2 | 11.8 |
| | " | -35 | " | 11.0 | .094 | 10.8 | 11.1 |
| | " | -60 | " | 10.9 | .083 | 10.8 | 11.0 |
| 5. | 3/11/91 | +15 | 289 | 6.6 | .896 | 5.5 | 8.2 |
| | " | -10 | " | 6.5 | .396 | 5.8 | 7.2 |
| | " | -35 | " | 8.5 | .174 | 8.2 | 8.8 |
| | " | -60 | " | 9.5 | .092 | 9.4 | 9.7 |
| 6. | 7/11/91 | +15 | 289 | 6.8 | 1.082 | 5.1 | 8.8 |
| | " | -10 | " | 6.8 | .811 | 5.5 | 8.0 |
| | " | -35 | " | 8.7 | .298 | 8.2 | 9.2 |
| | " | -60 | " | 9.7 | .184 | 9.3 | 9.9 |

5 and 6 are situated downstream of Greatford where the hydrological surveys indicated the channel experiences effluent conditions. As described above, the temperature profiles from these sites are subtly different from sites 2 and 3 and two factors can be extracted to provide evidence of the origin of the upwelling water. Firstly, at -60 cm there is a definite diurnal variation which suggests that intragravel water has a surface rather than deep groundwater origin. However, the greater difference between surface and intragravel temperatures indicates that this intragravel water is fed into the substrate some distance upstream rather than in the immediate locale as with sites 2 and 3.

### C.5.5 Summary Of Temperature Survey Results

Hydrological surveys had established the interactive nature between surface and intragravel water along the lower reach of the West Glen. Sites 2 and 3 were selected because of the influent nature of the channel and temperature profiles shown in figures C.16a and b and C.17a reiterate the surface origin of the intragravel water. Sites 5 and 6 were located in the reach that had been shown to experience effluent conditions. The traces for these sites in figures C.19 and C.20 highlight important differences than those described above. In these four cases, intragravel temperatures are not as responsive to surface water temperature changes although a definite diurnal variation is exhibited by the traces. This suggests that the intragravel water originates from surface water infiltrating into the substrate some distance upstream rather than at that immediate point as with sites 2 and 3. Consequently, water entering the stream along the stretch of the West Glen below Greatford is likely to have originated from surface water draining from the channel upstream and not the upwelling of deeper groundwater. Indeed, none of the sites exhibited the temperature profiles that would be expected from a site with direct upwelling from deeper groundwater. Table C.5 below summarises the nature of each site.

Table C.5. - Summary of influent/effluent conditions for each site.

| Site No. | Nature of Channel |
|---|---|
| 1 | Influent |
| 2 | Influent |
| 3 | Influent |
| 4 | Effluent |
| 5 | Effluent |
| 6 | Effluent |

## C.6 References


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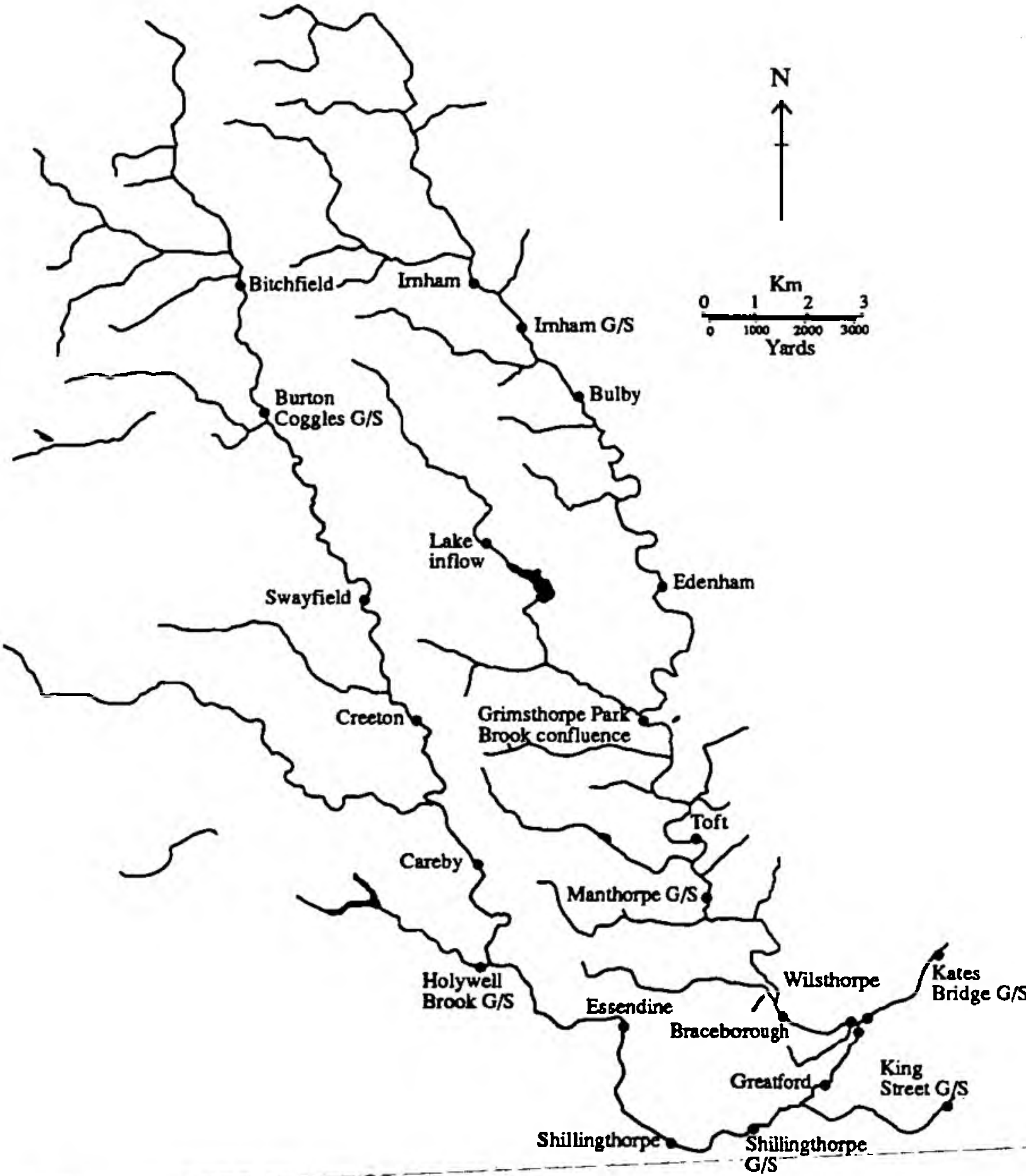



Figure C.1. - Location of the flow monitoring sites within the Glen catchment

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25/10/90 | .0006 | .0010 | 0 | 0 | .0366 | 0 | .0151 | 0 | 0 | 0 | .0025 | .0002 | .0027 | .0100 | .0130 |
| 28/11/90 | .0051 | .0080 | 0 | .0001 | .0194 | 0 | .0138 | 0 | 0 | 0 | .0043 | 0 | .0043 | .0080 | .0100 |
| 19/12/90 | .0038 | .0050 | 0 | .0002 | .0217 | 0 | .0168 | 0 | 0 | 0 | .0047 | .0001 | .0048 | .0110 | .0150 |
| 25/1/91 | .0601 | .0740 | .0078 | .0055 | .0360 | .0200 | .0493 | .0218 | .0470 | .0386 | .0758 | .0343 | .1101 | .1820 | .0110 |
| 1/3/91 | .6120 | .5670 | .6745 | .6774 | .9019 | .0540 | 1.0247 | 1.0642 | .9840 | 1.3823 | n/a | n/a | n/a | 3.1070 | .0330 |
| 7/4/91 | .0329 | .0250 | 0 | .0219 | .0647 | .0740 | .1326 | .1097 | .1320 | .1056 | .2596 | .3395 | .5991 | .4850 | .0320 |
| 26/4/91 | .0061 | .0090 | 0 | .0077 | .0461 | .0720 | .1038 | .0702 | .1090 | .0913 | .0782 | .2334 | .3116 | .2890 | .0250 |
| 28/5/91 | .0028 | .0030 | 0 | .0025 | .0582 | .0640 | .1257 | .1839 | .1470 | .1428 | .1492 | .0978 | .2470 | .2160 | .0300 |
| 1/7/91 | .0020 | .0030 | 0 | .0020 | .0265 | .0430 | .0745 | .1162 | .1130 | .0844 | .1168 | .0056 | .1224 | n/a | .0120 |
| 29/7/91 | .0002 | 0 | 0 | .0011 | .0217 | .0340 | .0501 | .1326 | .1380 | .0970 | .1116 | .0003 | .1119 | n/a | .0320 |
| 27/8/91 | .0001 | 0 | 0 | .0001 | .0160 | .0300 | .0333 | .1484 | .1500 | .1070 | .1183 | .0006 | .1189 | .1460 | .0320 |
| 27/9/91 | 0 | 0 | 0 | n/a | .0264 | .0130 | .0180 | .1454 | .1340 | .1045 | .1135 | .0005 | .1140 | .1340 | .0190 |
| 30/10/91 | .0061 | .0020 | 0 | .0002 | .0335 | .0120 | .0308 | .0962 | .0730 | .0900 | .0993 | .0004 | .0997 | .0990 | .0080 |
| 25/11/91 | .0100 | .0110 | 0 | .0002 | .0131 | .0190 | .0257 | .0046 | .0110 | .0184 | .0250 | .0001 | .0251 | .0490 | .0110 |

n/a - not available

Table C.1. - Results of the West Glen discharge surveys (figures shown are in cumecs)

| Date | Bitchfield - SK985285 | Burton Coggles G/S - SK987261 | Swayfield - TF007223 | Creeton - TF015195 | Careby - TF025166 | Holywell Brook G/S - TF026148 | Essendine - TF051135 | Shillingthorpe - TF058111 | Shillingthorpe G/S - TF074112 | Greatford - TF088121 | Confluence (U/S) - TF095132 | East Glen (U/S) - TF095133 | Wilsthorpe - TF096133 | Kates Bridge G/S - TF106147 | King Street G/S - TF109106 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15/1/90 | .0625 | .0690 | .0242 | .0227 | .0631 | .0590 | .0987 | .0838 | .1210 | .1182 | .1185 | .0724 | .1909 | .1800 | .0530 |
| 15/3/90 | .0310 | .0370 | .0155 | .0505 | .1257 | .1790 | .3206 | .3129 | .3910 | .3880 | .3773 | .5561 | .9334 | .9910 | .0700 |
| 25/5/90 | .0008 | .0010 | 0 | .0066 | .0592 | .0970 | .1630 | .1437 | .1380 | .1053 | .1209 | .0458 | .1667 | .1850 | .0200 |
| 21/6/90 | .0003 | .0010 | 0 | .0017 | .0603 | .0760 | .1241 | .0694 | .1050 | .0532 | .0617 | .0093 | .0710 | .1010 | .0340 |
| 27/7/90 | 0 | 0 | 0 | .0005 | .0309 | .0160 | .0437 | .0204 | .0270 | .0043 | .0031 | .0002 | .0033 | .0050 | .0270 |
| 22/8/90 | .0001 | 0 | 0 | .0011 | .0230 | .0140 | .0407 | .0098 | .0020 | .0023 | .0049 | .0001 | .0050 | .0040 | .0320 |
| 25/9/90 | .0007 | 0 | 0 | .0002 | .0189 | .0050 | .0220 | .0034 | 0 | 0 | .0026 | .0001 | .0027 | .0050 | 0 |

Table C.2. - Results of the East Glen discharge surveys (figures shown are in cumecs)

| Date | Irnham G/S - TF038273 | Irnham - TF029282 | Bulby - TF048259 | Edenham (U/S) - TF062221 | Grimsthorpe Lake Input - TF030232 | Grimsthpe. Pk. Bk. Conf. - TF058193 | Toft - TF067171 | Manthorpe G/S - TF068159 | Braceborough - TF081136 | Confluence (U/S) - TF095133 | West Glen (U/S) - TF095132 | Wilsthorpe - TF096133 | Kates Bridge G/S - TF106147 | King Street G/S - TF109106 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 18/1/90 | .0459 | .0560 | .0541 | .0767 | .0183 | .0783 | .0559 | .0430 | .0414 | n/a | n/a | n/a | .2010 | .0460 |
| 14/3/90 | .0529 | .0610 | .0611 | .0880 | .0219 | .1161 | .1111 | .1200 | .5223 | .5078 | .3109 | .8187 | .9730 | .0510 |
| 24/5/90 | .0033 | .0030 | .0036 | .0071 | .0020 | .0089 | 0 | 0 | .0766 | .0602 | .1247 | .1849 | .1860 | .0340 |
| 22/6/90 | .0158 | .0080 | .0057 | .0026 | .0022 | 0 | 0 | 0 | .0566 | .0365 | .0829 | .1194 | .1130 | .0330 |
| 27/7/90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0001 | .0002 | .0031 | .0033 | .0050 | .0270 |
| 22/8/90 | .0032 | .0010 | .0003 | 0 | 0 | 0 | 0 | 0 | <.0001 | .0001 | .0049 | .0050 | .0040 | .0320 |
| 25/9/90 | .0048 | .0040 | .0009 | 0 | 0 | 0 | 0 | 0 | <.0001 | .0001 | .0026 | .0027 | .0050 | 0 |
| 25/10/90 | .0029 | .0050 | .0021 | .0003 | .0016 | 0 | 0 | 0 | <.0001 | .0002 | .0025 | .0027 | .0100 | .0130 |
| 28/11/90 | .0136 | .0170 | .0141 | .0218 | .0130 | 0 | 0 | 0 | <.0001 | 0 | .0043 | .0043 | .0080 | .0100 |
| 19/12/90 | .0100 | .0120 | .0080 | .0144 | .0130 | 0 | 0 | 0 | <.0001 | .0001 | .0047 | .0048 | .0110 | .0150 |
| 25/1/91 | .0760 | .0790 | .0783 | .1316 | .0347 | .1057 | .0853 | .0620 | .0429 | .0343 | .0758 | .1101 | .1820 | .0110 |
| 1/3/91 | .6772 | .5810 | .9325 | 1.1932 | .1692 | 1.7592 | 1.8293 | 1.4480 | 2.0313 | n/a | n/a | n/a | 3.1070 | .0330 |
| 7/4/91 | .0366 | .0370 | .0431 | .0690 | .0121 | .0469 | .0204 | .0240 | .1903 | .3395 | .2596 | .5991 | .4850 | .0320 |
| 26/4/91 | .0114 | .0150 | .0163 | .0240 | .0049 | .0258 | .0023 | 0 | .1472 | .2334 | .0782 | .3116 | .2890 | .0250 |
| 28/5/91 | .0104 | .0080 | .0051 | .0179 | .0015 | .0144 | 0 | 0 | .0977 | .0978 | .1492 | .2470 | .2160 | .0300 |
| 1/7/91 | .0090 | .0120 | .0095 | .0337 | .0088 | .0313 | 0 | 0 | .0138 | .0056 | .1168 | .1224 | n/a | .0120 |
| 29/7/91 | .0005 | 0 | 0 | 0 | .0001 | 0 | 0 | 0 | 0 | .0003 | .1116 | .1119 | n/a | .0320 |
| 27/8/91 | .0002 | .0010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0006 | .1183 | .1189 | .1460 | .0320 |
| 27/9/91 | 0 | .0040 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | .0005 | .1135 | .1140 | .1340 | .0190 |
| 30/10/91 | .0055 | .0090 | .0051 | .0024 | .0059 | 0 | 0 | 0 | 0 | .0004 | .0993 | .0997 | .0990 | .0080 |
| 25/11/91 | .0242 | .0200 | .0242 | .0319 | .0107 | .0211 | 0 | 0 | 0 | .0001 | .0250 | .0251 | .0490 | .0110 |

n/a - not available

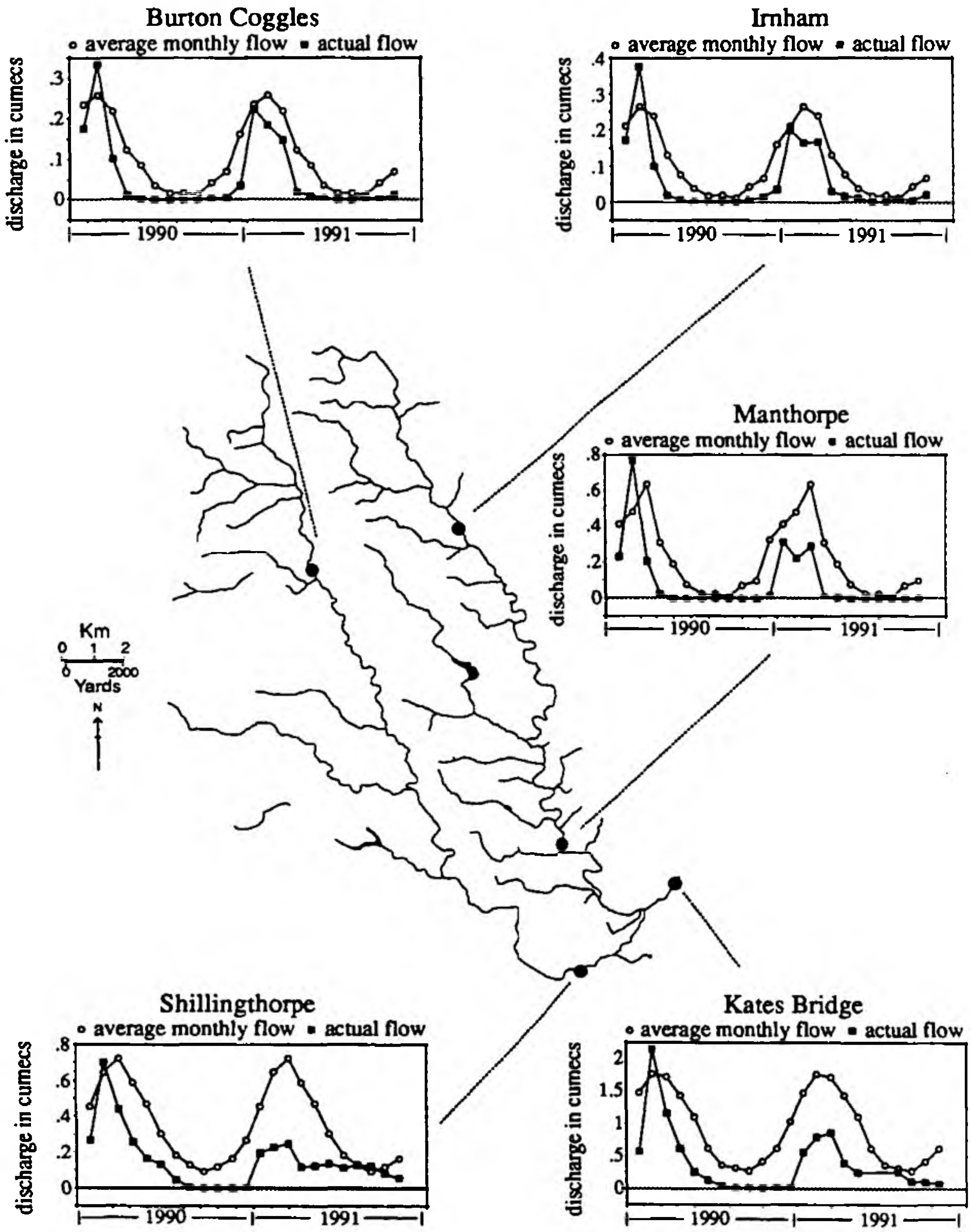



Figure C.2. - Long term average monthly flows (∘) and actual recorded (▪) flows during 1990 and 1991 for the five main river gauging stations.

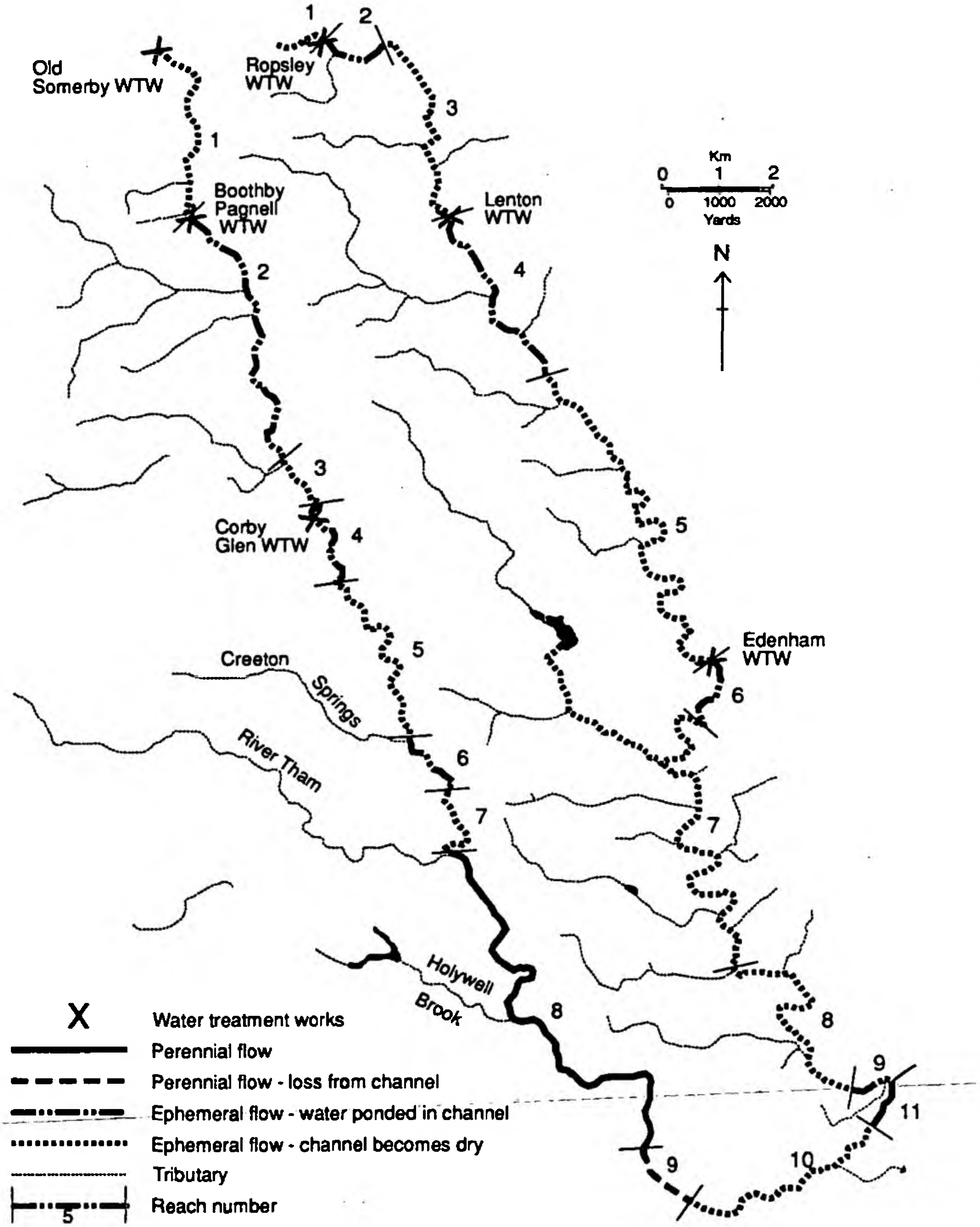



Figure C.3. - Map of West and East Glen split into distinct reaches based on the nature of the channel during low flow.

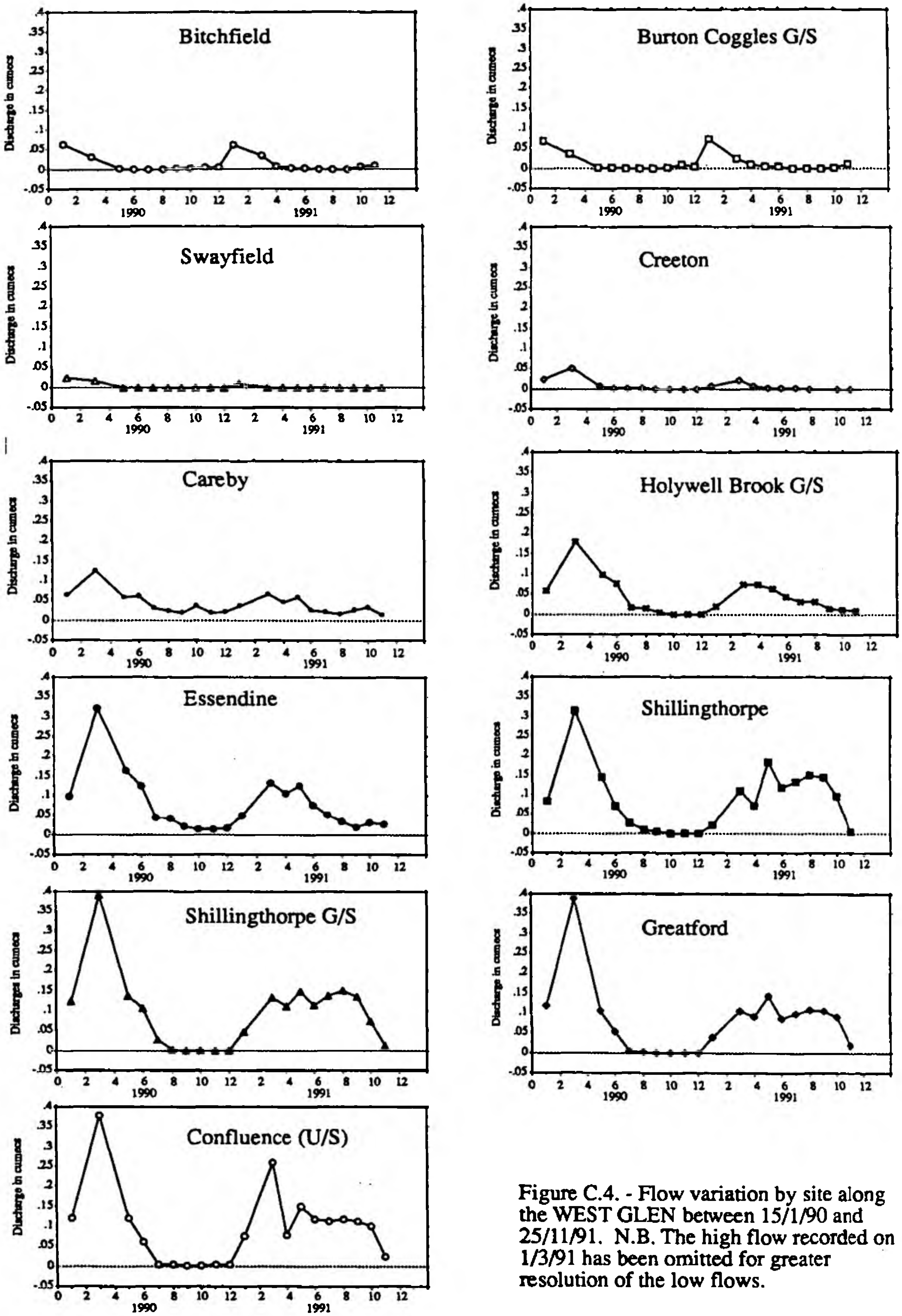



Figure C.4. - Flow variation by site along the WEST GLEN between 15/1/90 and 25/11/91. N.B. The high flow recorded on 1/3/91 has been omitted for greater resolution of the low flows.

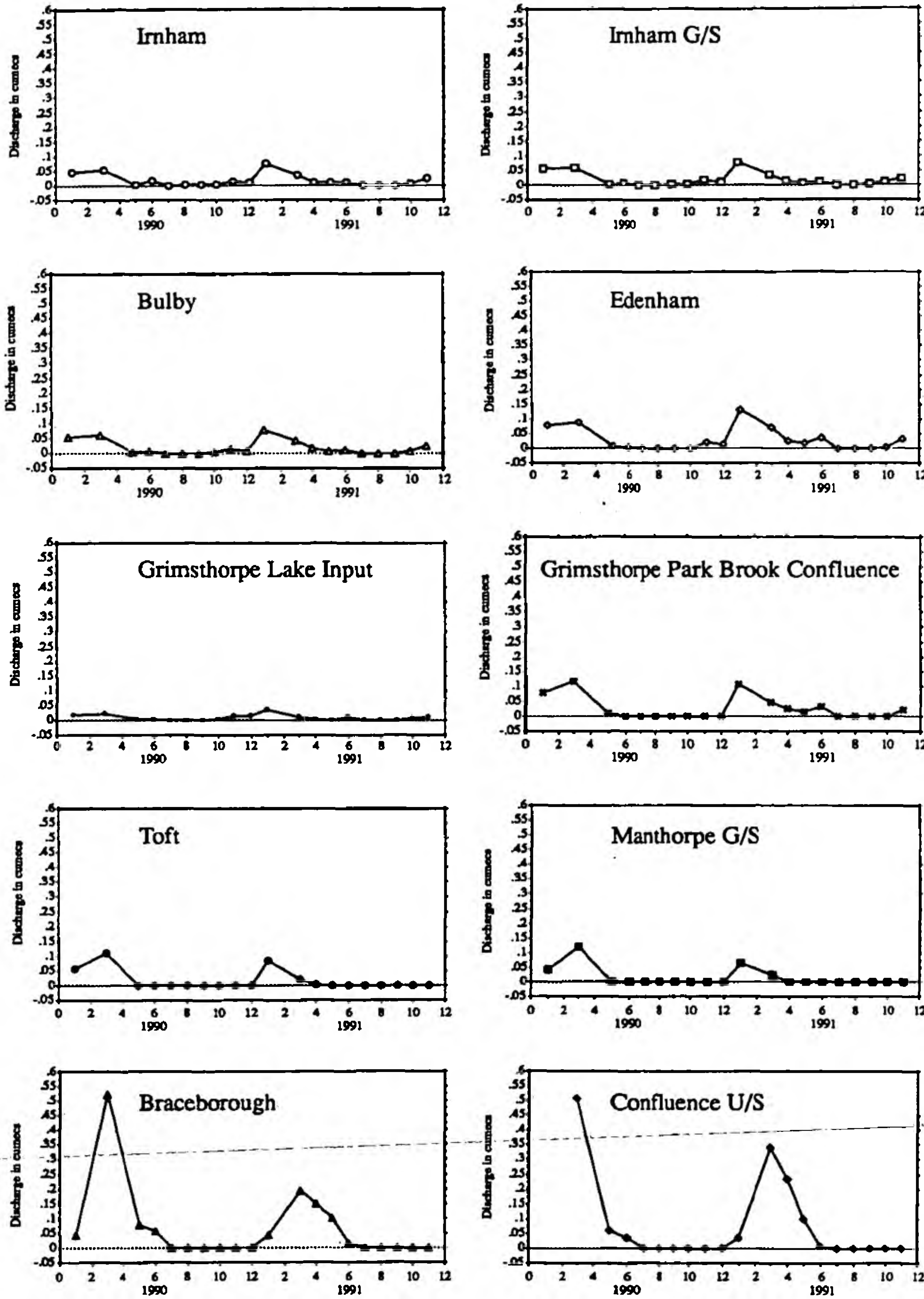



Figure C.5. - Flow variation by site along the EAST GLEN between 15/1/90 and 25/11/91.
N.B. The high flow recorded on 1/3/91 has been omitted for greater resolution of low flows.

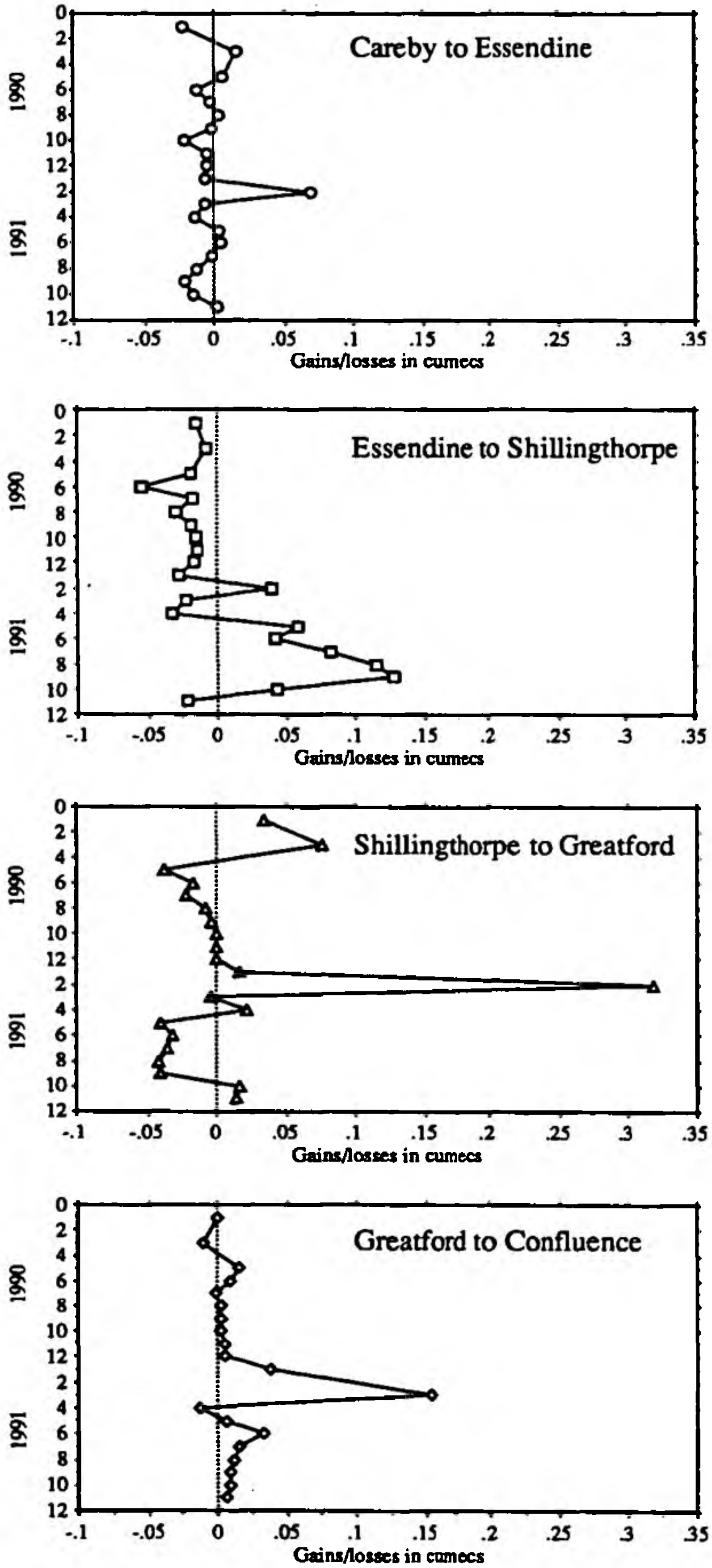



Figure C.6 - Gains/losses along selected reaches of the WEST GLEN.

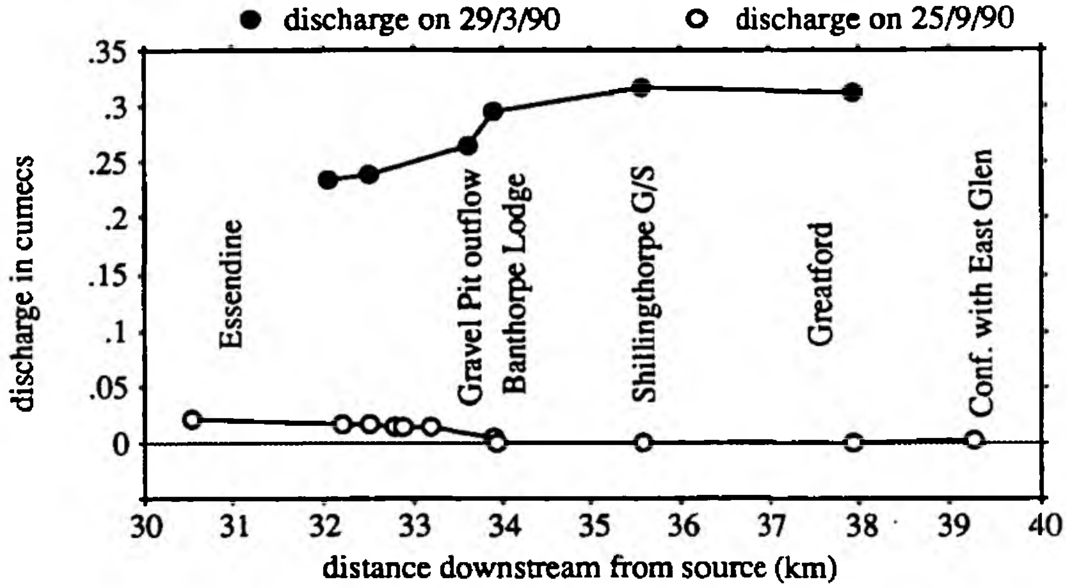



Figure C.7. - Downstream flow variations on the lower West Glen on the 29/3/90 and 25/9/90.

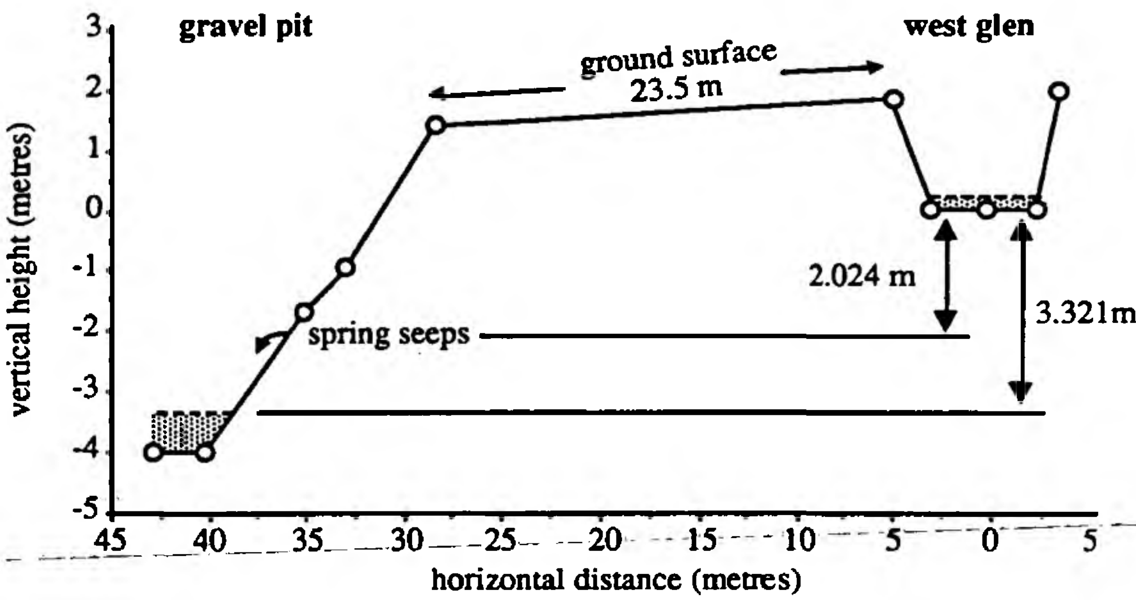
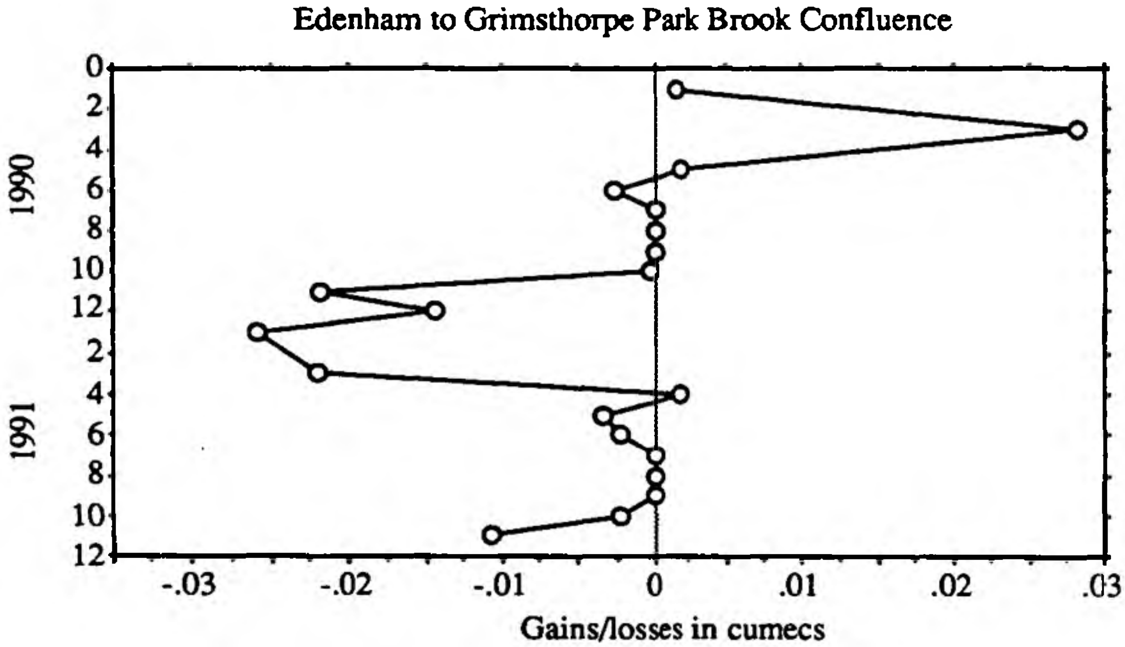



Figure C.8. - Cross-section between the West Glen upstream of Banthorpe Lodge and the gravel pit



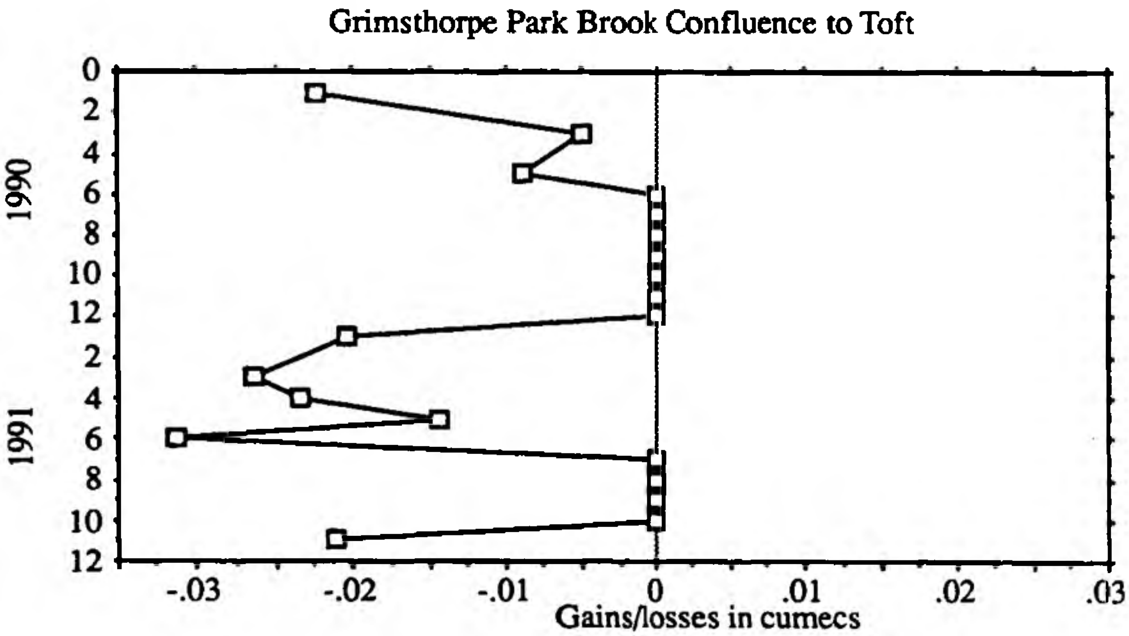




Figure C.9. - Gains/losses along selected reaches of the EAST GLEN.

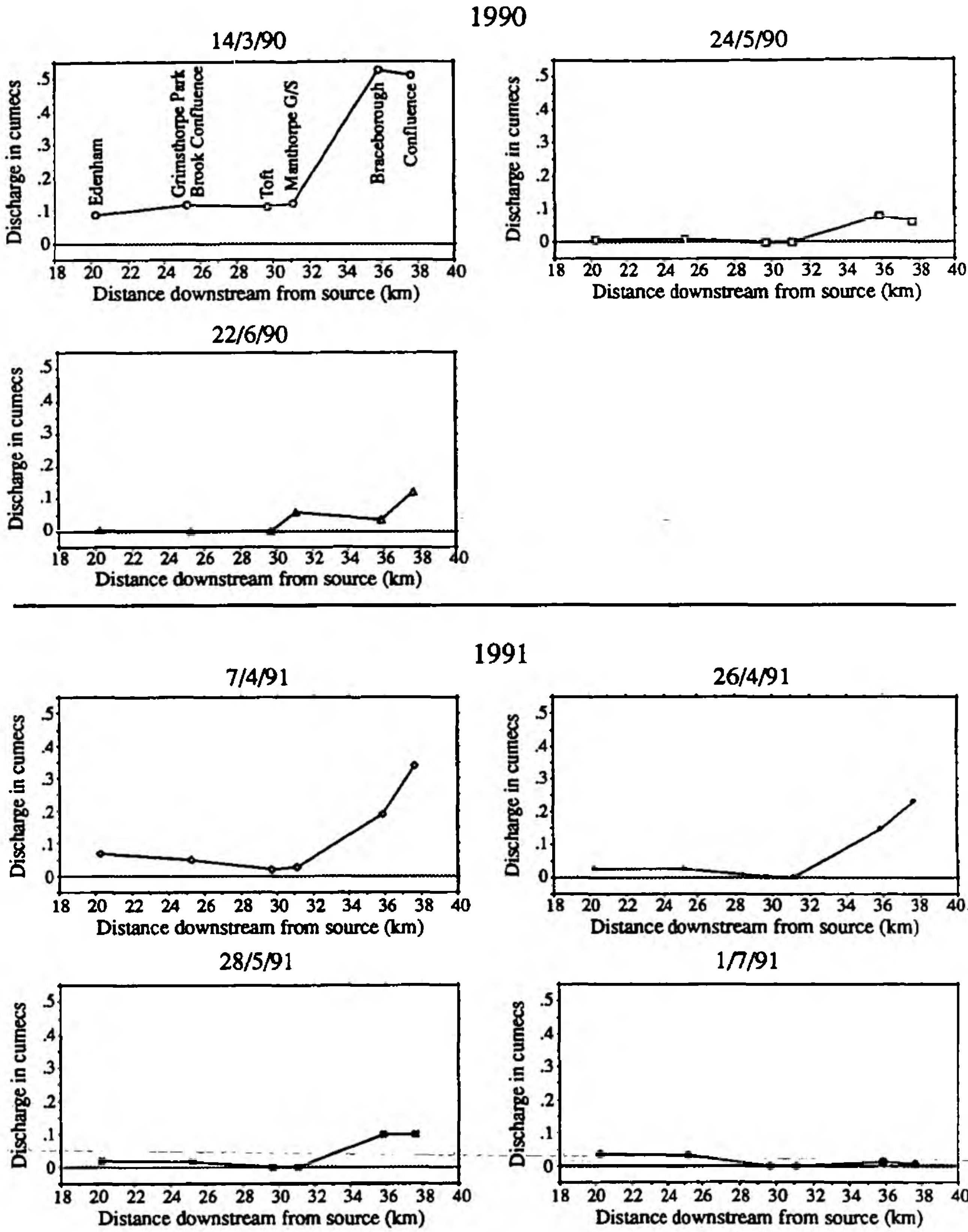



Figure C.10 - Downstream flow variations in discharge on the East Glen between Edenham and the West Glen confluence during selected periods in 1990 and 1991. The graphs highlight the increases in flow between Manthorpe G/S and Braceborough and their rapid decline.

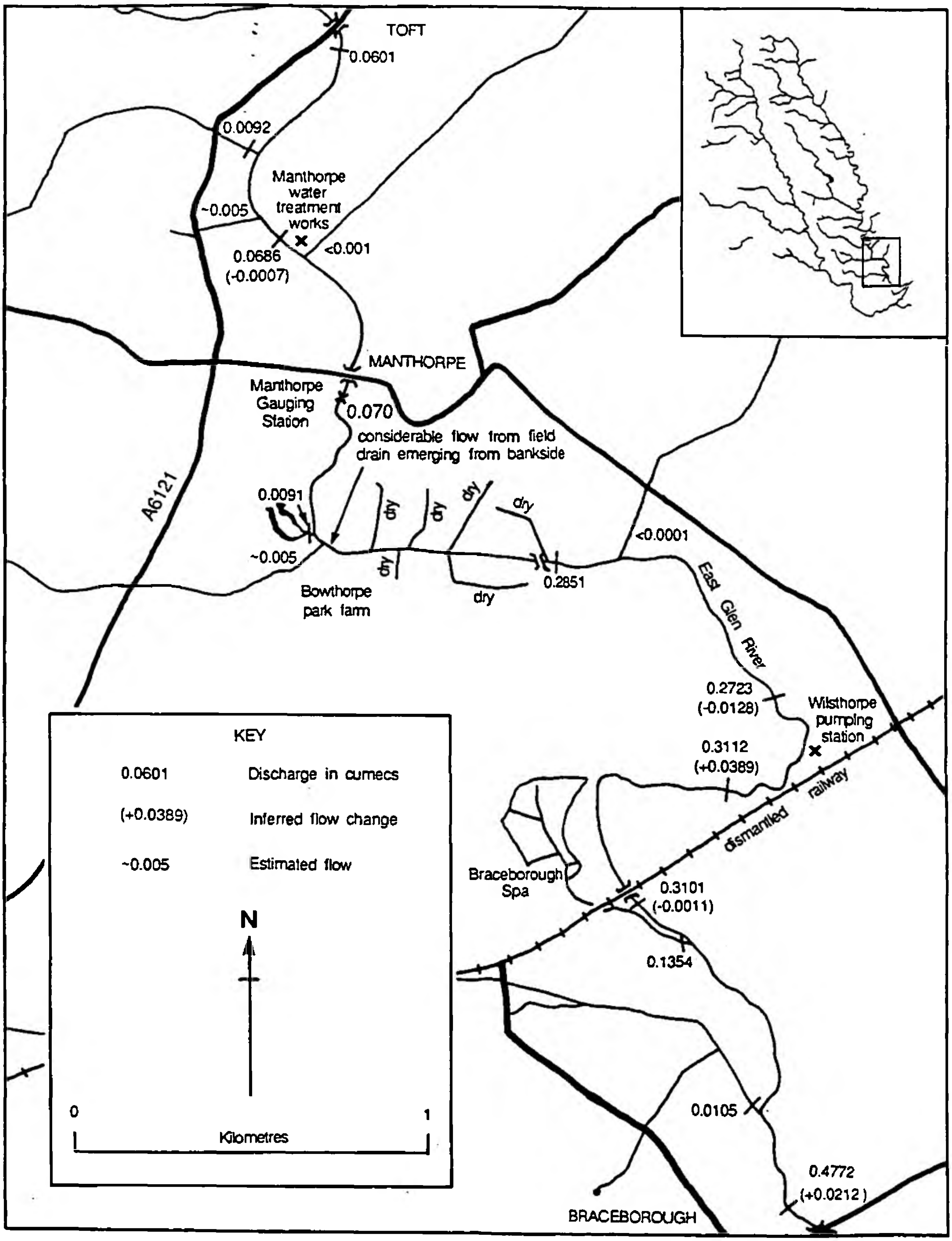
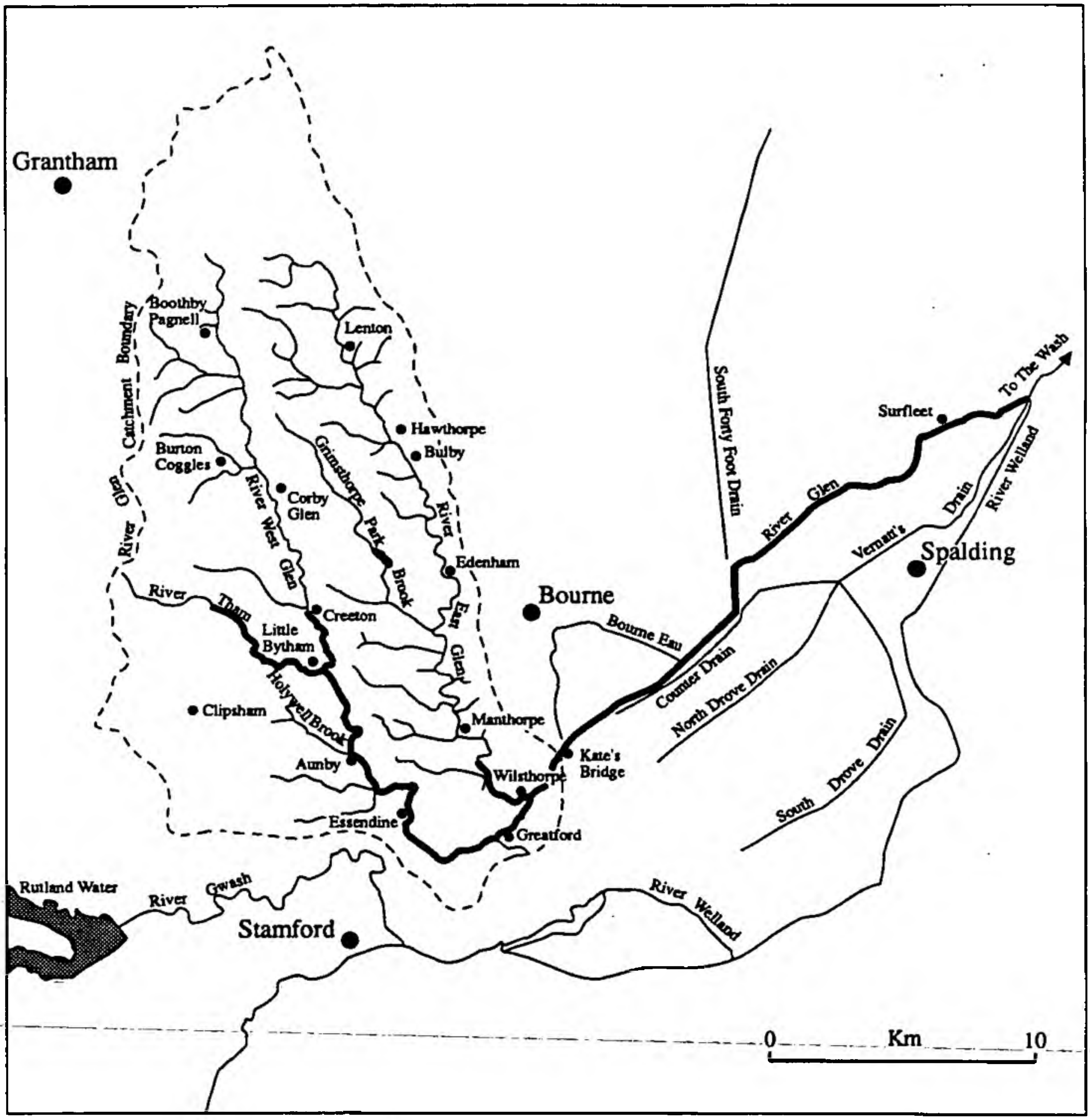



Figure C.11. - Results of the detailed gauging survey undertaken on the downstream section of the East Glen on 22/3/90




C.12 - The Glen catchment highlighting reaches with consistent flow

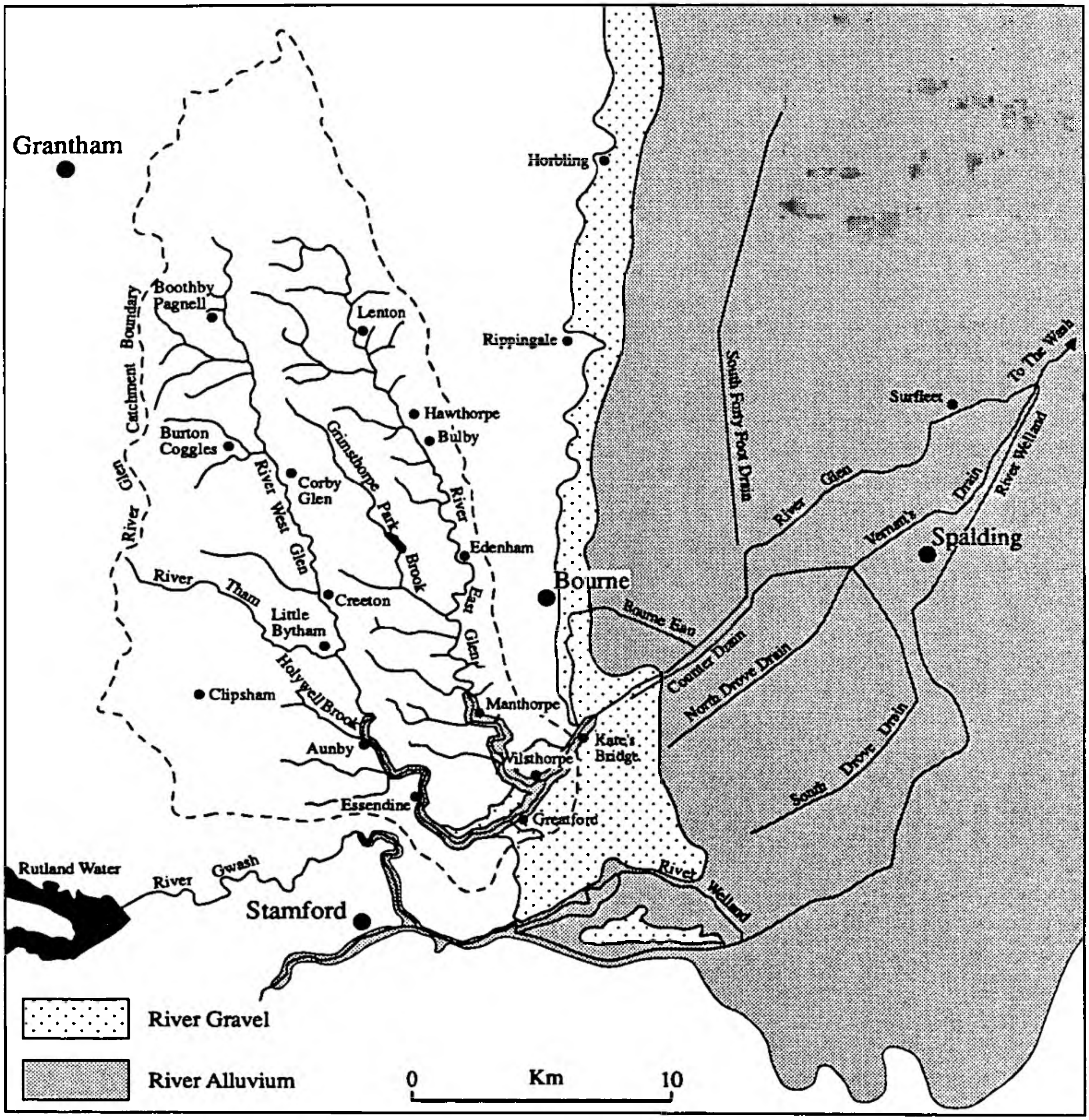



Figure C.13. - The Glen catchment highlighting the extent of alluvial gravels in the area

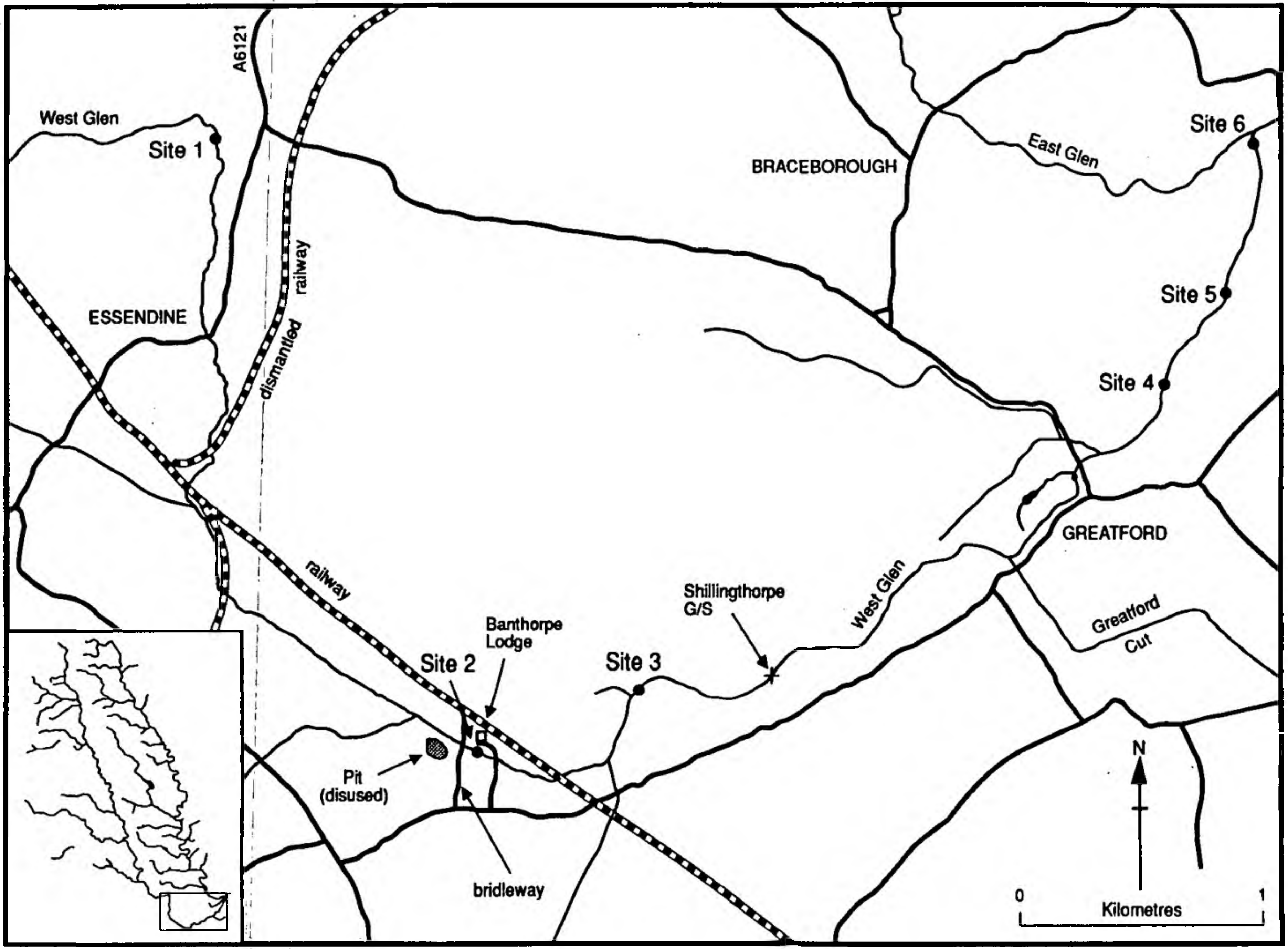



Figure C.15. - Location of sites used for the temperature surveys

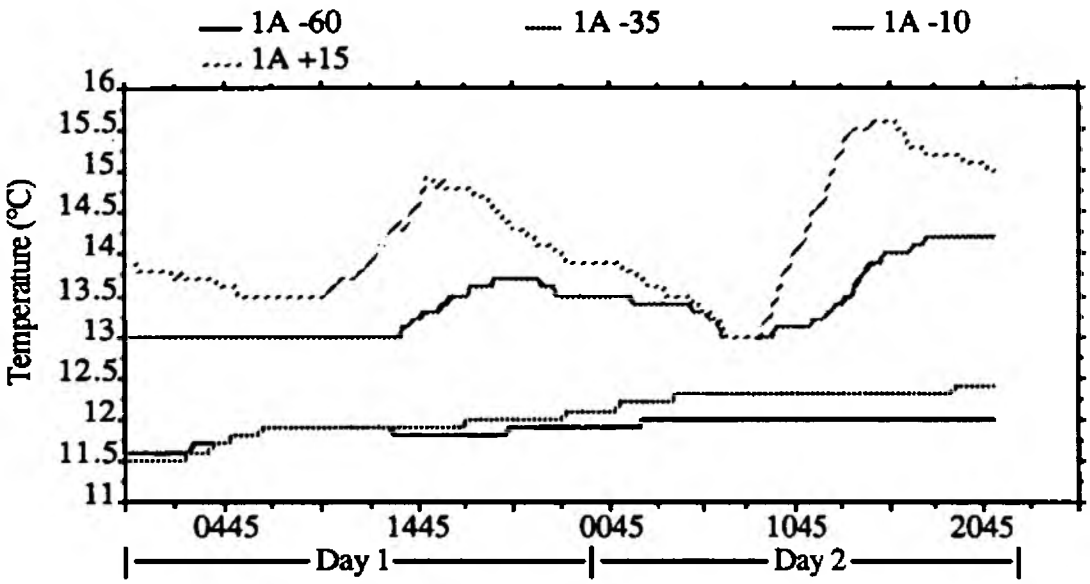



Figure C.16a - Temperature survey results for site 1. Day 1 = 9/10/91

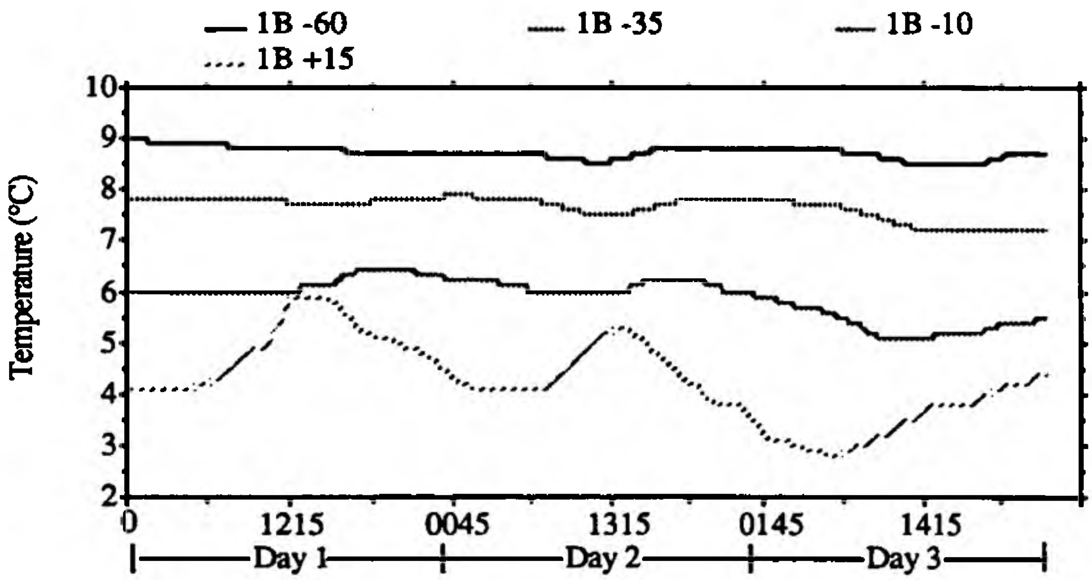



Figure C.16b - Temperature survey results for site 1. Day 1 = 14/11/91

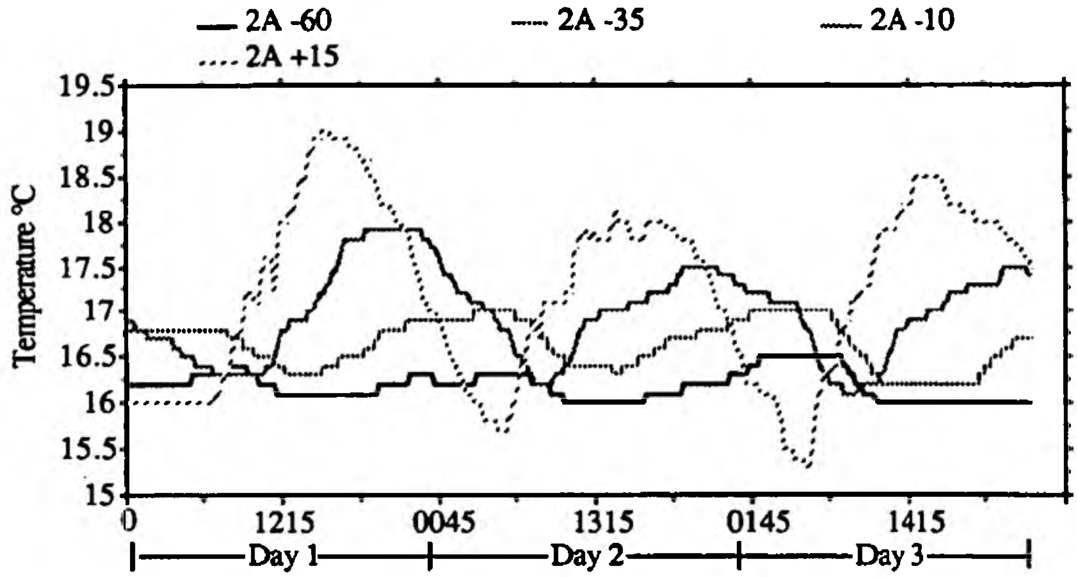



Figure C.17a - Temperature survey results for site 2. Day 1 = 17/7/91

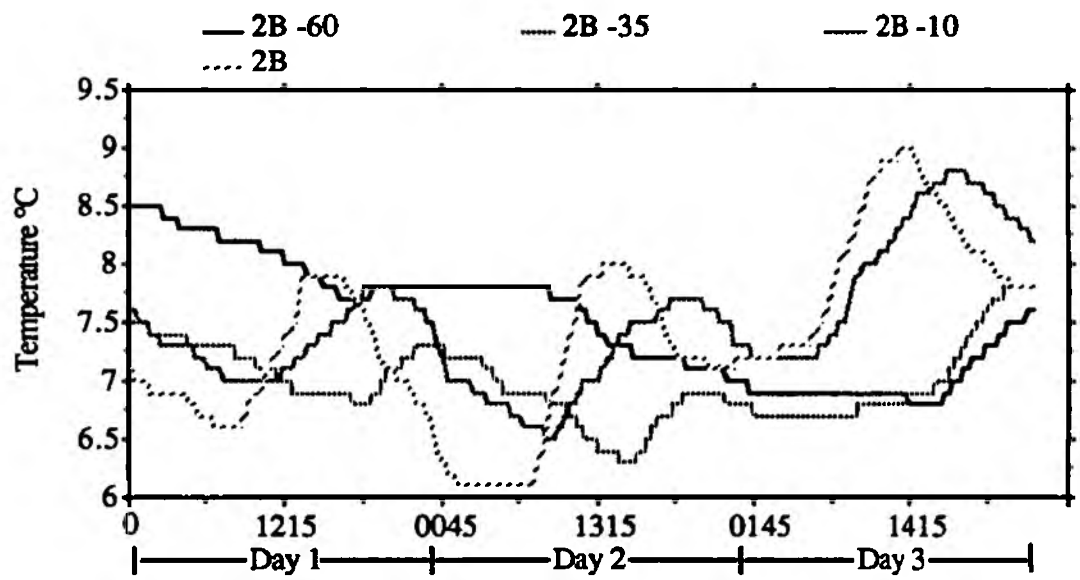



Figure C.17b - Temperature survey results for site 2. Day 1 = 17/10/91

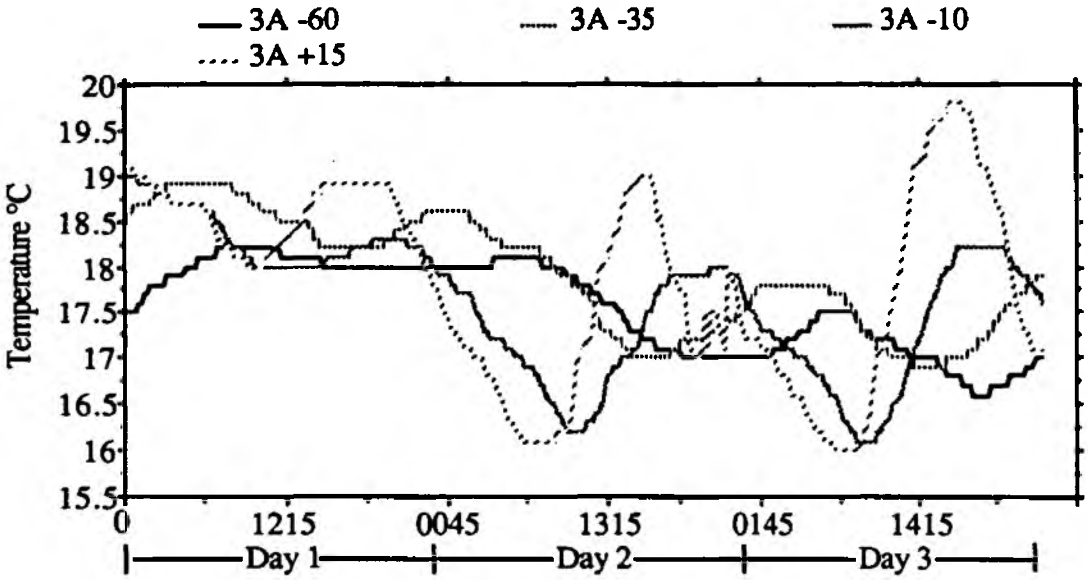



Figure C.18a - Temperature survey results for site 3. Day 1 = 8/8/91

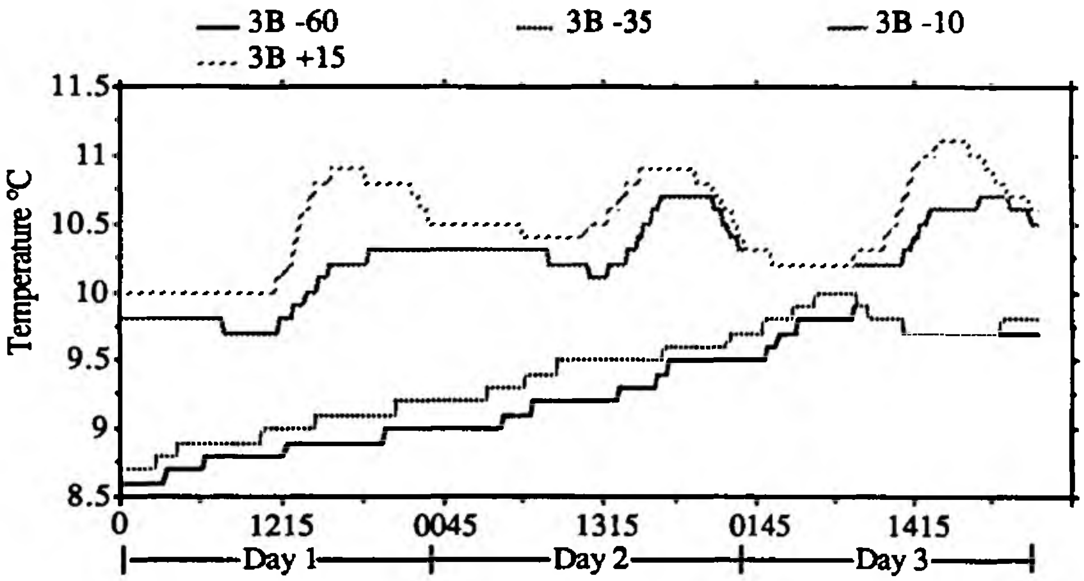



Figure C.18b - Temperature survey results for site 3. Day 1 = 23/10/91

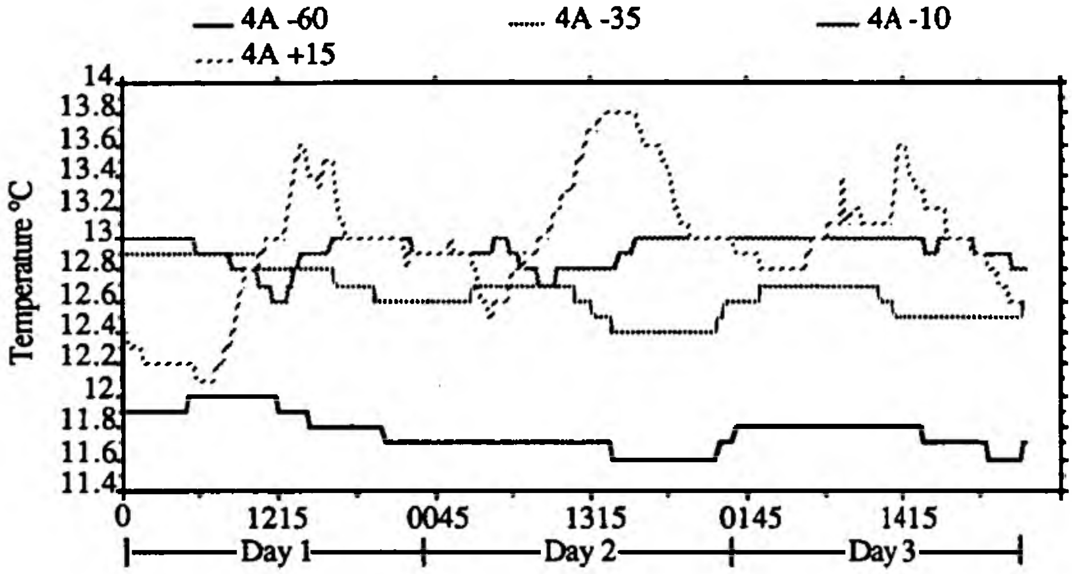



Figure C.19a - Temperature survey results for site 4. Day 1 = 14/6/91

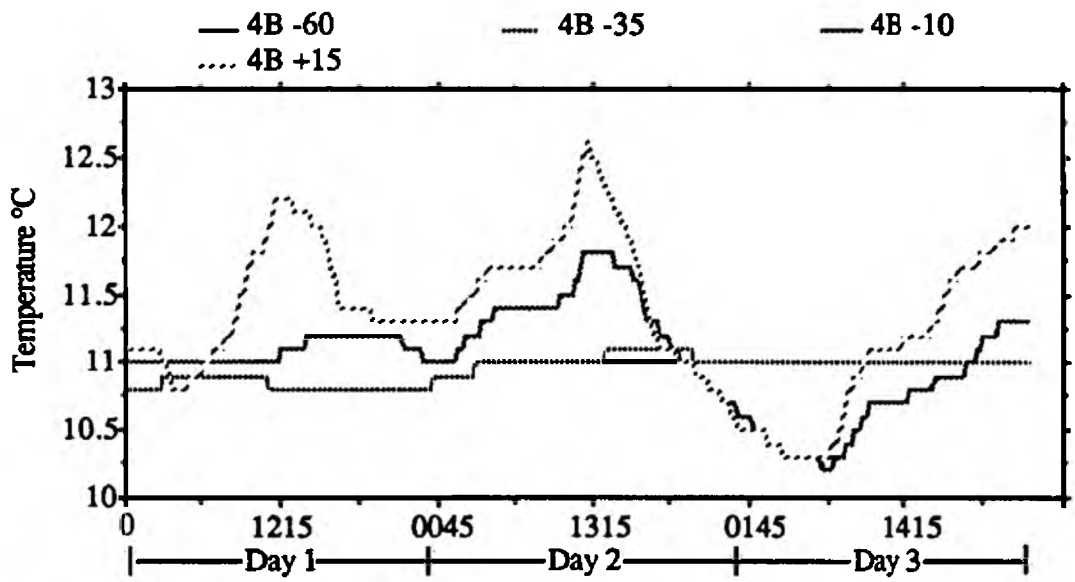



Figure C.19b - Temperature survey results for site 4. Day 1 = 28/10/91

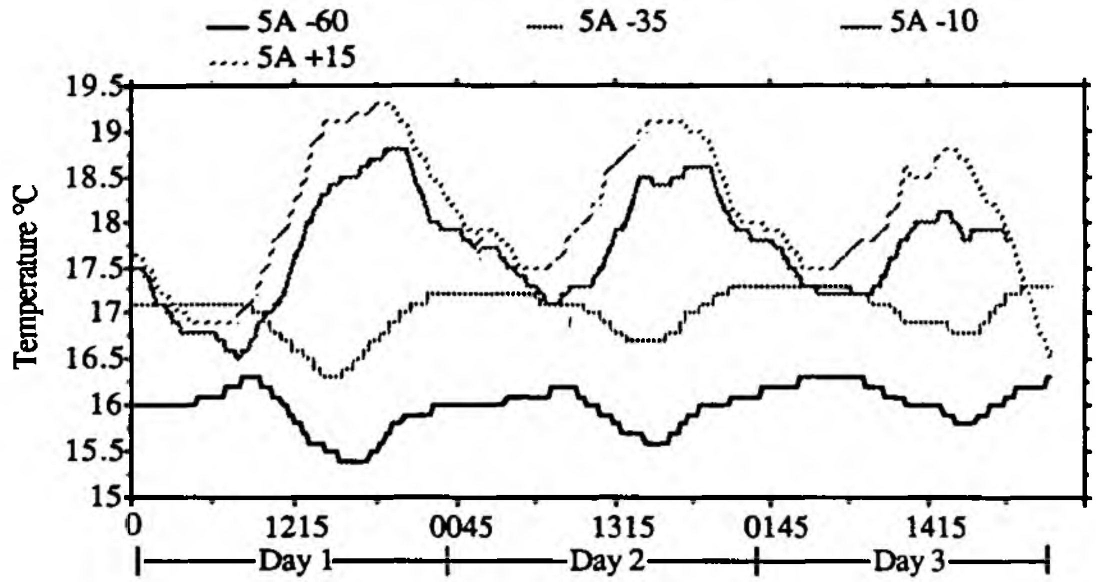



Figure C.20a - Temperature survey results for site 5. Day 1 = 14/8/91

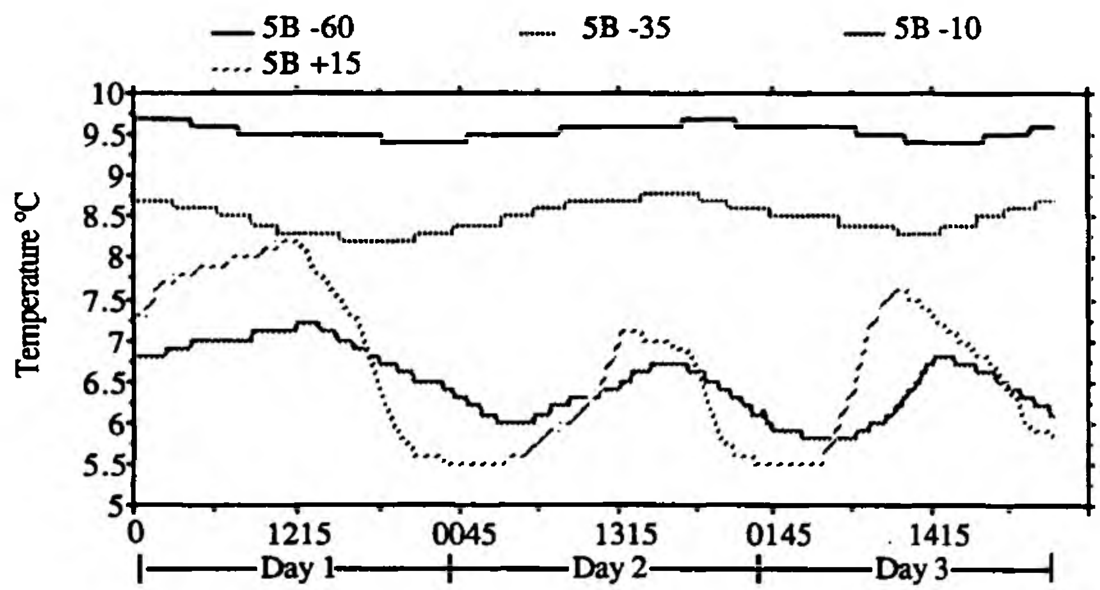



Figure C.20b - Temperature survey results for site 5. Day 1 = 3/11/91

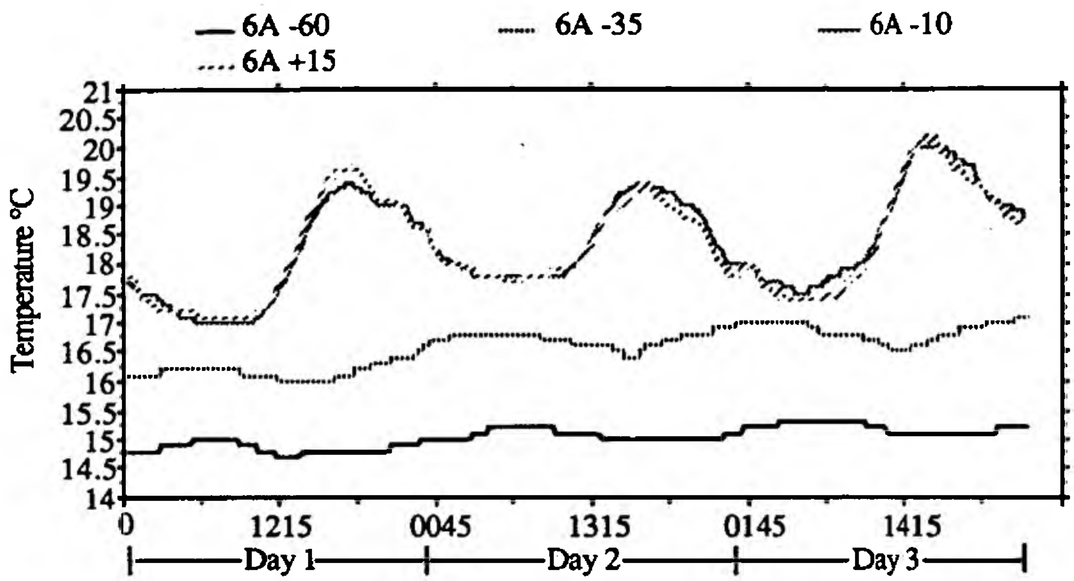



Figure C.21a - Temperature survey results for site 6. Day 1 = 26/7/91

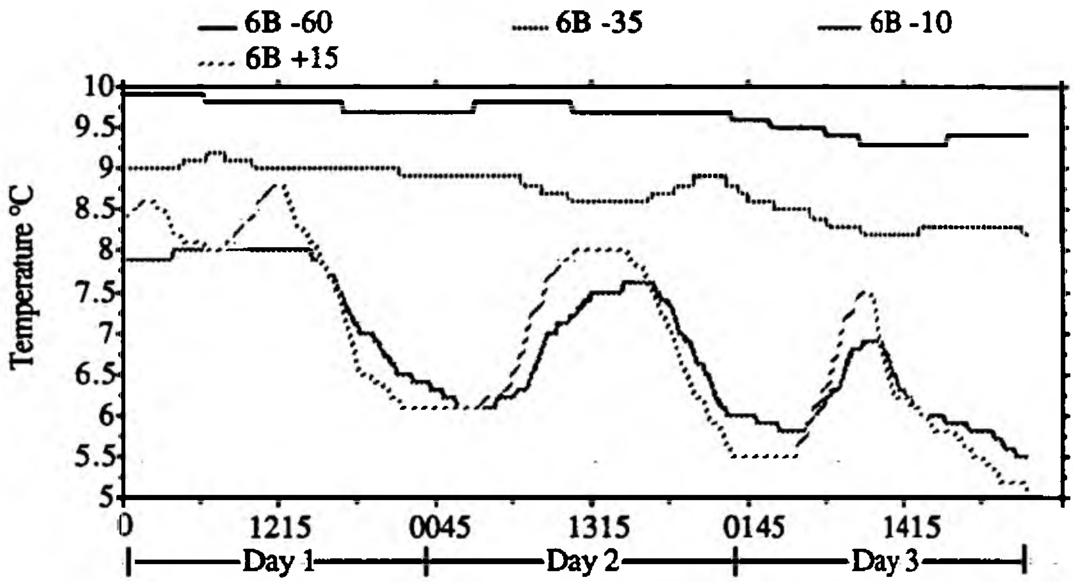



Figure C.21b - Temperature survey results for site 6. Day 1 = 7/11/91

## Appendix B  Temperature survey data

| time | day | 1A-60 | 1A-35 | 1A-10 | 1A+15 | 1B-60 | 1B-35 | 1B-10 | 1B+15 | 2A-60 | 2A-35 | 2A-10 | 2A+15 | 2B-60 | 2B-35 | 2B-10 | 2B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24hr clock | no. | | | | | | | | | | | | | | | | |
| 0:00 | 1 | 11.6 | 11.5 | 13.0 | 13.9 | 9.0 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.9 | 16.0 | 8.5 | 7.5 | 7.6 | 7.1 |
| 0:15 | 1 | 11.6 | 11.5 | 13.0 | 13.9 | 9.0 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.9 | 16.0 | 8.5 | 7.5 | 7.6 | 7.0 |
| 0:30 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 9.0 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.8 | 16.0 | 8.5 | 7.5 | 7.5 | 7.0 |
| 0:45 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 9.0 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.8 | 16.0 | 8.5 | 7.5 | 7.5 | 7.0 |
| 1:00 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 9.0 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.8 | 16.0 | 8.5 | 7.5 | 7.5 | 7.0 |
| 1:15 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 9.0 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.8 | 16.0 | 8.5 | 7.5 | 7.5 | 7.0 |
| 1:30 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 9.0 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.5 | 7.4 | 7.4 | 6.9 |
| 1:45 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.5 | 7.4 | 7.4 | 6.9 |
| 2:00 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.5 | 7.4 | 7.4 | 6.9 |
| 2:15 | 1 | 11.6 | 11.5 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.5 | 7.4 | 7.3 | 6.9 |
| 2:30 | 1 | 11.6 | 11.5 | 13.0 | 13.8 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.4 | 7.4 | 7.3 | 6.9 |
| 2:45 | 1 | 11.6 | 11.5 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.4 | 7.4 | 7.3 | 6.9 |
| 3:00 | 1 | 11.6 | 11.6 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.4 | 7.4 | 7.3 | 6.9 |
| 3:15 | 1 | 11.7 | 11.6 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.7 | 16.0 | 8.4 | 7.4 | 7.3 | 6.9 |
| 3:30 | 1 | 11.7 | 11.6 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.6 | 16.0 | 8.4 | 7.4 | 7.3 | 6.9 |
| 3:45 | 1 | 11.7 | 11.6 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.6 | 16.0 | 8.3 | 7.4 | 7.3 | 6.9 |
| 4:00 | 1 | 11.7 | 11.6 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.6 | 16.0 | 8.3 | 7.4 | 7.3 | 6.9 |
| 4:15 | 1 | 11.7 | 11.7 | 13.0 | 13.7 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.5 | 16.0 | 8.3 | 7.4 | 7.3 | 6.9 |
| 4:30 | 1 | 11.7 | 11.7 | 13.0 | 13.6 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.5 | 16.0 | 8.3 | 7.3 | 7.3 | 6.8 |
| 4:45 | 1 | 11.7 | 11.7 | 13.0 | 13.6 | 8.9 | 7.8 | 6.0 | 4.1 | 16.2 | 16.8 | 16.5 | 16.0 | 8.3 | 7.3 | 7.3 | 6.8 |
| 5:00 | 1 | 11.7 | 11.7 | 13.0 | 13.6 | 8.9 | 7.8 | 6.0 | 4.2 | 16.3 | 16.8 | 16.5 | 16.0 | 8.3 | 7.3 | 7.2 | 6.8 |
| 5:15 | 1 | 11.8 | 11.8 | 13.0 | 13.6 | 8.9 | 7.8 | 6.0 | 4.2 | 16.3 | 16.8 | 16.4 | 16.0 | 8.3 | 7.3 | 7.2 | 6.7 |
| 5:30 | 1 | 11.8 | 11.8 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.2 | 16.3 | 16.8 | 16.4 | 16.0 | 8.3 | 7.3 | 7.2 | 6.7 |
| 5:45 | 1 | 11.8 | 11.8 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.2 | 16.3 | 16.8 | 16.4 | 16.0 | 8.3 | 7.3 | 7.2 | 6.7 |
| 6:00 | 1 | 11.8 | 11.8 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.2 | 16.3 | 16.8 | 16.4 | 16.0 | 8.3 | 7.3 | 7.1 | 6.7 |
| 6:15 | 1 | 11.8 | 11.8 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.3 | 16.3 | 16.8 | 16.4 | 16.0 | 8.3 | 7.3 | 7.1 | 6.7 |
| 6:30 | 1 | 11.8 | 11.8 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.3 | 16.3 | 16.8 | 16.4 | 16.0 | 8.3 | 7.3 | 7.1 | 6.6 |
| 6:45 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.3 | 16.3 | 16.8 | 16.3 | 16.0 | 8.3 | 7.3 | 7.1 | 6.6 |
| 7:00 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.4 | 16.3 | 16.8 | 16.3 | 16.1 | 8.2 | 7.3 | 7.1 | 6.6 |
| 7:15 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.9 | 7.8 | 6.0 | 4.4 | 16.3 | 16.8 | 16.3 | 16.2 | 8.2 | 7.3 | 7.0 | 6.6 |
| 7:30 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.5 | 16.3 | 16.8 | 16.3 | 16.3 | 8.2 | 7.3 | 7.0 | 6.6 |
| 7:45 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.5 | 16.3 | 16.6 | 16.3 | 16.3 | 8.2 | 7.3 | 7.0 | 6.6 |
| 8:00 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.5 | 16.4 | 16.7 | 16.3 | 16.4 | 8.2 | 7.3 | 7.0 | 6.6 |
| 8:15 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.6 | 16.4 | 16.7 | 16.3 | 16.6 | 8.2 | 7.2 | 7.0 | 6.6 |
| 8:30 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.7 | 16.4 | 16.7 | 16.3 | 16.8 | 8.2 | 7.2 | 7.0 | 6.6 |
| 8:45 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.8 | 16.4 | 16.7 | 16.3 | 16.8 | 8.2 | 7.2 | 7.0 | 6.7 |
| 9:00 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.8 | 16.4 | 16.6 | 16.3 | 16.9 | 8.2 | 7.2 | 7.0 | 6.7 |
| 9:15 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.8 | 16.4 | 16.6 | 16.3 | 17.2 | 8.2 | 7.2 | 7.0 | 6.8 |
| 9:30 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.9 | 16.3 | 16.6 | 16.3 | 17.2 | 8.2 | 7.2 | 7.0 | 6.9 |
| 9:45 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.9 | 16.3 | 16.6 | 16.3 | 17.2 | 8.2 | 7.2 | 7.0 | 6.9 |
| 10:00 | 1 | 11.9 | 11.9 | 13.0 | 13.5 | 8.8 | 7.8 | 6.0 | 4.9 | 16.3 | 16.5 | 16.3 | 17.1 | 8.2 | 7.1 | 7.0 | 6.9 |
| 10:15 | 1 | 11.9 | 11.9 | 13.0 | 13.6 | 8.8 | 7.8 | 6.0 | 4.9 | 16.2 | 16.5 | 16.3 | 17.1 | 8.1 | 7.1 | 7.0 | 6.9 |
| 10:30 | 1 | 11.9 | 11.9 | 13.0 | 13.6 | 8.8 | 7.8 | 6.0 | 5.0 | 16.2 | 16.5 | 16.3 | 17.4 | 8.1 | 7.1 | 7.0 | 7.0 |
| 10:45 | 1 | 11.9 | 11.9 | 13.0 | 13.7 | 8.8 | 7.8 | 6.0 | 5.1 | 16.2 | 16.5 | 16.3 | 17.5 | 8.1 | 7.1 | 7.0 | 7.1 |
| 11:00 | 1 | 11.9 | 11.9 | 13.0 | 13.7 | 8.8 | 7.8 | 6.0 | 5.2 | 16.2 | 16.5 | 16.4 | 17.6 | 8.1 | 7.1 | 7.0 | 7.1 |
| 11:15 | 1 | 11.9 | 11.9 | 13.0 | 13.7 | 8.8 | 7.8 | 6.0 | 5.3 | 16.2 | 16.5 | 16.4 | 17.6 | 8.1 | 7.1 | 7.0 | 7.2 |
| 11:30 | 1 | 11.9 | 11.9 | 13.0 | 13.7 | 8.8 | 7.8 | 6.0 | 5.5 | 16.2 | 16.5 | 16.5 | 17.2 | 8.1 | 7.0 | 7.0 | 7.2 |
| 11:45 | 1 | 11.9 | 11.9 | 13.0 | 13.8 | 8.8 | 7.8 | 6.0 | 5.6 | 16.1 | 16.4 | 16.6 | 17.5 | 8.1 | 7.0 | 7.0 | 7.3 |
| 12:00 | 1 | 11.9 | 11.9 | 13.0 | 13.8 | 8.8 | 7.7 | 6.0 | 5.8 | 16.1 | 16.4 | 16.7 | 17.9 | 8.1 | 7.0 | 7.1 | 7.3 |
| 12:15 | 1 | 11.9 | 11.9 | 13.0 | 13.9 | 8.8 | 7.7 | 6.0 | 5.9 | 16.1 | 16.4 | 16.8 | 18.0 | 8.0 | 7.0 | 7.1 | 7.4 |
| 12:30 | 1 | 11.9 | 11.9 | 13.0 | 14.0 | 8.8 | 7.7 | 6.0 | 5.9 | 16.1 | 16.3 | 16.8 | 18.0 | 8.0 | 7.0 | 7.1 | 7.4 |
| 12:45 | 1 | 11.9 | 11.9 | 13.0 | 14.1 | 8.8 | 7.7 | 6.0 | 5.9 | 16.1 | 16.3 | 16.9 | 18.1 | 8.0 | 6.9 | 7.1 | 7.5 |
| 13:00 | 1 | 11.9 | 11.9 | 13.0 | 14.1 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 16.9 | 18.1 | 8.0 | 6.9 | 7.2 | 7.5 |
| 13:15 | 1 | 11.9 | 11.9 | 13.0 | 14.2 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 16.9 | 18.2 | 8.0 | 6.9 | 7.2 | 7.8 |
| 13:30 | 1 | 11.8 | 11.9 | 13.0 | 14.3 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 16.9 | 18.3 | 8.0 | 6.9 | 7.2 | 7.8 |
| 13:45 | 1 | 11.8 | 11.9 | 13.0 | 14.4 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 16.9 | 18.4 | 8.0 | 6.9 | 7.2 | 7.9 |
| 14:00 | 1 | 11.8 | 11.9 | 13.1 | 14.3 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 16.9 | 18.5 | 7.9 | 6.9 | 7.3 | 7.9 |
| 14:15 | 1 | 11.8 | 11.9 | 13.1 | 14.4 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 17.0 | 18.7 | 7.9 | 6.9 | 7.3 | 7.9 |
| 14:30 | 1 | 11.8 | 11.9 | 13.2 | 14.5 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 17.0 | 18.8 | 7.9 | 6.9 | 7.3 | 7.9 |
| 14:45 | 1 | 11.8 | 11.9 | 13.2 | 14.8 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 17.0 | 18.8 | 7.9 | 6.9 | 7.3 | 7.9 |
| 15:00 | 1 | 11.8 | 11.9 | 13.3 | 14.8 | 8.8 | 7.7 | 6.1 | 5.9 | 16.1 | 16.3 | 17.1 | 18.9 | 7.9 | 6.9 | 7.4 | 7.9 |
| 15:15 | 1 | 11.8 | 11.9 | 13.3 | 14.9 | 8.8 | 7.7 | 6.1 | 5.8 | 16.1 | 16.3 | 17.2 | 18.9 | 7.8 | 6.9 | 7.4 | 7.9 |
| 15:30 | 1 | 11.8 | 11.9 | 13.3 | 14.9 | 8.8 | 7.7 | 6.1 | 5.8 | 16.1 | 16.4 | 17.2 | 19.0 | 7.8 | 6.9 | 7.4 | 7.9 |
| 15:45 | 1 | 11.8 | 11.9 | 13.3 | 14.8 | 8.8 | 7.7 | 6.2 | 5.8 | 16.1 | 16.4 | 17.3 | 19.0 | 7.8 | 6.9 | 7.4 | 7.9 |
| 16:00 | 1 | 11.8 | 11.9 | 13.4 | 14.9 | 8.8 | 7.7 | 6.2 | 5.7 | 16.1 | 16.4 | 17.3 | 19.0 | 7.8 | 6.9 | 7.5 | 7.9 |
| 16:15 | 1 | 11.8 | 11.9 | 13.4 | 14.8 | 8.8 | 7.7 | 6.3 | 5.6 | 16.1 | 16.4 | 17.4 | 18.9 | 7.8 | 6.9 | 7.5 | 7.9 |
| 16:30 | 1 | 11.8 | 11.9 | 13.5 | 14.8 | 8.7 | 7.7 | 6.3 | 5.5 | 16.1 | 16.4 | 17.5 | 18.9 | 7.7 | 6.9 | 7.5 | 7.9 |
| 16:45 | 1 | 11.8 | 11.9 | 13.5 | 14.8 | 8.7 | 7.7 | 6.3 | 5.5 | 16.1 | 16.5 | 17.6 | 18.9 | 7.7 | 6.9 | 7.5 | 7.9 |
| 17:00 | 1 | 11.8 | 11.9 | 13.5 | 14.8 | 8.7 | 7.7 | 6.3 | 5.4 | 16.1 | 16.5 | 17.7 | 18.9 | 7.7 | 6.9 | 7.5 | 7.8 |
| 17:15 | 1 | 11.8 | 12.0 | 13.5 | 14.8 | 8.7 | 7.7 | 6.4 | 5.3 | 16.1 | 16.5 | 17.8 | 18.9 | 7.7 | 6.9 | 7.6 | 7.8 |
| 17:30 | 1 | 11.8 | 12.0 | 13.6 | 14.8 | 8.7 | 7.7 | 6.4 | 5.3 | 16.1 | 16.5 | 17.8 | 18.9 | 7.7 | 6.9 | 7.6 | 7.8 |
| 17:45 | 1 | 11.8 | 12.0 | 13.6 | 14.7 | 8.7 | 7.7 | 6.4 | 5.2 | 16.1 | 16.5 | 17.8 | 18.8 | 7.7 | 6.8 | 7.6 | 7.7 |
| 18:00 | 1 | 11.8 | 12.0 | 13.6 | 14.7 | 8.7 | 7.7 | 6.4 | 5.2 | 16.1 | 16.5 | 17.8 | 18.8 | 7.7 | 6.8 | 7.7 | 7.7 |
| 18:15 | 1 | 11.8 | 12.0 | 13.6 | 14.7 | 8.7 | 7.7 | 6.4 | 5.2 | 16.1 | 16.5 | 17.8 | 18.8 | 7.7 | 6.8 | 7.7 | 7.6 |
| 18:30 | 1 | 11.8 | 12.0 | 13.6 | 14.6 | 8.7 | 7.8 | 6.4 | 5.2 | 16.1 | 16.5 | 17.8 | 18.7 | 7.7 | 6.8 | 7.8 | 7.6 |
| 18:45 | 1 | 11.8 | 12.0 | 13.7 | 14.5 | 8.7 | 7.8 | 6.4 | 5.1 | 16.1 | 16.5 | 17.8 | 18.7 | 7.7 | 6.8 | 7.8 | 7.5 |
| 19:00 | 1 | 11.8 | 12.0 | 13.7 | 14.5 | 8.7 | 7.8 | 6.4 | 5.1 | 16.1 | 16.6 | 17.9 | 18.6 | 7.7 | 6.8 | 7.8 | 7.5 |
| 19:15 | 1 | 11.8 | 12.0 | 13.7 | 14.4 | 8.7 | 7.8 | 6.4 | 5.1 | 16.1 | 16.6 | 17.9 | 18.5 | 7.8 | 6.9 | 7.8 | 7.4 |
| 19:30 | 1 | 11.9 | 12.0 | 13.7 | 14.4 | 8.7 | 7.8 | 6.4 | 5.1 | 16.1 | 16.6 | 17.9 | 18.5 | 7.8 | 6.9 | 7.8 | 7.3 |
| 19:45 | 1 | 11.9 | 12.0 | 13.7 | 14.3 | 8.7 | 7.8 | 6.4 | 5.1 | 16.1 | 16.7 | 17.9 | 18.4 | 7.8 | 6.9 | 7.8 | 7.2 |
| 20:00 | 1 | 11.9 | 12.0 | 13.7 | 14.3 | 8.7 | 7.8 | 6.4 | 5.1 | 16.2 | 16.7 | 17.9 | 18.3 | 7.8 | 7.0 | 7.8 | 7.2 |
| 20:15 | 1 | 11.9 | 12.0 | 13.7 | 14.3 | 8.7 | 7.8 | 6.4 | 5.0 | 16.2 | 16.8 | 17.9 | 18.2 | 7.8 | 7.0 | 7.8 | 7.1 |
| 20:30 | 1 | 11.9 | 12.0 | 13.7 | 14.2 | 8.7 | 7.8 | 6.4 | 5.0 | 16.2 | 16.8 | 17.9 | 18.2 | 7.8 | 7.1 | 7.8 | 7.1 |
| 20:45 | 1 | 11.9 | 12.0 | 13.7 | 14.2 | 8.7 | 7.8 | 6.4 | 5.0 | 16.2 | 16.8 | 17.9 | 18.2 | 7.8 | 7.1 | 7.8 | 7.1 |
| 21:00 | 1 | 11.9 | 12.0 | 13.7 | 14.1 | 8.7 | 7.8 | 6.4 | 4.9 | 16.2 | 16.8 | 17.9 | 18.1 | 7.8 | 7.1 | 7.7 | 7.1 |
| 21:15 | 1 | 11.9 | 12.0 | 13.6 | 14.1 | 8.7 | 7.8 | 6.4 | 4.9 | 16.2 | 16.8 | 17.9 | 18.1 | 7.8 | 7.1 | 7.7 | 7.0 |

# Appendix B  Temperature survey data

| time | day | 1A-60 | 1A-35 | 1A-10 | 1A+15 | 1B-60 | 1B-35 | 1B-10 | 1B+15 | 2A-60 | 2A-35 | 2A-10 | 2A+15 | 2B-60 | 2B-35 | 2B-10 | 2B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24hr clock | no. | | | | | | | | | | | | | | | | |
| 21:30 | 1 | 11.9 | 12.0 | 13.6 | 14.1 | 8.7 | 7.8 | 6.4 | 4.9 | 16.2 | 16.8 | 17.9 | 18.0 | 7.8 | 7.1 | 7.7 | 7.0 |
| 21:45 | 1 | 11.9 | 12.0 | 13.6 | 14.1 | 8.7 | 7.8 | 6.4 | 4.9 | 16.2 | 16.8 | 17.9 | 18.0 | 7.8 | 7.2 | 7.7 | 7.0 |
| 22:00 | 1 | 11.9 | 12.0 | 13.5 | 14.0 | 8.7 | 7.8 | 6.3 | 4.9 | 16.2 | 16.8 | 17.9 | 17.9 | 7.8 | 7.2 | 7.7 | 7.0 |
| 22:15 | 1 | 11.9 | 12.0 | 13.5 | 14.0 | 8.7 | 7.8 | 6.3 | 4.8 | 16.2 | 16.9 | 17.9 | 17.9 | 7.8 | 7.2 | 7.7 | 6.9 |
| 22:30 | 1 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.8 | 6.3 | 4.8 | 16.3 | 16.9 | 17.9 | 17.8 | 7.8 | 7.2 | 7.7 | 6.9 |
| 22:45 | 1 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.8 | 6.3 | 4.8 | 16.3 | 16.9 | 17.9 | 17.6 | 7.8 | 7.3 | 7.6 | 6.8 |
| 23:00 | 1 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.8 | 6.3 | 4.7 | 16.3 | 16.9 | 17.9 | 17.5 | 7.8 | 7.3 | 7.6 | 6.8 |
| 23:15 | 1 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.8 | 6.3 | 4.7 | 16.3 | 16.9 | 17.9 | 17.3 | 7.8 | 7.3 | 7.6 | 6.8 |
| 23:30 | 1 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.8 | 6.3 | 4.6 | 16.3 | 16.9 | 17.8 | 17.1 | 7.8 | 7.3 | 7.5 | 6.7 |
| 23:45 | 1 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.8 | 6.3 | 4.5 | 16.3 | 16.9 | 17.8 | 17.1 | 7.8 | 7.3 | 7.5 | 6.7 |
| 0:00 | 1 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.8 | 6.3 | 4.5 | 16.3 | 16.9 | 17.8 | 17.0 | 7.8 | 7.3 | 7.5 | 6.6 |
| 0:15 | 2 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.9 | 6.2 | 4.5 | 16.3 | 16.9 | 17.7 | 17.0 | 7.8 | 7.3 | 7.4 | 6.5 |
| 0:30 | 2 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.9 | 6.2 | 4.4 | 16.2 | 16.9 | 17.7 | 17.0 | 7.8 | 7.3 | 7.3 | 6.4 |
| 0:45 | 2 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.9 | 6.2 | 4.3 | 16.2 | 16.9 | 17.6 | 16.9 | 7.8 | 7.3 | 7.2 | 6.3 |
| 1:00 | 2 | 11.9 | 12.1 | 13.5 | 13.9 | 8.7 | 7.9 | 6.2 | 4.3 | 16.2 | 16.9 | 17.5 | 16.8 | 7.8 | 7.2 | 7.1 | 6.3 |
| 1:15 | 2 | 11.9 | 12.2 | 13.5 | 13.9 | 8.7 | 7.9 | 6.2 | 4.2 | 16.2 | 16.9 | 17.4 | 16.7 | 7.8 | 7.2 | 7.0 | 6.2 |
| 1:30 | 2 | 11.9 | 12.2 | 13.5 | 13.8 | 8.7 | 7.9 | 6.2 | 4.2 | 16.2 | 16.9 | 17.4 | 16.6 | 7.8 | 7.2 | 7.0 | 6.2 |
| 1:45 | 2 | 11.9 | 12.2 | 13.5 | 13.8 | 8.7 | 7.9 | 6.2 | 4.2 | 16.2 | 16.9 | 17.4 | 16.5 | 7.8 | 7.2 | 7.0 | 6.2 |
| 2:00 | 2 | 11.9 | 12.2 | 13.4 | 13.8 | 8.7 | 7.9 | 6.2 | 4.2 | 16.2 | 16.9 | 17.3 | 16.4 | 7.8 | 7.2 | 7.0 | 6.1 |
| 2:15 | 2 | 11.9 | 12.2 | 13.4 | 13.7 | 8.7 | 7.9 | 6.2 | 4.1 | 16.2 | 16.9 | 17.2 | 16.3 | 7.8 | 7.2 | 7.0 | 6.1 |
| 2:30 | 2 | 12.0 | 12.2 | 13.4 | 13.7 | 8.7 | 7.8 | 6.2 | 4.1 | 16.2 | 16.9 | 17.2 | 16.3 | 7.8 | 7.2 | 7.0 | 6.1 |
| 2:45 | 2 | 12.0 | 12.2 | 13.4 | 13.6 | 8.7 | 7.8 | 6.2 | 4.1 | 16.2 | 16.9 | 17.2 | 16.2 | 7.8 | 7.2 | 7.0 | 6.1 |
| 3:00 | 2 | 12.0 | 12.2 | 13.4 | 13.6 | 8.7 | 7.8 | 6.2 | 4.1 | 16.2 | 16.9 | 17.2 | 16.1 | 7.8 | 7.2 | 7.0 | 6.1 |
| 3:15 | 2 | 12.0 | 12.2 | 13.4 | 13.6 | 8.7 | 7.8 | 6.2 | 4.1 | 16.2 | 16.9 | 17.1 | 16.1 | 7.8 | 7.2 | 6.9 | 6.1 |
| 3:30 | 2 | 12.0 | 12.2 | 13.4 | 13.6 | 8.7 | 7.8 | 6.2 | 4.1 | 16.2 | 17.0 | 17.1 | 16.0 | 7.8 | 7.2 | 6.9 | 6.1 |
| 3:45 | 2 | 12.0 | 12.2 | 13.4 | 13.5 | 8.7 | 7.8 | 6.2 | 4.1 | 16.3 | 17.0 | 17.1 | 16.0 | 7.8 | 7.2 | 6.9 | 6.1 |
| 4:00 | 2 | 12.0 | 12.2 | 13.4 | 13.5 | 8.7 | 7.8 | 6.2 | 4.1 | 16.3 | 17.0 | 17.1 | 16.0 | 7.8 | 7.2 | 6.9 | 6.1 |
| 4:15 | 2 | 12.0 | 12.3 | 13.4 | 13.5 | 8.7 | 7.8 | 6.2 | 4.1 | 16.3 | 17.0 | 17.1 | 15.9 | 7.8 | 7.1 | 6.9 | 6.1 |
| 4:30 | 2 | 12.0 | 12.3 | 13.4 | 13.5 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 17.0 | 15.8 | 7.8 | 7.1 | 6.8 | 6.1 |
| 4:45 | 2 | 12.0 | 12.3 | 13.4 | 13.5 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 17.0 | 15.8 | 7.8 | 7.1 | 6.8 | 6.1 |
| 5:00 | 2 | 12.0 | 12.3 | 13.4 | 13.5 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 17.0 | 15.8 | 7.8 | 7.0 | 6.8 | 6.1 |
| 5:15 | 2 | 12.0 | 12.3 | 13.3 | 13.4 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 16.9 | 15.8 | 7.8 | 7.0 | 6.8 | 6.1 |
| 5:30 | 2 | 12.0 | 12.3 | 13.3 | 13.4 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 16.9 | 15.7 | 7.8 | 7.0 | 6.8 | 6.1 |
| 5:45 | 2 | 12.0 | 12.3 | 13.3 | 13.3 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 16.8 | 15.7 | 7.8 | 6.9 | 6.8 | 6.1 |
| 6:00 | 2 | 12.0 | 12.3 | 13.3 | 13.3 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 16.8 | 15.7 | 7.8 | 6.9 | 6.8 | 6.1 |
| 6:15 | 2 | 12.0 | 12.3 | 13.2 | 13.3 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 16.8 | 15.8 | 7.8 | 6.9 | 6.7 | 6.1 |
| 6:30 | 2 | 12.0 | 12.3 | 13.2 | 13.2 | 8.7 | 7.8 | 6.1 | 4.1 | 16.3 | 17.0 | 16.7 | 15.9 | 7.8 | 6.9 | 6.7 | 6.1 |
| 6:45 | 2 | 12.0 | 12.3 | 13.1 | 13.2 | 8.7 | 7.8 | 6.0 | 4.1 | 16.3 | 17.0 | 16.6 | 16.0 | 7.8 | 6.9 | 6.7 | 6.1 |
| 7:00 | 2 | 12.0 | 12.3 | 13.0 | 13.1 | 8.7 | 7.8 | 6.0 | 4.1 | 16.3 | 16.9 | 16.5 | 16.1 | 7.8 | 6.9 | 6.7 | 6.1 |
| 7:15 | 2 | 12.0 | 12.3 | 13.0 | 13.0 | 8.7 | 7.8 | 6.0 | 4.1 | 16.3 | 16.9 | 16.5 | 16.4 | 7.8 | 6.9 | 6.6 | 6.1 |
| 7:30 | 2 | 12.0 | 12.3 | 13.0 | 13.0 | 8.7 | 7.8 | 6.0 | 4.1 | 16.3 | 16.9 | 16.4 | 16.4 | 7.8 | 6.9 | 6.6 | 6.1 |
| 7:45 | 2 | 12.0 | 12.3 | 13.0 | 13.0 | 8.7 | 7.7 | 6.0 | 4.1 | 16.3 | 16.9 | 16.4 | 16.6 | 7.8 | 6.9 | 6.6 | 6.1 |
| 8:00 | 2 | 12.0 | 12.3 | 13.0 | 13.0 | 8.7 | 7.7 | 6.0 | 4.1 | 16.3 | 16.9 | 16.3 | 16.8 | 7.8 | 6.9 | 6.6 | 6.1 |
| 8:15 | 2 | 12.0 | 12.3 | 13.0 | 13.0 | 8.6 | 7.7 | 6.0 | 4.1 | 16.2 | 16.8 | 16.3 | 16.8 | 7.8 | 6.9 | 6.6 | 6.2 |
| 8:30 | 2 | 12.0 | 12.3 | 13.0 | 13.0 | 8.6 | 7.7 | 6.0 | 4.2 | 16.2 | 16.8 | 16.2 | 16.9 | 7.8 | 6.9 | 6.6 | 6.3 |
| 8:45 | 2 | 12.0 | 12.3 | 13.0 | 13.0 | 8.6 | 7.7 | 6.0 | 4.2 | 16.2 | 16.8 | 16.2 | 16.7 | 7.8 | 6.9 | 6.6 | 6.4 |
| 9:00 | 2 | 12.0 | 12.3 | 13.0 | 13.1 | 8.6 | 7.7 | 6.0 | 4.3 | 16.2 | 16.7 | 16.2 | 17.0 | 7.8 | 6.9 | 6.5 | 6.5 |
| 9:15 | 2 | 12.0 | 12.3 | 13.0 | 13.2 | 8.6 | 7.7 | 6.0 | 4.4 | 16.2 | 16.7 | 16.2 | 17.1 | 7.8 | 6.8 | 6.5 | 6.7 |
| 9:30 | 2 | 12.0 | 12.3 | 13.0 | 13.3 | 8.6 | 7.6 | 6.0 | 4.4 | 16.2 | 16.6 | 16.2 | 17.1 | 7.7 | 6.8 | 6.5 | 6.8 |
| 9:45 | 2 | 12.0 | 12.3 | 13.1 | 13.5 | 8.6 | 7.6 | 6.0 | 4.4 | 16.1 | 16.6 | 16.2 | 17.1 | 7.7 | 6.8 | 6.5 | 6.9 |
| 10:00 | 2 | 12.0 | 12.3 | 13.1 | 13.7 | 8.6 | 7.6 | 6.0 | 4.5 | 16.1 | 16.5 | 16.3 | 17.1 | 7.7 | 6.8 | 6.6 | 7.0 |
| 10:15 | 2 | 12.0 | 12.3 | 13.1 | 13.8 | 8.6 | 7.6 | 6.0 | 4.6 | 16.1 | 16.5 | 16.3 | 17.1 | 7.7 | 6.8 | 6.6 | 7.1 |
| 10:30 | 2 | 12.0 | 12.3 | 13.1 | 13.9 | 8.6 | 7.6 | 6.0 | 4.7 | 16.1 | 16.5 | 16.3 | 17.1 | 7.7 | 6.8 | 6.7 | 7.2 |
| 10:45 | 2 | 12.0 | 12.3 | 13.1 | 14.0 | 8.6 | 7.6 | 6.0 | 4.8 | 16.0 | 16.5 | 16.4 | 17.1 | 7.7 | 6.7 | 6.7 | 7.3 |
| 11:00 | 2 | 12.0 | 12.3 | 13.1 | 14.1 | 8.6 | 7.5 | 6.0 | 4.8 | 16.0 | 16.4 | 16.4 | 17.2 | 7.7 | 6.7 | 6.8 | 7.4 |
| 11:15 | 2 | 12.0 | 12.3 | 13.1 | 14.2 | 8.5 | 7.5 | 6.0 | 4.9 | 16.0 | 16.4 | 16.5 | 17.2 | 7.7 | 6.7 | 6.8 | 7.5 |
| 11:30 | 2 | 12.0 | 12.3 | 13.1 | 14.4 | 8.5 | 7.5 | 6.0 | 5.0 | 16.0 | 16.4 | 16.6 | 17.7 | 7.7 | 6.6 | 6.9 | 7.6 |
| 11:45 | 2 | 12.0 | 12.3 | 13.2 | 14.5 | 8.5 | 7.5 | 6.0 | 5.0 | 16.0 | 16.4 | 16.7 | 17.7 | 7.6 | 6.6 | 6.9 | 7.8 |
| 12:00 | 2 | 12.0 | 12.3 | 13.2 | 14.5 | 8.5 | 7.5 | 6.0 | 5.1 | 16.0 | 16.4 | 16.8 | 17.8 | 7.6 | 6.6 | 7.0 | 7.8 |
| 12:15 | 2 | 12.0 | 12.3 | 13.2 | 14.6 | 8.5 | 7.5 | 6.0 | 5.1 | 16.0 | 16.4 | 16.8 | 17.9 | 7.6 | 6.5 | 7.0 | 7.9 |
| 12:30 | 2 | 12.0 | 12.3 | 13.3 | 14.8 | 8.5 | 7.5 | 6.0 | 5.2 | 16.0 | 16.4 | 16.9 | 17.9 | 7.5 | 6.5 | 7.0 | 7.9 |
| 12:45 | 2 | 12.0 | 12.3 | 13.3 | 14.9 | 8.5 | 7.5 | 6.0 | 5.2 | 16.0 | 16.4 | 16.9 | 17.8 | 7.5 | 6.5 | 7.0 | 7.9 |
| 13:00 | 2 | 12.0 | 12.3 | 13.4 | 15.1 | 8.5 | 7.5 | 6.0 | 5.2 | 16.0 | 16.4 | 16.9 | 17.9 | 7.5 | 6.5 | 7.0 | 7.9 |
| 13:15 | 2 | 12.0 | 12.3 | 13.4 | 15.2 | 8.6 | 7.5 | 6.0 | 5.2 | 16.0 | 16.4 | 16.9 | 17.8 | 7.4 | 6.4 | 7.0 | 7.9 |
| 13:30 | 2 | 12.0 | 12.3 | 13.5 | 15.4 | 8.6 | 7.5 | 6.0 | 5.3 | 16.0 | 16.4 | 16.9 | 17.8 | 7.4 | 6.4 | 7.1 | 7.9 |
| 13:45 | 2 | 12.0 | 12.3 | 13.5 | 15.5 | 8.6 | 7.5 | 6.0 | 5.3 | 16.0 | 16.4 | 17.0 | 17.8 | 7.4 | 6.4 | 7.1 | 8.0 |
| 14:00 | 2 | 12.0 | 12.3 | 13.6 | 15.5 | 8.6 | 7.5 | 6.0 | 5.3 | 16.0 | 16.4 | 17.0 | 17.8 | 7.3 | 6.4 | 7.2 | 8.0 |
| 14:15 | 2 | 12.0 | 12.3 | 13.7 | 15.5 | 8.6 | 7.5 | 6.0 | 5.3 | 16.0 | 16.4 | 17.0 | 17.8 | 7.3 | 6.4 | 7.2 | 8.0 |
| 14:30 | 2 | 12.0 | 12.3 | 13.8 | 15.5 | 8.6 | 7.5 | 6.0 | 5.3 | 16.0 | 16.4 | 17.0 | 17.9 | 7.3 | 6.4 | 7.3 | 8.0 |
| 14:45 | 2 | 12.0 | 12.3 | 13.9 | 15.5 | 8.6 | 7.5 | 6.1 | 5.2 | 16.0 | 16.3 | 17.0 | 18.0 | 7.3 | 6.4 | 7.3 | 8.0 |
| 15:00 | 2 | 12.0 | 12.3 | 13.9 | 15.6 | 8.7 | 7.5 | 6.1 | 5.2 | 16.0 | 16.3 | 17.0 | 18.1 | 7.3 | 6.3 | 7.4 | 8.0 |
| 15:15 | 2 | 12.0 | 12.3 | 13.9 | 15.6 | 8.7 | 7.6 | 6.1 | 5.1 | 16.0 | 16.3 | 17.0 | 18.0 | 7.3 | 6.3 | 7.4 | 8.0 |
| 15:30 | 2 | 12.0 | 12.3 | 14.0 | 15.6 | 8.7 | 7.6 | 6.1 | 5.1 | 16.0 | 16.4 | 17.0 | 18.0 | 7.3 | 6.3 | 7.4 | 8.0 |
| 15:45 | 2 | 12.0 | 12.3 | 14.0 | 15.6 | 8.7 | 7.6 | 6.2 | 5.0 | 16.0 | 16.4 | 17.0 | 18.0 | 7.3 | 6.3 | 7.5 | 7.9 |
| 16:00 | 2 | 12.0 | 12.3 | 14.0 | 15.6 | 8.7 | 7.6 | 6.2 | 5.0 | 16.0 | 16.4 | 17.1 | 17.9 | 7.2 | 6.3 | 7.5 | 7.9 |
| 16:15 | 2 | 12.0 | 12.3 | 14.0 | 15.5 | 8.7 | 7.6 | 6.2 | 4.9 | 16.0 | 16.4 | 17.1 | 17.8 | 7.2 | 6.3 | 7.5 | 7.9 |
| 16:30 | 2 | 12.0 | 12.3 | 14.0 | 15.5 | 8.8 | 7.6 | 6.2 | 4.8 | 16.0 | 16.4 | 17.1 | 17.8 | 7.2 | 6.4 | 7.5 | 7.9 |
| 16:45 | 2 | 12.0 | 12.3 | 14.0 | 15.3 | 8.8 | 7.7 | 6.2 | 4.8 | 16.0 | 16.5 | 17.1 | 17.8 | 7.2 | 6.4 | 7.5 | 7.9 |
| 17:00 | 2 | 12.0 | 12.3 | 14.1 | 15.3 | 8.8 | 7.7 | 6.2 | 4.7 | 16.0 | 16.5 | 17.1 | 17.8 | 7.2 | 6.5 | 7.5 | 7.8 |
| 17:15 | 2 | 12.0 | 12.3 | 14.1 | 15.3 | 8.8 | 7.7 | 6.2 | 4.7 | 16.1 | 16.5 | 17.1 | 17.9 | 7.2 | 6.5 | 7.5 | 7.8 |
| 17:30 | 2 | 12.0 | 12.3 | 14.1 | 15.3 | 8.8 | 7.7 | 6.2 | 4.6 | 16.1 | 16.5 | 17.2 | 18.0 | 7.2 | 6.6 | 7.5 | 7.7 |
| 17:45 | 2 | 12.0 | 12.3 | 14.2 | 15.2 | 8.8 | 7.7 | 6.2 | 4.6 | 16.1 | 16.5 | 17.2 | 18.0 | 7.2 | 6.6 | 7.5 | 7.7 |
| 18:00 | 2 | 12.0 | 12.3 | 14.2 | 15.2 | 8.8 | 7.7 | 6.2 | 4.5 | 16.1 | 16.6 | 17.2 | 18.0 | 7.2 | 6.7 | 7.6 | 7.6 |
| 18:15 | 2 | 12.0 | 12.3 | 14.2 | 15.2 | 8.8 | 7.7 | 6.2 | 4.5 | 16.1 | 16.6 | 17.2 | 18.0 | 7.2 | 6.7 | 7.6 | 7.5 |
| 18:30 | 2 | 12.0 | 12.3 | 14.2 | 15.2 | 8.8 | 7.8 | 6.2 | 4.4 | 16.1 | 16.6 | 17.2 | 18.0 | 7.2 | 6.7 | 7.6 | 7.4 |
| 18:45 | 2 | 12.0 | 12.3 | 14.2 | 15.2 | 8.8 | 7.8 | 6.2 | 4.3 | 16.1 | 16.6 | 17.2 | 18.0 | 7.2 | 6.7 | 7.6 | 7.4 |

# Appendix B  Temperature survey data

| time | day | 1A-60 | 1A-35 | 1A-10 | 1A+15 | 1B-60 | 1B-35 | 1B-10 | 1B+15 | 2A-60 | 2A-35 | 2A-10 | 2A+15 | 2B-60 | 2B-35 | 2B-10 | 2B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24hr clock | no. | | | | | | | | | | | | | | | | |
| 19:00 | 2 | 12.0 | 12.3 | 14.2 | 15.2 | 8.8 | 7.8 | 6.2 | 4.3 | 16.1 | 16.7 | 17.2 | 17.9 | 7.2 | 6.7 | 7.7 | 7.3 |
| 19:15 | 2 | 12.0 | 12.4 | 14.2 | 15.2 | 8.8 | 7.8 | 6.2 | 4.2 | 16.1 | 16.7 | 17.3 | 17.9 | 7.2 | 6.8 | 7.7 | 7.3 |
| 19:30 | 2 | 12.0 | 12.4 | 14.2 | 15.2 | 8.8 | 7.8 | 6.2 | 4.2 | 16.1 | 16.7 | 17.3 | 17.9 | 7.2 | 6.8 | 7.7 | 7.2 |
| 19:45 | 2 | 12.0 | 12.4 | 14.2 | 15.1 | 8.8 | 7.8 | 6.2 | 4.2 | 16.1 | 16.7 | 17.4 | 17.8 | 7.2 | 6.8 | 7.7 | 7.2 |
| 20:00 | 2 | 12.0 | 12.4 | 14.2 | 15.1 | 8.8 | 7.8 | 6.2 | 4.2 | 16.1 | 16.7 | 17.4 | 17.8 | 7.2 | 6.9 | 7.7 | 7.2 |
| 20:15 | 2 | 12.0 | 12.4 | 14.2 | 15.1 | 8.8 | 7.8 | 6.2 | 4.1 | 16.2 | 16.7 | 17.5 | 17.8 | 7.1 | 6.9 | 7.7 | 7.2 |
| 20:30 | 2 | 12.0 | 12.4 | 14.2 | 15.1 | 8.8 | 7.8 | 6.2 | 4.0 | 16.2 | 16.7 | 17.5 | 17.8 | 7.1 | 6.9 | 7.7 | 7.2 |
| 20:45 | 2 | 12.0 | 12.4 | 14.2 | 15.1 | 8.8 | 7.8 | 6.1 | 3.9 | 16.2 | 16.7 | 17.5 | 17.8 | 7.1 | 6.9 | 7.7 | 7.2 |
| 21:00 | 2 | 12.0 | 12.4 | 14.2 | 15.0 | 8.8 | 7.8 | 6.1 | 3.9 | 16.2 | 16.7 | 17.5 | 17.7 | 7.1 | 6.9 | 7.7 | 7.2 |
| 21:15 | 2 | 12.0 | 12.4 | 14.2 | 15.0 | 8.8 | 7.8 | 6.1 | 3.9 | 16.2 | 16.7 | 17.5 | 17.6 | 7.1 | 6.9 | 7.7 | 7.2 |
| 21:30 | 2 | • | • | • | • | 8.8 | 7.8 | 6.1 | 3.8 | 16.2 | 16.8 | 17.5 | 17.6 | 7.1 | 6.9 | 7.7 | 7.2 |
| 21:45 | 2 | • | • | • | • | 8.8 | 7.8 | 6.1 | 3.8 | 16.2 | 16.8 | 17.5 | 17.6 | 7.1 | 6.9 | 7.6 | 7.2 |
| 22:00 | 2 | • | • | • | • | 8.8 | 7.8 | 6.1 | 3.8 | 16.2 | 16.8 | 17.5 | 17.5 | 7.1 | 6.9 | 7.6 | 7.1 |
| 22:15 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.8 | 16.2 | 16.8 | 17.5 | 17.4 | 7.1 | 6.9 | 7.6 | 7.1 |
| 22:30 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.8 | 16.2 | 16.8 | 17.5 | 17.3 | 7.1 | 6.9 | 7.6 | 7.1 |
| 22:45 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.8 | 16.2 | 16.8 | 17.5 | 17.2 | 7.1 | 6.9 | 7.6 | 7.1 |
| 23:00 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.8 | 16.2 | 16.8 | 17.5 | 17.1 | 7.1 | 6.9 | 7.5 | 7.1 |
| 23:15 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.8 | 16.2 | 16.8 | 17.4 | 17.0 | 7.1 | 6.9 | 7.5 | 7.1 |
| 23:30 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.8 | 16.2 | 16.8 | 17.4 | 17.0 | 7.0 | 6.8 | 7.5 | 7.1 |
| 23:45 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.8 | 16.2 | 16.8 | 17.4 | 16.9 | 7.0 | 6.8 | 7.5 | 7.1 |
| 0:00 | 2 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.7 | 16.3 | 16.9 | 17.4 | 16.9 | 7.0 | 6.8 | 7.3 | 7.1 |
| 0:15 | 3 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.7 | 16.3 | 16.9 | 17.4 | 16.8 | 7.0 | 6.8 | 7.3 | 7.2 |
| 0:30 | 3 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.6 | 16.3 | 16.9 | 17.3 | 16.6 | 7.0 | 6.8 | 7.3 | 7.2 |
| 0:45 | 3 | • | • | • | • | 8.8 | 7.8 | 6.0 | 3.5 | 16.3 | 16.9 | 17.3 | 16.5 | 7.0 | 6.8 | 7.3 | 7.2 |
| 1:00 | 3 | • | • | • | • | 8.8 | 7.8 | 5.9 | 3.4 | 16.3 | 16.9 | 17.3 | 16.3 | 7.0 | 6.8 | 7.3 | 7.2 |
| 1:15 | 3 | • | • | • | • | 8.8 | 7.8 | 5.9 | 3.4 | 16.3 | 16.9 | 17.2 | 16.2 | 6.9 | 6.8 | 7.3 | 7.2 |
| 1:30 | 3 | • | • | • | • | 8.8 | 7.8 | 5.9 | 3.3 | 16.4 | 16.9 | 17.2 | 16.2 | 6.9 | 6.8 | 7.2 | 7.2 |
| 1:45 | 3 | • | • | • | • | 8.8 | 7.8 | 5.9 | 3.2 | 16.4 | 17.0 | 17.2 | 16.2 | 6.9 | 6.7 | 7.2 | 7.2 |
| 2:00 | 3 | • | • | • | • | 8.8 | 7.8 | 5.9 | 3.1 | 16.4 | 17.0 | 17.2 | 16.2 | 6.9 | 6.7 | 7.2 | 7.2 |
| 2:15 | 3 | • | • | • | • | 8.8 | 7.8 | 5.9 | 3.1 | 16.5 | 17.0 | 17.2 | 16.1 | 6.9 | 6.7 | 7.2 | 7.2 |
| 2:30 | 3 | • | • | • | • | 8.8 | 7.8 | 5.9 | 3.1 | 16.5 | 17.0 | 17.2 | 16.1 | 6.9 | 6.7 | 7.2 | 7.2 |
| 2:45 | 3 | • | • | • | • | 8.8 | 7.8 | 5.8 | 3.1 | 16.5 | 17.0 | 17.2 | 16.1 | 6.9 | 6.7 | 7.2 | 7.2 |
| 3:00 | 3 | • | • | • | • | 8.8 | 7.8 | 5.8 | 3.1 | 16.5 | 17.0 | 17.2 | 16.1 | 6.9 | 6.7 | 7.2 | 7.2 |
| 3:15 | 3 | • | • | • | • | 8.8 | 7.8 | 5.8 | 3.1 | 16.5 | 17.0 | 17.1 | 16.1 | 6.9 | 6.7 | 7.2 | 7.2 |
| 3:30 | 3 | • | • | • | • | 8.8 | 7.8 | 5.8 | 3.1 | 16.5 | 17.0 | 17.1 | 16.0 | 6.9 | 6.7 | 7.2 | 7.2 |
| 3:45 | 3 | • | • | • | • | 8.8 | 7.8 | 5.8 | 3.0 | 16.5 | 17.0 | 17.1 | 15.9 | 6.9 | 6.7 | 7.2 | 7.3 |
| 4:00 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 3.0 | 16.5 | 17.0 | 17.1 | 15.8 | 6.9 | 6.7 | 7.2 | 7.3 |
| 4:15 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 3.0 | 16.5 | 17.0 | 17.1 | 15.5 | 6.9 | 6.7 | 7.2 | 7.3 |
| 4:30 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 3.0 | 16.5 | 17.0 | 17.1 | 15.5 | 6.9 | 6.7 | 7.2 | 7.3 |
| 4:45 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 2.9 | 16.5 | 17.0 | 17.1 | 15.5 | 6.9 | 6.7 | 7.2 | 7.3 |
| 5:00 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 2.9 | 16.5 | 17.0 | 17.1 | 15.4 | 6.9 | 6.7 | 7.2 | 7.3 |
| 5:15 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 2.9 | 16.5 | 17.0 | 17.1 | 15.4 | 6.9 | 6.7 | 7.2 | 7.3 |
| 5:30 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 2.9 | 16.5 | 17.0 | 17.0 | 15.4 | 6.9 | 6.7 | 7.2 | 7.3 |
| 5:45 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 2.9 | 16.5 | 17.0 | 16.9 | 15.4 | 6.9 | 6.7 | 7.2 | 7.3 |
| 6:00 | 3 | • | • | • | • | 8.8 | 7.7 | 5.7 | 2.9 | 16.5 | 17.0 | 16.8 | 15.3 | 6.9 | 6.7 | 7.2 | 7.3 |
| 6:15 | 3 | • | • | • | • | 8.8 | 7.7 | 5.6 | 2.9 | 16.5 | 17.0 | 16.8 | 15.3 | 6.9 | 6.7 | 7.2 | 7.4 |
| 6:30 | 3 | • | • | • | • | 8.8 | 7.7 | 5.6 | 2.8 | 16.5 | 17.0 | 16.7 | 15.5 | 6.9 | 6.7 | 7.2 | 7.4 |
| 6:45 | 3 | • | • | • | • | 8.8 | 7.7 | 5.6 | 2.8 | 16.5 | 17.0 | 16.6 | 15.8 | 6.9 | 6.7 | 7.2 | 7.4 |
| 7:00 | 3 | • | • | • | • | 8.8 | 7.7 | 5.6 | 2.8 | 16.5 | 17.0 | 16.5 | 16.0 | 6.9 | 6.7 | 7.3 | 7.5 |
| 7:15 | 3 | • | • | • | • | 8.8 | 7.7 | 5.6 | 2.8 | 16.5 | 17.0 | 16.4 | 16.1 | 6.9 | 6.7 | 7.3 | 7.5 |
| 7:30 | 3 | • | • | • | • | 8.8 | 7.7 | 5.5 | 2.8 | 16.5 | 17.0 | 16.3 | 16.3 | 6.9 | 6.7 | 7.3 | 7.6 |
| 7:45 | 3 | • | • | • | • | 8.8 | 7.7 | 5.5 | 2.8 | 16.5 | 17.0 | 16.3 | 16.3 | 6.9 | 6.7 | 7.4 | 7.7 |
| 8:00 | 3 | • | • | • | • | 8.7 | 7.8 | 5.5 | 2.9 | 16.5 | 17.0 | 16.2 | 16.3 | 6.9 | 6.7 | 7.4 | 7.8 |
| 8:15 | 3 | • | • | • | • | 8.7 | 7.6 | 5.5 | 2.9 | 16.5 | 16.9 | 16.2 | 16.4 | 6.9 | 6.7 | 7.4 | 7.9 |
| 8:30 | 3 | • | • | • | • | 8.7 | 7.6 | 5.4 | 2.9 | 16.5 | 16.9 | 16.2 | 16.4 | 6.9 | 6.7 | 7.5 | 8.0 |
| 8:45 | 3 | • | • | • | • | 8.7 | 7.6 | 5.4 | 2.9 | 16.5 | 16.8 | 16.2 | 16.8 | 6.9 | 6.7 | 7.5 | 8.1 |
| 9:00 | 3 | • | • | • | • | 8.7 | 7.6 | 5.4 | 3.0 | 16.4 | 16.8 | 16.1 | 16.8 | 6.9 | 6.7 | 7.6 | 8.1 |
| 9:15 | 3 | • | • | • | • | 8.7 | 7.6 | 5.4 | 3.0 | 16.4 | 16.7 | 16.1 | 16.9 | 6.9 | 6.7 | 7.7 | 8.2 |
| 9:30 | 3 | • | • | • | • | 8.7 | 7.5 | 5.3 | 3.0 | 16.3 | 16.7 | 16.1 | 16.9 | 6.9 | 6.7 | 7.8 | 8.2 |
| 9:45 | 3 | • | • | • | • | 8.7 | 7.5 | 5.3 | 3.0 | 16.3 | 16.6 | 16.1 | 17.1 | 6.9 | 6.7 | 7.9 | 8.3 |
| 10:00 | 3 | • | • | • | • | 8.7 | 7.5 | 5.2 | 3.0 | 16.2 | 16.6 | 16.1 | 17.1 | 6.9 | 6.8 | 7.9 | 8.4 |
| 10:15 | 3 | • | • | • | • | 8.7 | 7.5 | 5.2 | 3.1 | 16.2 | 16.5 | 16.2 | 17.2 | 6.9 | 6.8 | 8.0 | 8.5 |
| 10:30 | 3 | • | • | • | • | 8.7 | 7.5 | 5.2 | 3.1 | 16.1 | 16.5 | 16.2 | 17.3 | 6.9 | 6.8 | 8.0 | 8.6 |
| 10:45 | 3 | • | • | • | • | 8.7 | 7.5 | 5.1 | 3.2 | 16.1 | 16.5 | 16.2 | 17.3 | 6.9 | 6.8 | 8.0 | 8.7 |
| 11:00 | 3 | • | • | • | • | 8.6 | 7.4 | 5.1 | 3.2 | 16.1 | 16.4 | 16.2 | 17.3 | 6.9 | 6.8 | 6.0 | 8.7 |
| 11:15 | 3 | • | • | • | • | 8.6 | 7.4 | 5.1 | 3.2 | 16.1 | 16.3 | 16.2 | 17.5 | 6.9 | 6.8 | 8.0 | 8.8 |
| 11:30 | 3 | • | • | • | • | 8.6 | 7.4 | 5.1 | 3.2 | 16.0 | 16.3 | 16.2 | 17.7 | 6.9 | 6.8 | 8.1 | 8.8 |
| 11:45 | 3 | • | • | • | • | 8.6 | 7.4 | 5.1 | 3.3 | 16.0 | 16.2 | 16.3 | 17.9 | 6.9 | 6.8 | 8.1 | 8.9 |
| 12:00 | 3 | • | • | • | • | 8.6 | 7.3 | 5.1 | 3.3 | 16.0 | 16.2 | 16.3 | 17.9 | 6.9 | 6.8 | 8.1 | 8.9 |
| 12:15 | 3 | • | • | • | • | 8.6 | 7.3 | 5.1 | 3.4 | 16.0 | 16.2 | 16.4 | 17.9 | 6.9 | 6.8 | 8.1 | 8.9 |
| 12:30 | 3 | • | • | • | • | 8.6 | 7.3 | 5.1 | 3.4 | 16.0 | 16.2 | 16.5 | 17.9 | 6.9 | 6.8 | 8.2 | 8.9 |
| 12:45 | 3 | • | • | • | • | 8.5 | 7.3 | 5.1 | 3.5 | 16.0 | 16.2 | 16.8 | 17.9 | 6.9 | 6.8 | 8.2 | 8.9 |
| 13:00 | 3 | • | • | • | • | 8.5 | 7.3 | 5.1 | 3.5 | 16.0 | 16.2 | 16.7 | 17.9 | 6.9 | 6.8 | 8.3 | 8.9 |
| 13:15 | 3 | • | • | • | • | 8.5 | 7.3 | 5.1 | 3.5 | 16.0 | 16.2 | 16.8 | 18.0 | 6.9 | 6.8 | 8.3 | 9.0 |
| 13:30 | 3 | • | • | • | • | 8.5 | 7.2 | 5.1 | 3.5 | 16.0 | 16.2 | 16.8 | 18.1 | 6.9 | 6.8 | 8.3 | 9.0 |
| 13:45 | 3 | • | • | • | • | 8.5 | 7.2 | 5.1 | 3.6 | 16.0 | 16.2 | 16.8 | 18.1 | 6.9 | 6.8 | 8.4 | 9.0 |
| 14:00 | 3 | • | • | • | • | 8.5 | 7.2 | 5.1 | 3.6 | 16.0 | 16.2 | 16.8 | 18.2 | 6.9 | 6.8 | 8.4 | 9.0 |
| 14:15 | 3 | • | • | • | • | 8.5 | 7.2 | 5.1 | 3.6 | 16.0 | 16.2 | 16.9 | 18.2 | 6.8 | 6.9 | 8.4 | 9.0 |
| 14:30 | 3 | • | • | • | • | 8.5 | 7.2 | 5.1 | 3.7 | 16.0 | 16.2 | 16.9 | 18.2 | 6.8 | 6.9 | 8.5 | 9.0 |
| 14:45 | 3 | • | • | • | • | 8.5 | 7.2 | 5.1 | 3.8 | 16.0 | 16.2 | 16.9 | 18.4 | 6.8 | 6.9 | 8.5 | 8.9 |
| 15:00 | 3 | • | • | • | • | 8.5 | 7.2 | 5.1 | 3.8 | 16.0 | 16.2 | 16.9 | 18.5 | 6.8 | 6.9 | 8.6 | 8.9 |
| 15:15 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 16.9 | 18.5 | 6.8 | 6.9 | 8.6 | 8.8 |
| 15:30 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 16.9 | 18.5 | 6.8 | 6.9 | 8.6 | 8.7 |
| 15:45 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 16.9 | 18.5 | 6.8 | 6.9 | 8.6 | 8.7 |
| 16:00 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.0 | 18.5 | 6.8 | 6.9 | 8.7 | 8.7 |
| 16:15 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.0 | 18.5 | 6.8 | 6.9 | 8.7 | 8.6 |

## Appendix B Temperature survey data

| time | day | 1A-60 | 1A-35 | 1A-10 | 1A+15 | 1B-60 | 1B-35 | 1B-10 | 1B+15 | 2A-60 | 2A-35 | 2A-10 | 2A+15 | 2B-60 | 2B-35 | 2B-10 | 2B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24hr clock | no. | | | | | | | | | | | | | | | | |
| 16:30 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.0 | 18.5 | 6.8 | 7.0 | 8.7 | 8.6 |
| 16:45 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.0 | 18.5 | 6.8 | 7.0 | 8.7 | 8.5 |
| 17:00 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.0 | 18.5 | 6.9 | 7.0 | 8.7 | 8.5 |
| 17:15 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.1 | 18.4 | 6.9 | 7.0 | 8.8 | 8.5 |
| 17:30 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.1 | 18.3 | 6.9 | 7.1 | 8.8 | 8.4 |
| 17:45 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.2 | 18.2 | 7.0 | 7.1 | 8.8 | 8.4 |
| 18:00 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.2 | 18.2 | 7.0 | 7.2 | 8.8 | 8.3 |
| 18:15 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.8 | 16.0 | 16.2 | 17.2 | 18.2 | 7.0 | 7.2 | 8.8 | 8.3 |
| 18:30 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.9 | 16.0 | 16.2 | 17.2 | 18.2 | 7.1 | 7.3 | 8.8 | 8.2 |
| 18:45 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.9 | 16.0 | 16.2 | 17.2 | 18.1 | 7.1 | 7.3 | 8.8 | 8.2 |
| 19:00 | 3 | • | • | • | • | 8.5 | 7.2 | 5.2 | 3.9 | 16.0 | 16.2 | 17.2 | 18.1 | 7.1 | 7.4 | 8.7 | 8.1 |
| 19:15 | 3 | • | • | • | • | 8.5 | 7.2 | 5.3 | 4.0 | 16.0 | 16.2 | 17.3 | 18.1 | 7.2 | 7.4 | 8.7 | 8.1 |
| 19:30 | 3 | • | • | • | • | 8.6 | 7.2 | 5.3 | 4.0 | 16.0 | 16.2 | 17.3 | 18.1 | 7.2 | 7.5 | 8.7 | 8.1 |
| 19:45 | 3 | • | • | • | • | 8.6 | 7.2 | 5.3 | 4.1 | 16.0 | 16.2 | 17.3 | 18.0 | 7.2 | 7.5 | 8.7 | 8.1 |
| 20:00 | 3 | • | • | • | • | 8.6 | 7.2 | 5.3 | 4.1 | 16.0 | 16.3 | 17.3 | 18.0 | 7.2 | 7.5 | 8.7 | 8.1 |
| 20:15 | 3 | • | • | • | • | 8.6 | 7.2 | 5.4 | 4.1 | 16.0 | 16.3 | 17.3 | 18.0 | 7.3 | 7.6 | 8.6 | 8.0 |
| 20:30 | 3 | • | • | • | • | 8.6 | 7.2 | 5.4 | 4.1 | 16.0 | 16.4 | 17.3 | 18.0 | 7.3 | 7.6 | 8.6 | 8.0 |
| 20:45 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.4 | 17.3 | 18.0 | 7.3 | 7.7 | 8.6 | 8.0 |
| 21:00 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.5 | 17.3 | 18.0 | 7.3 | 7.7 | 8.5 | 7.9 |
| 21:15 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.5 | 17.3 | 18.0 | 7.4 | 7.7 | 8.5 | 7.9 |
| 21:30 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.5 | 17.3 | 18.0 | 7.4 | 7.7 | 8.5 | 7.9 |
| 21:45 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.5 | 17.4 | 17.9 | 7.4 | 7.8 | 8.5 | 7.9 |
| 22:00 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.6 | 17.5 | 17.9 | 7.5 | 7.8 | 8.4 | 7.9 |
| 22:15 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.6 | 17.5 | 17.8 | 7.5 | 7.8 | 8.4 | 7.8 |
| 22:30 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.6 | 17.5 | 17.8 | 7.5 | 7.8 | 8.4 | 7.8 |
| 22:45 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.2 | 16.0 | 16.7 | 17.5 | 17.8 | 7.5 | 7.8 | 8.4 | 7.8 |
| 23:00 | 3 | • | • | • | • | 8.7 | 7.2 | 5.4 | 4.3 | 16.0 | 16.7 | 17.5 | 17.7 | 7.5 | 7.8 | 8.3 | 7.8 |
| 23:15 | 3 | • | • | • | • | 8.7 | 7.2 | 5.5 | 4.4 | 16.0 | 16.7 | 17.5 | 17.7 | 7.5 | 7.8 | 8.3 | 7.8 |
| 23:30 | 3 | • | • | • | • | 8.7 | 7.2 | 5.5 | 4.4 | 16.0 | 16.7 | 17.5 | 17.6 | 7.6 | 7.8 | 8.3 | 7.8 |
| 23:45 | 3 | • | • | • | • | 8.7 | 7.2 | 5.5 | 4.4 | 16.0 | 16.7 | 17.4 | 17.6 | 7.6 | 7.8 | 8.2 | 7.8 |
| 0:00 | 3 | • | • | • | • | 8.7 | 7.2 | 5.5 | 4.4 | 16.0 | 16.7 | 17.4 | 17.5 | 7.6 | 7.8 | 8.2 | 7.8 |

# Appendix B  Temperature survey data

| time | day | 3A-60 | 3A-35 | 3A-10 | 3A+15 | 3B-60 | 3B-35 | 3B-10 | 3B+15 | 4A-60 | 4A-35 | 4A-10 | 4A+15 | 4B-60 | 4B-35 | 4B-10 | 4B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 hr clock | no. | | | | | | | | | | | | | | | | |
| 0:00 | 1 | 17.5 | 18.5 | 19.0 | 19.1 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.4 | 10.8 | 10.8 | 11.0 | 11.1 |
| 0:15 | 1 | 17.5 | 18.6 | 19.0 | 19.1 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.3 | 10.8 | 10.8 | 11.0 | 11.1 |
| 0:30 | 1 | 17.5 | 18.7 | 19.0 | 19.0 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.3 | 10.8 | 10.8 | 11.0 | 11.1 |
| 0:45 | 1 | 17.6 | 18.7 | 18.9 | 19.0 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.3 | 10.8 | 10.8 | 11.0 | 11.1 |
| 1:00 | 1 | 17.6 | 18.7 | 18.9 | 19.0 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.3 | 10.8 | 10.8 | 11.0 | 11.1 |
| 1:15 | 1 | 17.7 | 18.7 | 18.9 | 19.0 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.3 | 10.8 | 10.8 | 11.0 | 11.1 |
| 1:30 | 1 | 17.7 | 18.7 | 18.9 | 18.9 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.8 | 10.8 | 11.0 | 11.1 |
| 1:45 | 1 | 17.8 | 18.7 | 18.9 | 18.9 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.8 | 10.8 | 11.0 | 11.1 |
| 2:00 | 1 | 17.8 | 18.8 | 18.9 | 18.9 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.8 | 10.8 | 11.0 | 11.1 |
| 2:15 | 1 | 17.8 | 18.8 | 18.8 | 18.8 | 8.6 | 8.7 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.8 | 10.8 | 11.0 | 11.1 |
| 2:30 | 1 | 17.8 | 18.8 | 18.8 | 18.8 | 8.6 | 8.8 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.8 | 10.8 | 11.0 | 11.1 |
| 2:45 | 1 | 17.8 | 18.8 | 18.8 | 18.8 | 8.6 | 8.8 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 11.0 |
| 3:00 | 1 | 17.9 | 18.9 | 18.8 | 18.8 | 8.6 | 8.8 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 11.0 |
| 3:15 | 1 | 17.9 | 18.9 | 18.7 | 18.7 | 8.7 | 8.8 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.9 |
| 3:30 | 1 | 17.9 | 18.9 | 18.7 | 18.7 | 8.7 | 8.8 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.8 |
| 3:45 | 1 | 17.9 | 18.9 | 18.7 | 18.7 | 8.7 | 8.8 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.8 |
| 4:00 | 1 | 17.9 | 18.9 | 18.7 | 18.7 | 8.7 | 8.8 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.8 |
| 4:15 | 1 | 17.9 | 18.9 | 18.7 | 18.7 | 8.7 | 8.9 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.8 |
| 4:30 | 1 | 18.0 | 18.9 | 18.7 | 18.7 | 8.7 | 8.9 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.8 |
| 4:45 | 1 | 18.0 | 18.9 | 18.7 | 18.7 | 8.7 | 8.9 | 9.8 | 10.0 | 11.9 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.9 |
| 5:00 | 1 | 18.0 | 18.9 | 18.7 | 18.7 | 8.7 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.9 |
| 5:15 | 1 | 18.0 | 18.9 | 18.7 | 18.7 | 8.7 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.9 |
| 5:30 | 1 | 18.1 | 18.9 | 18.7 | 18.7 | 8.7 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 13.0 | 12.2 | 10.9 | 10.9 | 11.0 | 10.9 |
| 5:45 | 1 | 18.1 | 18.9 | 18.7 | 18.7 | 8.7 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.1 | 10.9 | 10.9 | 11.0 | 10.9 |
| 6:00 | 1 | 18.1 | 18.9 | 18.6 | 18.6 | 8.7 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.1 | 10.9 | 10.9 | 11.0 | 11.0 |
| 6:15 | 1 | 18.1 | 18.9 | 18.6 | 18.6 | 8.8 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.1 | 10.9 | 10.9 | 11.0 | 11.0 |
| 6:30 | 1 | 18.1 | 18.9 | 18.6 | 18.5 | 8.8 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.1 | 10.9 | 10.9 | 11.0 | 11.0 |
| 6:45 | 1 | 18.1 | 18.9 | 18.5 | 18.4 | 8.8 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.1 | 10.9 | 10.9 | 11.0 | 11.0 |
| 7:00 | 1 | 18.2 | 18.9 | 18.5 | 18.3 | 8.8 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.1 | 10.9 | 10.9 | 11.0 | 11.1 |
| 7:15 | 1 | 18.2 | 18.9 | 18.4 | 18.3 | 8.8 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.2 | 10.9 | 10.9 | 11.0 | 11.1 |
| 7:30 | 1 | 18.2 | 18.9 | 18.3 | 18.2 | 8.8 | 8.9 | 9.8 | 10.0 | 12.0 | 12.9 | 12.9 | 12.2 | 10.9 | 10.9 | 11.0 | 11.1 |
| 7:45 | 1 | 18.2 | 18.9 | 18.3 | 18.2 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.9 | 12.2 | 10.9 | 10.9 | 11.0 | 11.2 |
| 8:00 | 1 | 18.2 | 18.9 | 18.2 | 18.2 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.9 | 12.3 | 10.9 | 10.9 | 11.0 | 11.2 |
| 8:15 | 1 | 18.2 | 18.8 | 18.2 | 18.1 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.9 | 12.3 | 10.9 | 10.9 | 11.0 | 11.2 |
| 8:30 | 1 | 18.2 | 18.8 | 18.2 | 18.1 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.4 | 10.9 | 10.9 | 11.0 | 11.3 |
| 8:45 | 1 | 18.2 | 18.8 | 18.2 | 18.1 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.5 | 10.9 | 10.9 | 11.0 | 11.4 |
| 9:00 | 1 | 18.2 | 18.8 | 18.1 | 18.1 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.6 | 10.9 | 10.9 | 11.0 | 11.5 |
| 9:15 | 1 | 18.2 | 18.8 | 18.1 | 18.0 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.7 | 10.9 | 10.9 | 11.0 | 11.5 |
| 9:30 | 1 | 18.2 | 18.7 | 18.1 | 18.0 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.7 | 10.9 | 10.9 | 11.0 | 11.6 |
| 9:45 | 1 | 18.2 | 18.7 | 18.0 | 18.0 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.8 | 10.9 | 10.9 | 11.0 | 11.7 |
| 10:00 | 1 | 18.2 | 18.7 | 18.0 | 18.0 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.8 | 10.9 | 10.9 | 11.0 | 11.8 |
| 10:15 | 1 | 18.2 | 18.6 | 18.0 | 18.0 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.8 | 10.9 | 10.9 | 11.0 | 11.8 |
| 10:30 | 1 | 18.2 | 18.6 | 18.0 | 18.0 | 8.8 | 8.9 | 9.7 | 10.0 | 12.0 | 12.9 | 12.8 | 12.8 | 10.9 | 10.9 | 11.0 | 11.8 |
| 10:45 | 1 | 18.2 | 18.6 | 18.0 | 18.1 | 8.8 | 9.0 | 9.7 | 10.0 | 12.0 | 12.8 | 12.7 | 12.9 | 10.9 | 10.9 | 11.0 | 11.8 |
| 11:00 | 1 | 18.2 | 18.6 | 18.0 | 18.1 | 8.8 | 9.0 | 9.7 | 10.0 | 12.0 | 12.8 | 12.7 | 12.9 | 10.9 | 10.9 | 11.0 | 11.9 |
| 11:15 | 1 | 18.2 | 18.6 | 18.0 | 18.2 | 8.8 | 9.0 | 9.7 | 10.0 | 12.0 | 12.8 | 12.7 | 13.0 | 10.8 | 10.8 | 11.0 | 12.0 |
| 11:30 | 1 | 18.2 | 18.5 | 18.0 | 18.2 | 8.8 | 9.0 | 9.7 | 10.0 | 12.0 | 12.8 | 12.7 | 13.0 | 10.8 | 10.8 | 11.0 | 12.1 |
| 11:45 | 1 | 18.1 | 18.5 | 18.0 | 18.3 | 8.8 | 9.0 | 9.7 | 10.1 | 12.0 | 12.8 | 12.6 | 13.0 | 10.8 | 10.8 | 11.0 | 12.2 |
| 12:00 | 1 | 18.1 | 18.5 | 18.0 | 18.3 | 8.8 | 9.0 | 9.8 | 10.1 | 12.0 | 12.8 | 12.6 | 13.0 | 10.8 | 10.8 | 11.0 | 12.2 |
| 12:15 | 1 | 18.1 | 18.5 | 18.0 | 18.3 | 8.8 | 9.0 | 9.8 | 10.1 | 11.9 | 12.8 | 12.6 | 13.0 | 10.8 | 10.8 | 11.1 | 12.2 |
| 12:30 | 1 | 18.1 | 18.5 | 18.0 | 18.4 | 8.9 | 9.0 | 9.8 | 10.2 | 11.9 | 12.8 | 12.6 | 13.0 | 10.8 | 10.8 | 11.1 | 12.2 |
| 12:45 | 1 | 18.1 | 18.5 | 18.0 | 18.4 | 8.9 | 9.0 | 9.8 | 10.2 | 11.9 | 12.8 | 12.6 | 13.1 | 10.8 | 10.8 | 11.1 | 12.2 |
| 13:00 | 1 | 18.1 | 18.5 | 18.0 | 18.4 | 8.9 | 9.0 | 9.9 | 10.3 | 11.9 | 12.8 | 12.7 | 13.2 | 10.8 | 10.8 | 11.1 | 12.2 |
| 13:15 | 1 | 18.1 | 18.5 | 18.0 | 18.5 | 8.9 | 9.0 | 9.9 | 10.4 | 11.9 | 12.8 | 12.7 | 13.3 | 10.8 | 10.8 | 11.1 | 12.1 |
| 13:30 | 1 | 18.1 | 18.5 | 18.0 | 18.5 | 8.9 | 9.0 | 9.9 | 10.5 | 11.9 | 12.8 | 12.8 | 13.4 | 10.8 | 10.8 | 11.1 | 12.1 |
| 13:45 | 1 | 18.1 | 18.5 | 18.0 | 18.6 | 8.9 | 9.0 | 9.9 | 10.6 | 11.9 | 12.8 | 12.8 | 13.5 | 10.8 | 10.8 | 11.1 | 12.1 |
| 14:00 | 1 | 18.1 | 18.4 | 18.0 | 18.7 | 8.9 | 9.0 | 10.0 | 10.6 | 11.9 | 12.8 | 12.9 | 13.6 | 10.8 | 10.8 | 11.1 | 12.1 |
| 14:15 | 1 | 18.1 | 18.3 | 18.0 | 18.8 | 8.9 | 9.0 | 10.0 | 10.7 | 11.9 | 12.8 | 12.9 | 13.6 | 10.8 | 10.8 | 11.2 | 12.1 |
| 14:30 | 1 | 18.1 | 18.3 | 18.0 | 18.8 | 8.9 | 9.0 | 10.0 | 10.7 | 11.9 | 12.8 | 12.9 | 13.5 | 10.8 | 10.8 | 11.2 | 12.1 |
| 14:45 | 1 | 18.1 | 18.2 | 18.0 | 18.8 | 8.9 | 9.1 | 10.0 | 10.8 | 11.8 | 12.8 | 12.9 | 13.4 | 10.8 | 10.8 | 11.2 | 12.0 |
| 15:00 | 1 | 18.0 | 18.2 | 18.0 | 18.9 | 8.9 | 9.1 | 10.1 | 10.8 | 11.8 | 12.8 | 12.9 | 13.4 | 10.8 | 10.8 | 11.2 | 12.0 |
| 15:15 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.1 | 10.8 | 11.8 | 12.8 | 12.9 | 13.4 | 10.8 | 10.8 | 11.2 | 12.0 |
| 15:30 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.1 | 10.8 | 11.8 | 12.8 | 12.9 | 13.3 | 10.8 | 10.8 | 11.2 | 11.9 |
| 15:45 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.2 | 10.8 | 11.8 | 12.8 | 12.9 | 13.4 | 10.8 | 10.8 | 11.2 | 11.9 |
| 16:00 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.8 | 12.9 | 13.5 | 10.8 | 10.8 | 11.2 | 11.8 |
| 16:15 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.8 | 12.9 | 13.5 | 10.8 | 10.8 | 11.2 | 11.7 |
| 16:30 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.8 | 13.0 | 13.5 | 10.8 | 10.8 | 11.2 | 11.6 |
| 16:45 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.3 | 10.8 | 10.8 | 11.2 | 11.4 |
| 17:00 | 1 | 18.0 | 18.2 | 18.1 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.2 | 10.8 | 10.8 | 11.2 | 11.4 |
| 17:15 | 1 | 18.0 | 18.2 | 18.2 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.1 | 10.8 | 10.8 | 11.2 | 11.4 |
| 17:30 | 1 | 18.0 | 18.2 | 18.2 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.1 | 10.8 | 10.8 | 11.2 | 11.4 |
| 17:45 | 1 | 18.0 | 18.2 | 18.2 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.4 |
| 18:00 | 1 | 18.0 | 18.2 | 18.2 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.4 |
| 18:15 | 1 | 18.0 | 18.2 | 18.2 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.4 |
| 18:30 | 1 | 18.0 | 18.2 | 18.2 | 18.9 | 8.9 | 9.1 | 10.2 | 10.9 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.4 |
| 18:45 | 1 | 18.0 | 18.2 | 18.2 | 18.9 | 8.9 | 9.1 | 10.2 | 10.8 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.4 |
| 19:00 | 1 | 18.0 | 18.2 | 18.3 | 18.9 | 8.9 | 9.1 | 10.3 | 10.8 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.4 |
| 19:15 | 1 | 18.0 | 18.2 | 18.3 | 18.9 | 8.9 | 9.1 | 10.3 | 10.8 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.4 |
| 19:30 | 1 | 18.0 | 18.2 | 18.3 | 18.9 | 8.9 | 9.1 | 10.3 | 10.8 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 19:45 | 1 | 18.0 | 18.2 | 18.3 | 18.9 | 8.9 | 9.1 | 10.3 | 10.8 | 11.8 | 12.7 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 20:00 | 1 | 18.0 | 18.3 | 18.3 | 18.9 | 8.9 | 9.1 | 10.3 | 10.8 | 11.8 | 12.8 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 20:15 | 1 | 18.0 | 18.3 | 18.3 | 18.9 | 9.0 | 9.1 | 10.3 | 10.8 | 11.8 | 12.8 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 20:30 | 1 | 18.0 | 18.3 | 18.3 | 18.8 | 9.0 | 9.1 | 10.3 | 10.8 | 11.8 | 12.8 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 20:45 | 1 | 18.0 | 18.4 | 18.3 | 18.7 | 9.0 | 9.1 | 10.3 | 10.8 | 11.7 | 12.8 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 21:00 | 1 | 18.0 | 18.4 | 18.3 | 18.6 | 9.0 | 9.2 | 10.3 | 10.8 | 11.7 | 12.8 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 21:15 | 1 | 18.0 | 18.4 | 18.3 | 18.5 | 9.0 | 9.2 | 10.3 | 10.8 | 11.7 | 12.8 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |

# Appendix B Temperature survey data

| time | day | 3A-60 | 3A-35 | 3A-10 | 3A+15 | 3B-60 | 3B-35 | 3B-10 | 3B+15 | 4A-60 | 4A-35 | 4A-10 | 4A+15 | 4B-60 | 4B-35 | 4B-10 | 4B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 hr clock | no. | | | | | | | | | | | | | | | | |
| 21:30 | 1 | 18.0 | 18.5 | 18.3 | 18.5 | 9.0 | 9.2 | 10.3 | 10.8 | 11.7 | 12.6 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 21:45 | 1 | 18.0 | 18.5 | 18.2 | 18.4 | 9.0 | 9.2 | 10.3 | 10.8 | 11.7 | 12.6 | 13.0 | 13.0 | 10.8 | 10.8 | 11.2 | 11.3 |
| 22:00 | 1 | 18.0 | 18.5 | 18.2 | 18.3 | 9.0 | 9.2 | 10.3 | 10.8 | 11.7 | 12.6 | 13.0 | 13.0 | 10.8 | 10.8 | 11.1 | 11.3 |
| 22:15 | 1 | 18.0 | 18.5 | 18.2 | 18.3 | 9.0 | 9.2 | 10.3 | 10.7 | 11.7 | 12.8 | 13.0 | 12.9 | 10.8 | 10.8 | 11.1 | 11.3 |
| 22:30 | 1 | 18.0 | 18.5 | 18.2 | 18.2 | 9.0 | 9.2 | 10.3 | 10.7 | 11.7 | 12.6 | 13.0 | 12.8 | 10.8 | 10.8 | 11.1 | 11.3 |
| 22:45 | 1 | 18.0 | 18.5 | 18.2 | 18.1 | 9.0 | 9.2 | 10.3 | 10.7 | 11.7 | 12.6 | 13.0 | 12.9 | 10.8 | 10.8 | 11.1 | 11.3 |
| 23:00 | 1 | 18.0 | 18.6 | 18.1 | 18.0 | 9.0 | 9.2 | 10.3 | 10.6 | 11.7 | 12.6 | 12.9 | 12.9 | 10.8 | 10.8 | 11.1 | 11.3 |
| 23:15 | 1 | 18.0 | 18.6 | 18.1 | 17.9 | 9.0 | 9.2 | 10.3 | 10.6 | 11.7 | 12.6 | 12.9 | 12.9 | 10.8 | 10.5 | 11.1 | 11.3 |
| 23:30 | 1 | 18.0 | 18.6 | 18.0 | 17.8 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.8 | 10.8 | 11.0 | 11.3 |
| 23:45 | 1 | 18.0 | 18.6 | 18.0 | 17.8 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.8 | 10.8 | 11.0 | 11.3 |
| 0:00 | 1 | 18.0 | 18.6 | 17.9 | 17.7 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.8 | 10.8 | 11.0 | 11.3 |
| 0:15 | 2 | 18.0 | 18.6 | 17.9 | 17.6 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.8 | 10.8 | 11.0 | 11.3 |
| 0:30 | 2 | 18.0 | 18.6 | 17.9 | 17.5 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.0 | 11.3 |
| 0:45 | 2 | 18.0 | 18.6 | 17.9 | 17.4 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.8 | 12.9 | 12.9 | 10.9 | 10.9 | 11.0 | 11.3 |
| 1:00 | 2 | 18.0 | 18.6 | 17.8 | 17.3 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.0 | 11.3 |
| 1:15 | 2 | 18.0 | 18.6 | 17.8 | 17.3 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.0 | 11.3 |
| 1:30 | 2 | 18.0 | 18.6 | 17.7 | 17.2 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.0 | 11.3 |
| 1:45 | 2 | 18.0 | 18.6 | 17.7 | 17.2 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.0 | 11.3 |
| 2:00 | 2 | 18.0 | 18.6 | 17.7 | 17.1 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 13.0 | 10.9 | 10.9 | 11.0 | 11.3 |
| 2:15 | 2 | 18.0 | 18.6 | 17.7 | 17.1 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.1 | 11.4 |
| 2:30 | 2 | 18.0 | 18.5 | 17.7 | 17.1 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.1 | 11.4 |
| 2:45 | 2 | 18.0 | 18.5 | 17.6 | 17.0 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.1 | 11.4 |
| 3:00 | 2 | 18.0 | 18.5 | 17.5 | 17.0 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.2 | 11.5 |
| 3:15 | 2 | 18.0 | 18.4 | 17.4 | 17.0 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.2 | 11.5 |
| 3:30 | 2 | 18.0 | 18.4 | 17.3 | 16.9 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.6 | 12.9 | 12.9 | 10.9 | 10.9 | 11.2 | 11.5 |
| 3:45 | 2 | 18.0 | 18.4 | 17.3 | 16.8 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.8 | 11.0 | 11.0 | 11.2 | 11.5 |
| 4:00 | 2 | 18.0 | 18.3 | 17.2 | 16.8 | 9.0 | 9.2 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.8 | 11.0 | 11.0 | 11.2 | 11.6 |
| 4:15 | 2 | 18.0 | 18.3 | 17.2 | 16.8 | 9.0 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.7 | 11.0 | 11.0 | 11.3 | 11.6 |
| 4:30 | 2 | 18.1 | 18.3 | 17.2 | 16.7 | 9.0 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.6 | 11.0 | 11.0 | 11.3 | 11.6 |
| 4:45 | 2 | 18.1 | 18.3 | 17.2 | 16.6 | 9.0 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.6 | 11.0 | 11.0 | 11.3 | 11.7 |
| 5:00 | 2 | 18.1 | 18.2 | 17.2 | 16.5 | 9.0 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.5 | 11.0 | 11.0 | 11.3 | 11.7 |
| 5:15 | 2 | 18.1 | 18.2 | 17.1 | 16.4 | 9.0 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.5 | 11.0 | 11.0 | 11.4 | 11.7 |
| 5:30 | 2 | 18.1 | 18.2 | 17.1 | 16.3 | 9.1 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 13.0 | 12.6 | 11.0 | 11.0 | 11.4 | 11.7 |
| 5:45 | 2 | 18.1 | 18.2 | 17.1 | 16.3 | 9.1 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 13.0 | 12.6 | 11.0 | 11.0 | 11.4 | 11.7 |
| 6:00 | 2 | 18.1 | 18.2 | 17.0 | 16.2 | 9.1 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 13.0 | 12.6 | 11.0 | 11.0 | 11.4 | 11.7 |
| 6:15 | 2 | 18.1 | 18.2 | 17.0 | 16.2 | 9.1 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 13.0 | 12.6 | 11.0 | 11.0 | 11.4 | 11.7 |
| 6:30 | 2 | 18.1 | 18.2 | 17.0 | 16.1 | 9.1 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 13.0 | 12.6 | 11.0 | 11.0 | 11.4 | 11.7 |
| 6:45 | 2 | 18.1 | 18.2 | 16.9 | 16.1 | 9.1 | 9.3 | 10.3 | 10.5 | 11.7 | 12.7 | 12.9 | 12.7 | 11.0 | 11.0 | 11.4 | 11.7 |
| 7:00 | 2 | 18.1 | 18.2 | 16.9 | 16.1 | 9.1 | 9.3 | 10.3 | 10.4 | 11.7 | 12.7 | 12.9 | 12.8 | 11.0 | 11.0 | 11.4 | 11.7 |
| 7:15 | 2 | 18.1 | 18.2 | 16.9 | 16.1 | 9.1 | 9.4 | 10.3 | 10.4 | 11.7 | 12.7 | 12.9 | 12.8 | 11.0 | 11.0 | 11.4 | 11.7 |
| 7:30 | 2 | 18.1 | 18.2 | 16.8 | 16.1 | 9.1 | 9.4 | 10.3 | 10.4 | 11.7 | 12.7 | 12.8 | 12.8 | 11.0 | 11.0 | 11.4 | 11.7 |
| 7:45 | 2 | 18.1 | 18.2 | 16.8 | 16.1 | 9.2 | 9.4 | 10.3 | 10.4 | 11.7 | 12.7 | 12.8 | 12.8 | 11.0 | 11.0 | 11.4 | 11.7 |
| 8:00 | 2 | 18.1 | 18.2 | 16.7 | 16.1 | 9.2 | 9.4 | 10.3 | 10.4 | 11.7 | 12.7 | 12.8 | 12.9 | 11.0 | 11.0 | 11.4 | 11.7 |
| 8:15 | 2 | 18.0 | 18.1 | 16.7 | 16.1 | 9.2 | 9.4 | 10.3 | 10.4 | 11.7 | 12.7 | 12.8 | 12.9 | 11.0 | 11.0 | 11.4 | 11.7 |
| 8:30 | 2 | 18.0 | 18.1 | 16.6 | 16.1 | 9.2 | 9.4 | 10.3 | 10.4 | 11.7 | 12.7 | 12.8 | 12.9 | 11.0 | 11.0 | 11.4 | 11.7 |
| 8:45 | 2 | 18.0 | 18.1 | 16.5 | 16.1 | 9.2 | 9.4 | 10.3 | 10.4 | 11.7 | 12.7 | 12.8 | 12.9 | 11.0 | 11.0 | 11.4 | 11.7 |
| 9:00 | 2 | 18.0 | 18.0 | 16.5 | 16.1 | 9.2 | 9.4 | 10.2 | 10.4 | 11.7 | 12.7 | 12.7 | 13.0 | 11.0 | 11.0 | 11.4 | 11.8 |
| 9:15 | 2 | 18.0 | 18.0 | 16.4 | 16.2 | 9.2 | 9.4 | 10.2 | 10.4 | 11.7 | 12.7 | 12.7 | 13.0 | 11.0 | 11.0 | 11.4 | 11.8 |
| 9:30 | 2 | 18.0 | 17.9 | 16.4 | 16.2 | 9.2 | 9.4 | 10.2 | 10.4 | 11.7 | 12.7 | 12.7 | 13.0 | 11.0 | 11.0 | 11.4 | 11.8 |
| 9:45 | 2 | 18.0 | 17.9 | 16.3 | 16.2 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.7 | 13.0 | 11.0 | 11.0 | 11.4 | 11.8 |
| 10:00 | 2 | 17.9 | 17.9 | 16.2 | 16.2 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.7 | 13.1 | 11.0 | 11.0 | 11.4 | 11.9 |
| 10:15 | 2 | 17.9 | 17.9 | 16.2 | 16.3 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.7 | 13.2 | 11.0 | 11.0 | 11.4 | 11.9 |
| 10:30 | 2 | 17.9 | 17.8 | 16.2 | 16.5 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.8 | 13.2 | 11.0 | 11.0 | 11.5 | 11.9 |
| 10:45 | 2 | 17.9 | 17.8 | 16.2 | 16.8 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.8 | 13.2 | 11.0 | 11.0 | 11.5 | 11.9 |
| 11:00 | 2 | 17.8 | 17.8 | 16.2 | 17.0 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.8 | 13.3 | 11.0 | 11.0 | 11.5 | 12.0 |
| 11:15 | 2 | 17.8 | 17.7 | 16.2 | 17.1 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.8 | 13.3 | 11.0 | 11.0 | 11.5 | 12.0 |
| 11:30 | 2 | 17.8 | 17.7 | 16.3 | 17.2 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.8 | 13.3 | 11.0 | 11.0 | 11.5 | 12.1 |
| 11:45 | 2 | 17.8 | 17.7 | 16.3 | 17.2 | 9.2 | 9.5 | 10.2 | 10.4 | 11.7 | 12.7 | 12.8 | 13.3 | 11.0 | 11.0 | 11.6 | 12.2 |
| 12:00 | 2 | 17.7 | 17.6 | 16.3 | 17.3 | 9.2 | 9.5 | 10.2 | 10.5 | 11.7 | 12.6 | 12.8 | 13.4 | 11.0 | 11.0 | 11.6 | 12.3 |
| 12:15 | 2 | 17.7 | 17.5 | 16.4 | 17.5 | 9.2 | 9.5 | 10.1 | 10.5 | 11.7 | 12.6 | 12.8 | 13.5 | 11.0 | 11.0 | 11.7 | 12.4 |
| 12:30 | 2 | 17.7 | 17.4 | 16.4 | 17.9 | 9.2 | 9.5 | 10.1 | 10.5 | 11.7 | 12.6 | 12.8 | 13.5 | 11.0 | 11.0 | 11.8 | 12.5 |
| 12:45 | 2 | 17.6 | 17.3 | 16.5 | 18.0 | 9.2 | 9.5 | 10.1 | 10.5 | 11.7 | 12.6 | 12.8 | 13.6 | 11.0 | 11.0 | 11.8 | 12.6 |
| 13:00 | 2 | 17.6 | 17.3 | 16.7 | 18.1 | 9.2 | 9.5 | 10.1 | 10.5 | 11.7 | 12.6 | 12.8 | 13.7 | 11.0 | 11.0 | 11.8 | 12.5 |
| 13:15 | 2 | 17.6 | 17.3 | 16.8 | 18.1 | 9.2 | 9.5 | 10.1 | 10.5 | 11.7 | 12.6 | 12.8 | 13.7 | 11.0 | 11.0 | 11.8 | 12.5 |
| 13:30 | 2 | 17.6 | 17.3 | 16.8 | 18.2 | 9.2 | 9.5 | 10.1 | 10.5 | 11.7 | 12.5 | 12.8 | 13.7 | 11.0 | 11.0 | 11.8 | 12.5 |
| 13:45 | 2 | 17.6 | 17.2 | 16.9 | 18.3 | 9.2 | 9.5 | 10.2 | 10.6 | 11.7 | 12.5 | 12.8 | 13.7 | 11.0 | 11.0 | 11.8 | 12.4 |
| 14:00 | 2 | 17.5 | 17.2 | 16.9 | 18.4 | 9.2 | 9.5 | 10.2 | 10.6 | 11.7 | 12.5 | 12.8 | 13.8 | 11.0 | 11.0 | 11.8 | 12.3 |
| 14:15 | 2 | 17.5 | 17.2 | 17.0 | 18.6 | 9.2 | 9.5 | 10.2 | 10.6 | 11.7 | 12.5 | 12.8 | 13.8 | 11.0 | 11.1 | 11.8 | 12.3 |
| 14:30 | 2 | 17.4 | 17.1 | 17.0 | 18.7 | 9.3 | 9.5 | 10.2 | 10.7 | 11.7 | 12.5 | 12.8 | 13.8 | 11.0 | 11.1 | 11.8 | 12.2 |
| 14:45 | 2 | 17.4 | 17.1 | 17.0 | 18.8 | 9.3 | 9.5 | 10.2 | 10.7 | 11.7 | 12.5 | 12.8 | 13.8 | 11.0 | 11.1 | 11.8 | 12.2 |
| 15:00 | 2 | 17.3 | 17.1 | 17.0 | 18.8 | 9.3 | 9.5 | 10.2 | 10.7 | 11.6 | 12.4 | 12.8 | 13.8 | 11.0 | 11.1 | 11.7 | 12.1 |
| 15:15 | 2 | 17.3 | 17.0 | 17.1 | 18.9 | 9.3 | 9.5 | 10.3 | 10.8 | 11.6 | 12.4 | 12.8 | 13.8 | 11.0 | 11.1 | 11.7 | 12.1 |
| 15:30 | 2 | 17.3 | 17.0 | 17.1 | 18.9 | 9.3 | 9.5 | 10.3 | 10.8 | 11.6 | 12.4 | 12.9 | 13.8 | 11.0 | 11.1 | 11.7 | 12.0 |
| 15:45 | 2 | 17.3 | 17.0 | 17.2 | 19.0 | 9.3 | 9.5 | 10.3 | 10.8 | 11.6 | 12.4 | 12.9 | 13.8 | 11.0 | 11.1 | 11.7 | 12.0 |
| 16:00 | 2 | 17.2 | 17.0 | 17.3 | 19.0 | 9.3 | 9.5 | 10.4 | 10.8 | 11.6 | 12.4 | 12.9 | 13.8 | 11.0 | 11.1 | 11.7 | 11.9 |
| 16:15 | 2 | 17.2 | 17.0 | 17.4 | 19.0 | 9.3 | 9.5 | 10.4 | 10.9 | 11.6 | 12.4 | 12.9 | 13.8 | 11.0 | 11.1 | 11.7 | 11.9 |
| 16:30 | 2 | 17.2 | 17.0 | 17.5 | 19.0 | 9.3 | 9.5 | 10.5 | 10.9 | 11.6 | 12.4 | 12.9 | 13.8 | 11.0 | 11.1 | 11.6 | 11.8 |
| 16:45 | 2 | 17.2 | 17.0 | 17.5 | 19.0 | 9.3 | 9.5 | 10.5 | 10.9 | 11.6 | 12.4 | 13.0 | 13.8 | 11.0 | 11.1 | 11.6 | 11.7 |
| 17:00 | 2 | 17.2 | 17.0 | 17.6 | 18.9 | 9.3 | 9.5 | 10.5 | 10.9 | 11.6 | 12.4 | 13.0 | 13.7 | 11.0 | 11.1 | 11.5 | 11.6 |
| 17:15 | 2 | 17.1 | 17.0 | 17.7 | 18.8 | 9.3 | 9.5 | 10.6 | 10.9 | 11.6 | 12.4 | 13.0 | 13.7 | 11.0 | 11.1 | 11.4 | 11.5 |
| 17:30 | 2 | 17.1 | 17.0 | 17.7 | 18.5 | 9.3 | 9.5 | 10.6 | 10.9 | 11.6 | 12.4 | 13.0 | 13.6 | 11.0 | 11.1 | 11.3 | 11.4 |
| 17:45 | 2 | 17.1 | 17.0 | 17.8 | 18.6 | 9.4 | 9.5 | 10.6 | 10.9 | 11.6 | 12.4 | 13.0 | 13.6 | 11.0 | 11.1 | 11.3 | 11.3 |
| 18:00 | 2 | 17.1 | 17.0 | 17.8 | 18.2 | 9.4 | 9.5 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.6 | 11.0 | 11.1 | 11.3 | 11.2 |
| 18:15 | 2 | 17.1 | 17.0 | 17.8 | 18.1 | 9.4 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.6 | 11.0 | 11.1 | 11.3 | 11.2 |
| 18:30 | 2 | 17.1 | 17.0 | 17.9 | 18.0 | 9.4 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.6 | 11.0 | 11.1 | 11.2 | 11.1 |
| 18:45 | 2 | 17.1 | 17.1 | 17.9 | 17.9 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.6 | 11.0 | 11.1 | 11.2 | 11.1 |

# Appendix B  Temperature survey data

| time<br>24 hr clock | day<br>no. | 3A-60 | 3A-35 | 3A-10 | 3A+15 | 3B-60 | 3B-35 | 3B-10 | 3B+15 | 4A-60 | 4A-35 | 4A-10 | 4A+15 | 4B-60 | 4B-35 | 4B-10 | 4B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19:00 | 2 | 17.1 | 17.1 | 17.9 | 17.9 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.5 | 11.0 | 11.1 | 11.2 | 11.1 |
| 19:15 | 2 | 17.1 | 17.1 | 17.9 | 17.8 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.5 | 11.0 | 11.1 | 11.2 | 11.1 |
| 19:30 | 2 | 17.0 | 17.2 | 17.9 | 17.7 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.4 | 11.0 | 11.1 | 11.1 | 11.1 |
| 19:45 | 2 | 17.0 | 17.2 | 17.9 | 17.7 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.3 | 11.0 | 11.1 | 11.1 | 11.1 |
| 20:00 | 2 | 17.0 | 17.2 | 17.9 | 17.2 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.2 | 11.0 | 11.1 | 11.1 | 11.0 |
| 20:15 | 2 | 17.0 | 17.2 | 17.9 | 17.1 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.2 | 11.0 | 11.1 | 11.0 | 11.0 |
| 20:30 | 2 | 17.0 | 17.2 | 17.9 | 17.0 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.1 | 11.0 | 11.1 | 11.0 | 11.0 |
| 20:45 | 2 | 17.0 | 17.2 | 17.9 | 17.0 | 9.5 | 9.6 | 10.7 | 10.9 | 11.6 | 12.4 | 13.0 | 13.1 | 11.0 | 11.1 | 11.0 | 11.0 |
| 21:00 | 2 | 17.0 | 17.2 | 17.9 | 17.1 | 9.5 | 9.6 | 10.7 | 10.8 | 11.6 | 12.4 | 13.0 | 13.1 | 11.0 | 11.1 | 11.0 | 11.0 |
| 21:15 | 2 | 17.0 | 17.2 | 17.9 | 17.5 | 9.5 | 9.6 | 10.7 | 10.8 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 11.0 | 11.0 |
| 21:30 | 2 | 17.0 | 17.3 | 17.9 | 17.1 | 9.5 | 9.6 | 10.7 | 10.8 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 10.9 |
| 21:45 | 2 | 17.0 | 17.3 | 18.0 | 17.5 | 9.5 | 9.6 | 10.7 | 10.8 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 10.9 |
| 22:00 | 2 | 17.0 | 17.3 | 18.0 | 17.5 | 9.5 | 9.6 | 10.7 | 10.8 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 10.9 |
| 22:15 | 2 | 17.0 | 17.3 | 18.0 | 17.3 | 9.5 | 9.6 | 10.6 | 10.7 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 10.9 |
| 22:30 | 2 | 17.0 | 17.3 | 18.0 | 17.2 | 9.5 | 9.6 | 10.6 | 10.7 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.8 | 10.8 |
| 22:45 | 2 | 17.0 | 17.3 | 18.0 | 17.1 | 9.5 | 9.6 | 10.6 | 10.7 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.8 | 10.8 |
| 23:00 | 2 | 17.0 | 17.4 | 18.0 | 18.0 | 9.5 | 9.6 | 10.5 | 10.6 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.8 | 10.8 |
| 23:15 | 2 | 17.0 | 17.4 | 17.9 | 17.9 | 9.5 | 9.6 | 10.5 | 10.6 | 11.6 | 12.4 | 13.0 | 13.0 | 11.0 | 11.0 | 10.8 | 10.8 |
| 23:30 | 2 | 17.0 | 17.4 | 17.9 | 17.8 | 9.5 | 9.7 | 10.4 | 10.6 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 10.7 | 10.7 |
| 23:45 | 2 | 17.0 | 17.5 | 17.9 | 17.8 | 9.5 | 9.7 | 10.4 | 10.5 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 10.7 | 10.7 |
| 0:00 | 2 | 17.0 | 17.5 | 17.8 | 17.4 | 9.5 | 9.7 | 10.4 | 10.5 | 11.7 | 12.6 | 13.0 | 13.0 | 11.0 | 11.0 | 10.7 | 10.7 |
| 0:15 | 3 | 17.0 | 17.5 | 17.7 | 17.3 | 9.5 | 9.7 | 10.3 | 10.4 | 11.7 | 12.6 | 13.0 | 13.0 | 11.0 | 11.0 | 10.7 | 10.6 |
| 0:30 | 3 | 17.0 | 17.6 | 17.6 | 17.2 | 9.5 | 9.7 | 10.3 | 10.4 | 11.7 | 12.6 | 13.0 | 13.0 | 11.0 | 11.0 | 10.7 | 10.6 |
| 0:45 | 3 | 17.0 | 17.6 | 17.5 | 17.2 | 9.5 | 9.7 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.6 | 10.5 |
| 1:00 | 3 | 17.0 | 17.7 | 17.5 | 17.2 | 9.5 | 9.7 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.6 | 10.5 |
| 1:15 | 3 | 17.0 | 17.7 | 17.4 | 17.2 | 9.5 | 9.7 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.6 | 10.5 |
| 1:30 | 3 | 17.0 | 17.8 | 17.4 | 17.2 | 9.5 | 9.7 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.6 | 10.5 |
| 1:45 | 3 | 17.0 | 17.8 | 17.3 | 17.1 | 9.5 | 9.7 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.6 | 10.5 |
| 2:00 | 3 | 17.0 | 17.8 | 17.3 | 17.1 | 9.5 | 9.7 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.5 | 10.5 |
| 2:15 | 3 | 17.0 | 17.8 | 17.3 | 17.0 | 9.5 | 9.8 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.5 | 10.5 |
| 2:30 | 3 | 17.0 | 17.8 | 17.3 | 17.0 | 9.6 | 9.8 | 10.3 | 10.3 | 11.8 | 12.6 | 13.0 | 12.9 | 11.0 | 11.0 | 10.5 | 10.5 |
| 2:45 | 3 | 17.1 | 17.8 | 17.2 | 17.0 | 9.6 | 9.8 | 10.3 | 10.3 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.5 | 10.5 |
| 3:00 | 3 | 17.1 | 17.8 | 17.2 | 16.9 | 9.6 | 9.8 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.5 | 10.5 |
| 3:15 | 3 | 17.1 | 17.8 | 17.2 | 16.8 | 9.6 | 9.8 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.4 | 10.4 |
| 3:30 | 3 | 17.1 | 17.8 | 17.1 | 16.8 | 9.7 | 9.8 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.4 | 10.4 |
| 3:45 | 3 | 17.2 | 17.8 | 17.1 | 16.8 | 9.7 | 9.8 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.4 | 10.4 |
| 4:00 | 3 | 17.2 | 17.8 | 17.1 | 16.7 | 9.7 | 9.8 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.4 | 10.4 |
| 4:15 | 3 | 17.2 | 17.8 | 17.1 | 16.6 | 9.7 | 9.6 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.4 | 10.4 |
| 4:30 | 3 | 17.2 | 17.8 | 17.0 | 16.6 | 9.7 | 9.8 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 4:45 | 3 | 17.3 | 17.8 | 17.0 | 16.6 | 9.7 | 9.9 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 5:00 | 3 | 17.3 | 17.8 | 17.0 | 16.5 | 9.8 | 9.9 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 5:15 | 3 | 17.3 | 17.8 | 17.0 | 16.4 | 9.8 | 9.9 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 5:30 | 3 | 17.3 | 17.8 | 16.9 | 16.4 | 9.8 | 9.9 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 5:45 | 3 | 17.4 | 17.8 | 16.9 | 16.3 | 9.8 | 9.9 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 6:00 | 3 | 17.4 | 17.8 | 16.8 | 16.2 | 9.8 | 9.9 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 6:15 | 3 | 17.5 | 17.8 | 16.8 | 16.2 | 9.8 | 9.9 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.8 | 11.0 | 11.0 | 10.3 | 10.3 |
| 6:30 | 3 | 17.5 | 17.8 | 16.8 | 16.2 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.9 | 11.0 | 11.0 | 10.3 | 10.3 |
| 6:45 | 3 | 17.5 | 17.8 | 16.7 | 16.1 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 12.9 | 11.0 | 11.0 | 10.3 | 10.3 |
| 7:00 | 3 | 17.5 | 17.8 | 16.7 | 16.1 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.0 | 11.0 | 11.0 | 10.3 | 10.3 |
| 7:15 | 3 | 17.5 | 17.7 | 16.6 | 16.1 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.0 | 11.0 | 11.0 | 10.3 | 10.3 |
| 7:30 | 3 | 17.5 | 17.7 | 16.6 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.0 | 11.0 | 11.0 | 10.2 | 10.3 |
| 7:45 | 3 | 17.5 | 17.7 | 16.5 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.0 | 11.0 | 11.0 | 10.2 | 10.3 |
| 8:00 | 3 | 17.5 | 17.7 | 16.4 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.0 | 11.0 | 11.0 | 10.2 | 10.3 |
| 8:15 | 3 | 17.5 | 17.7 | 16.3 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.2 | 10.4 |
| 8:30 | 3 | 17.5 | 17.6 | 16.3 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.3 | 10.4 |
| 8:45 | 3 | 17.5 | 17.6 | 16.2 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.3 | 10.5 |
| 9:00 | 3 | 17.5 | 17.5 | 16.2 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.3 | 10.6 |
| 9:15 | 3 | 17.4 | 17.5 | 16.1 | 16.0 | 9.8 | 10.0 | 10.2 | 10.2 | 11.8 | 12.7 | 13.0 | 13.4 | 11.0 | 11.0 | 10.4 | 10.7 |
| 9:30 | 3 | 17.4 | 17.4 | 16.1 | 16.0 | 9.9 | 10.0 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.4 | 10.8 |
| 9:45 | 3 | 17.3 | 17.3 | 16.1 | 16.1 | 9.9 | 9.9 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.4 | 10.8 |
| 10:00 | 3 | 17.3 | 17.3 | 16.1 | 16.2 | 9.9 | 9.9 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.2 | 11.0 | 11.0 | 10.5 | 10.9 |
| 10:15 | 3 | 17.3 | 17.2 | 16.1 | 16.4 | 9.9 | 9.9 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.2 | 11.0 | 11.0 | 10.5 | 10.9 |
| 10:30 | 3 | 17.2 | 17.2 | 16.1 | 16.6 | 9.9 | 9.9 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.2 | 11.0 | 11.0 | 10.6 | 11.0 |
| 10:45 | 3 | 17.2 | 17.2 | 16.1 | 16.8 | 9.8 | 9.8 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.6 | 11.0 |
| 11:00 | 3 | 17.2 | 17.1 | 16.2 | 17.0 | 9.8 | 9.8 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.6 | 11.0 |
| 11:15 | 3 | 17.2 | 17.1 | 16.2 | 17.1 | 9.8 | 9.8 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 11:30 | 3 | 17.2 | 17.1 | 16.3 | 17.2 | 9.8 | 9.8 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 11:45 | 3 | 17.2 | 17.1 | 16.3 | 17.3 | 9.8 | 9.8 | 10.2 | 10.3 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 12:00 | 3 | 17.2 | 17.0 | 16.4 | 17.5 | 9.8 | 9.8 | 10.2 | 10.4 | 11.8 | 12.7 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 12:15 | 3 | 17.2 | 17.0 | 16.5 | 17.6 | 9.8 | 9.8 | 10.2 | 10.4 | 11.8 | 12.6 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 12:30 | 3 | 17.1 | 17.0 | 16.5 | 17.8 | 9.8 | 9.8 | 10.2 | 10.5 | 11.8 | 12.6 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 12:45 | 3 | 17.1 | 17.0 | 16.6 | 18.0 | 9.8 | 9.8 | 10.2 | 10.5 | 11.8 | 12.6 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 13:00 | 3 | 17.1 | 17.0 | 16.7 | 18.2 | 9.8 | 9.8 | 10.2 | 10.6 | 11.8 | 12.6 | 13.0 | 13.1 | 11.0 | 11.0 | 10.7 | 11.1 |
| 13:15 | 3 | 17.1 | 17.0 | 16.8 | 18.4 | 9.8 | 9.8 | 10.2 | 10.6 | 11.8 | 12.6 | 13.0 | 13.2 | 11.0 | 11.0 | 10.7 | 11.1 |
| 13:30 | 3 | 17.0 | 17.0 | 16.9 | 18.6 | 9.7 | 9.7 | 10.3 | 10.7 | 11.8 | 12.5 | 13.0 | 13.3 | 11.0 | 11.0 | 10.7 | 11.1 |
| 13:45 | 3 | 17.0 | 17.0 | 17.0 | 18.9 | 9.7 | 9.7 | 10.3 | 10.7 | 11.8 | 12.5 | 13.0 | 13.5 | 11.0 | 11.0 | 10.7 | 11.1 |
| 14:00 | 3 | 17.0 | 16.9 | 17.1 | 19.1 | 9.7 | 9.7 | 10.3 | 10.8 | 11.8 | 12.5 | 13.0 | 13.6 | 11.0 | 11.0 | 10.7 | 11.1 |
| 14:15 | 3 | 17.0 | 16.9 | 17.2 | 19.1 | 9.7 | 9.7 | 10.4 | 10.9 | 11.8 | 12.5 | 13.0 | 13.6 | 11.0 | 11.0 | 10.7 | 11.2 |
| 14:30 | 3 | 17.0 | 16.9 | 17.3 | 19.2 | 9.7 | 9.7 | 10.4 | 10.9 | 11.8 | 12.5 | 13.0 | 13.6 | 11.0 | 11.0 | 10.7 | 11.2 |
| 14:45 | 3 | 17.0 | 16.9 | 17.4 | 19.2 | 9.7 | 9.7 | 10.5 | 11.0 | 11.8 | 12.5 | 13.0 | 13.5 | 11.0 | 11.0 | 10.8 | 11.2 |
| 15:00 | 3 | 17.0 | 16.9 | 17.5 | 19.4 | 9.7 | 9.7 | 10.5 | 11.0 | 11.8 | 12.5 | 13.0 | 13.4 | 11.0 | 11.0 | 10.8 | 11.2 |
| 15:15 | 3 | 17.0 | 16.9 | 17.6 | 19.5 | 9.7 | 9.7 | 10.5 | 11.0 | 11.8 | 12.5 | 13.0 | 13.4 | 11.0 | 11.0 | 10.8 | 11.2 |
| 15:30 | 3 | 17.0 | 16.9 | 17.7 | 19.6 | 9.7 | 9.7 | 10.6 | 11.0 | 11.8 | 12.5 | 13.0 | 13.3 | 11.0 | 11.0 | 10.8 | 11.2 |
| 15:45 | 3 | 16.9 | 16.9 | 17.8 | 19.6 | 9.7 | 9.7 | 10.6 | 11.0 | 11.8 | 12.5 | 13.0 | 13.3 | 11.0 | 11.0 | 10.8 | 11.2 |
| 16:00 | 3 | 16.9 | 16.9 | 17.9 | 19.6 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 13.0 | 13.3 | 11.0 | 11.0 | 10.8 | 11.2 |
| 16:15 | 3 | 16.9 | 16.9 | 17.9 | 19.7 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 12.9 | 13.2 | 11.0 | 11.0 | 10.8 | 11.2 |

# Appendix B Temperature survey data

| time | day | 3A-60 | 3A-35 | 3A-10 | 3A+15 | 3B-60 | 3B-35 | 3B-10 | 3B+15 | 4A-60 | 4A-35 | 4A-10 | 4A+15 | 4B-60 | 4B-35 | 4B-10 | 4B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 hr clock | no. | | | | | | | | | | | | | | | | |
| 16:30 | 3 | 16.8 | 17.0 | 18.0 | 19.7 | 9.7 | 9.7 | 10.8 | 11.1 | 11.7 | 12.5 | 12.9 | 13.2 | 11.0 | 11.0 | 10.8 | 11.3 |
| 16:45 | 3 | 16.8 | 17.0 | 18.0 | 19.8 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 12.9 | 13.2 | 11.0 | 11.0 | 10.9 | 11.3 |
| 17:00 | 3 | 16.8 | 17.0 | 18.1 | 19.8 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 12.9 | 13.2 | 11.0 | 11.0 | 10.9 | 11.4 |
| 17:15 | 3 | 16.8 | 17.0 | 18.2 | 19.8 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 13.0 | 13.2 | 11.0 | 11.0 | 10.9 | 11.4 |
| 17:30 | 3 | 16.8 | 17.0 | 18.2 | 19.8 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 13.0 | 13.2 | 11.0 | 11.0 | 10.9 | 11.5 |
| 17:45 | 3 | 16.7 | 17.0 | 18.2 | 19.8 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 13.0 | 13.2 | 11.0 | 11.0 | 10.9 | 11.5 |
| 18:00 | 3 | 16.7 | 17.0 | 18.2 | 19.7 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 11.6 |
| 18:15 | 3 | 16.7 | 17.1 | 18.2 | 19.7 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 11.6 |
| 18:30 | 3 | 16.6 | 17.1 | 18.2 | 19.6 | 9.7 | 9.7 | 10.6 | 11.1 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 11.7 |
| 18:45 | 3 | 16.8 | 17.1 | 18.2 | 19.4 | 9.7 | 9.7 | 10.6 | 11.0 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 11.7 |
| 19:00 | 3 | 16.6 | 17.2 | 18.2 | 19.2 | 9.7 | 9.7 | 10.6 | 11.0 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 10.9 | 11.7 |
| 19:15 | 3 | 16.6 | 17.2 | 18.2 | 19.1 | 9.7 | 9.7 | 10.6 | 11.0 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 11.0 | 11.7 |
| 19:30 | 3 | 16.6 | 17.2 | 18.2 | 19.1 | 9.7 | 9.7 | 10.7 | 11.0 | 11.7 | 12.5 | 13.0 | 13.0 | 11.0 | 11.0 | 11.0 | 11.7 |
| 19:45 | 3 | 16.6 | 17.3 | 18.2 | 19.0 | 9.7 | 9.7 | 10.7 | 11.0 | 11.7 | 12.5 | 13.0 | 12.9 | 11.0 | 11.0 | 11.0 | 11.7 |
| 20:00 | 3 | 16.7 | 17.3 | 18.2 | 18.9 | 9.7 | 9.7 | 10.7 | 10.9 | 11.7 | 12.5 | 12.9 | 12.9 | 11.0 | 11.0 | 11.1 | 11.7 |
| 20:15 | 3 | 16.7 | 17.4 | 18.2 | 18.8 | 9.7 | 9.7 | 10.7 | 10.9 | 11.7 | 12.5 | 12.9 | 12.9 | 11.0 | 11.0 | 11.1 | 11.8 |
| 20:30 | 3 | 16.7 | 17.4 | 18.2 | 18.7 | 9.7 | 9.7 | 10.7 | 10.9 | 11.7 | 12.5 | 12.9 | 12.9 | 11.0 | 11.0 | 11.2 | 11.8 |
| 20:45 | 3 | 16.7 | 17.5 | 18.2 | 18.6 | 9.7 | 9.7 | 10.7 | 10.8 | 11.7 | 12.5 | 12.9 | 12.9 | 11.0 | 11.0 | 11.2 | 11.8 |
| 21:00 | 3 | 16.7 | 17.5 | 18.2 | 18.4 | 9.7 | 9.7 | 10.7 | 10.8 | 11.6 | 12.5 | 12.9 | 12.8 | 11.0 | 11.0 | 11.2 | 11.8 |
| 21:15 | 3 | 16.7 | 17.6 | 18.1 | 18.2 | 9.7 | 9.8 | 10.7 | 10.8 | 11.6 | 12.5 | 12.9 | 12.8 | 11.0 | 11.0 | 11.2 | 11.8 |
| 21:30 | 3 | 16.8 | 17.6 | 18.1 | 18.0 | 9.7 | 9.8 | 10.7 | 10.8 | 11.6 | 12.5 | 12.9 | 12.8 | 11.0 | 11.0 | 11.2 | 11.9 |
| 21:45 | 3 | 16.8 | 17.6 | 18.0 | 17.8 | 9.7 | 9.8 | 10.7 | 10.7 | 11.6 | 12.5 | 12.9 | 12.8 | 11.0 | 11.0 | 11.3 | 11.9 |
| 22:00 | 3 | 16.8 | 17.7 | 18.0 | 17.6 | 9.7 | 9.8 | 10.8 | 10.7 | 11.6 | 12.5 | 12.9 | 12.7 | 11.0 | 11.0 | 11.3 | 11.9 |
| 22:15 | 3 | 16.8 | 17.7 | 17.9 | 17.4 | 9.7 | 9.8 | 10.6 | 10.7 | 11.6 | 12.5 | 12.9 | 12.7 | 11.0 | 11.0 | 11.3 | 11.9 |
| 22:30 | 3 | 16.8 | 17.7 | 17.9 | 17.3 | 9.7 | 9.8 | 10.6 | 10.7 | 11.6 | 12.5 | 12.9 | 12.7 | 11.0 | 11.0 | 11.3 | 11.9 |
| 22:45 | 3 | 16.9 | 17.8 | 17.9 | 17.3 | 9.7 | 9.8 | 10.6 | 10.7 | 11.6 | 12.5 | 12.9 | 12.6 | 11.0 | 11.0 | 11.3 | 11.9 |
| 23:00 | 3 | 16.9 | 17.6 | 17.8 | 17.2 | 9.7 | 9.8 | 10.8 | 10.7 | 11.6 | 12.5 | 12.8 | 12.6 | 11.0 | 11.0 | 11.3 | 12.0 |
| 23:15 | 3 | 16.9 | 17.8 | 17.8 | 17.1 | 9.7 | 9.8 | 10.6 | 10.7 | 11.6 | 12.5 | 12.8 | 12.6 | 11.0 | 11.0 | 11.3 | 12.0 |
| 23:30 | 3 | 17.0 | 17.9 | 17.7 | 17.1 | 9.7 | 9.8 | 10.5 | 10.6 | 11.6 | 12.5 | 12.8 | 12.6 | 11.0 | 11.0 | 11.3 | 12.0 |
| 23:45 | 3 | 17.0 | 17.9 | 17.7 | 17.1 | 9.7 | 9.8 | 10.5 | 10.6 | 11.7 | 12.6 | 12.8 | 12.6 | 11.0 | 11.0 | 11.3 | 12.0 |
| 0:00 | 3 | 17.0 | 17.9 | 17.6 | 17.1 | 9.7 | 9.8 | 10.5 | 10.6 | 11.7 | 12.6 | 12.8 | 12.6 | 11.0 | 11.0 | 11.3 | 12.0 |

## Appendix B Temperature survey data

| time | day | 5A-60 | 5A-35 | 5A-10 | 5A+15 | 5B-60 | 5B-35 | 5B-10 | 5B+15 | 6A-60 | 6A-35 | 6A-10 | 6A+15 | 6B-60 | 6B-35 | 6B-10 | 6B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 hr clock | no. | | | | | | | | | | | | | | | | |
| 0:00 | 1 | 16.0 | 17.1 | 17.5 | 17.7 | 9.7 | 8.7 | 6.8 | 7.3 | 14.8 | 16.1 | 17.7 | 17.8 | 9.9 | 9.0 | 7.9 | 8.4 |
| 0:15 | 1 | 16.0 | 17.1 | 17.5 | 17.6 | 9.7 | 8.7 | 6.8 | 7.3 | 14.8 | 16.1 | 17.7 | 17.8 | 9.9 | 9.0 | 7.9 | 8.5 |
| 0:30 | 1 | 16.0 | 17.1 | 17.5 | 17.6 | 9.7 | 8.7 | 6.8 | 7.3 | 14.8 | 16.1 | 17.6 | 17.8 | 9.9 | 9.0 | 7.9 | 8.5 |
| 0:45 | 1 | 16.0 | 17.1 | 17.4 | 17.5 | 9.7 | 8.7 | 6.8 | 7.4 | 14.8 | 16.1 | 17.6 | 17.7 | 9.9 | 9.0 | 7.9 | 8.5 |
| 1:00 | 1 | 16.0 | 17.1 | 17.4 | 17.5 | 9.7 | 8.7 | 6.8 | 7.4 | 14.8 | 16.1 | 17.5 | 17.5 | 9.9 | 9.0 | 7.9 | 8.5 |
| 1:15 | 1 | 16.0 | 17.1 | 17.3 | 17.5 | 9.7 | 8.7 | 6.8 | 7.5 | 14.8 | 16.1 | 17.5 | 17.4 | 9.9 | 9.0 | 7.9 | 8.6 |
| 1:30 | 1 | 16.0 | 17.1 | 17.2 | 17.4 | 9.7 | 8.7 | 6.8 | 7.6 | 14.8 | 16.1 | 17.5 | 17.4 | 9.9 | 9.0 | 7.9 | 8.6 |
| 1:45 | 1 | 16.0 | 17.1 | 17.1 | 17.3 | 9.7 | 8.7 | 6.8 | 7.6 | 14.8 | 16.1 | 17.5 | 17.4 | 9.9 | 9.0 | 7.9 | 8.6 |
| 2:00 | 1 | 16.0 | 17.1 | 17.1 | 17.2 | 9.7 | 8.7 | 6.8 | 7.7 | 14.8 | 16.1 | 17.5 | 17.3 | 9.9 | 9.0 | 7.9 | 8.6 |
| 2:15 | 1 | 16.0 | 17.1 | 17.1 | 17.2 | 9.7 | 8.7 | 6.9 | 7.7 | 14.8 | 16.1 | 17.5 | 17.3 | 9.9 | 9.0 | 7.9 | 8.6 |
| 2:30 | 1 | 16.0 | 17.1 | 17.0 | 17.2 | 9.7 | 8.7 | 6.9 | 7.7 | 14.8 | 16.1 | 17.4 | 17.2 | 9.9 | 9.0 | 7.9 | 8.5 |
| 2:45 | 1 | 16.0 | 17.1 | 17.0 | 17.1 | 9.7 | 8.7 | 6.9 | 7.7 | 14.9 | 16.2 | 17.4 | 17.2 | 9.9 | 9.0 | 7.9 | 8.5 |
| 3:00 | 1 | 16.0 | 17.1 | 16.9 | 17.1 | 9.7 | 8.6 | 6.9 | 7.8 | 14.9 | 16.2 | 17.3 | 17.2 | 9.9 | 9.0 | 7.9 | 8.5 |
| 3:15 | 1 | 16.0 | 17.1 | 16.9 | 17.0 | 9.7 | 8.6 | 6.9 | 7.8 | 14.9 | 16.2 | 17.3 | 17.2 | 9.9 | 9.0 | 7.9 | 8.4 |
| 3:30 | 1 | 16.0 | 17.1 | 16.8 | 17.0 | 9.7 | 8.6 | 6.9 | 7.8 | 14.9 | 16.2 | 17.2 | 17.2 | 9.9 | 9.0 | 7.9 | 8.3 |
| 3:45 | 1 | 16.0 | 17.1 | 16.8 | 17.0 | 9.7 | 8.6 | 6.9 | 7.8 | 14.9 | 16.2 | 17.2 | 17.2 | 9.9 | 9.0 | 8.0 | 8.2 |
| 4:00 | 1 | 16.0 | 17.1 | 16.8 | 17.0 | 9.7 | 8.6 | 6.9 | 7.8 | 14.9 | 16.2 | 17.2 | 17.2 | 9.9 | 9.0 | 8.0 | 8.2 |
| 4:15 | 1 | 16.0 | 17.1 | 16.6 | 16.9 | 9.6 | 8.6 | 7.0 | 7.8 | 14.9 | 16.2 | 17.1 | 17.2 | 9.9 | 9.0 | 8.0 | 8.2 |
| 4:30 | 1 | 16.0 | 17.1 | 16.8 | 16.9 | 9.6 | 8.6 | 7.0 | 7.9 | 14.9 | 16.2 | 17.1 | 17.2 | 9.9 | 9.1 | 8.0 | 8.1 |
| 4:45 | 1 | 16.1 | 17.1 | 16.8 | 16.9 | 9.6 | 8.6 | 7.0 | 7.9 | 14.9 | 16.2 | 17.1 | 17.2 | 9.9 | 9.1 | 8.0 | 8.1 |
| 5:00 | 1 | 16.1 | 17.1 | 16.8 | 16.9 | 9.6 | 8.6 | 7.0 | 7.9 | 14.9 | 16.2 | 17.1 | 17.2 | 9.9 | 9.1 | 8.0 | 8.1 |
| 5:15 | 1 | 16.1 | 17.1 | 16.8 | 16.9 | 9.6 | 8.6 | 7.0 | 7.9 | 15.0 | 16.2 | 17.1 | 17.2 | 9.9 | 9.1 | 8.0 | 8.1 |
| 5:30 | 1 | 16.1 | 17.1 | 16.8 | 16.9 | 9.6 | 8.6 | 7.0 | 7.9 | 15.0 | 16.2 | 17.0 | 17.2 | 9.9 | 9.1 | 8.0 | 8.1 |
| 5:45 | 1 | 16.1 | 17.1 | 16.8 | 16.9 | 9.6 | 8.6 | 7.0 | 7.9 | 15.0 | 16.2 | 17.0 | 17.1 | 9.9 | 9.1 | 8.0 | 8.1 |
| 6:00 | 1 | 16.1 | 17.1 | 16.8 | 16.9 | 9.6 | 8.6 | 7.0 | 7.9 | 15.0 | 16.2 | 17.0 | 17.1 | 9.9 | 9.1 | 8.0 | 8.1 |
| 6:15 | 1 | 16.1 | 17.1 | 16.7 | 16.9 | 9.6 | 8.5 | 7.0 | 7.9 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.0 |
| 6:30 | 1 | 16.1 | 17.1 | 16.7 | 16.9 | 9.6 | 8.5 | 7.0 | 7.9 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.2 | 8.0 | 8.0 |
| 6:45 | 1 | 16.1 | 17.1 | 16.7 | 16.9 | 9.6 | 8.5 | 7.0 | 7.9 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.2 | 8.0 | 8.0 |
| 7:00 | 1 | 16.2 | 17.1 | 16.6 | 16.9 | 9.6 | 8.5 | 7.0 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.2 | 8.0 | 8.0 |
| 7:15 | 1 | 16.2 | 17.1 | 16.6 | 16.9 | 9.6 | 8.5 | 7.0 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.2 | 8.0 | 8.0 |
| 7:30 | 1 | 16.2 | 17.1 | 16.6 | 16.9 | 9.6 | 8.5 | 7.0 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.2 | 8.0 | 8.0 |
| 7:45 | 1 | 16.2 | 17.1 | 16.5 | 16.9 | 9.5 | 8.5 | 7.0 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.2 | 8.0 | 8.0 |
| 8:00 | 1 | 16.2 | 17.1 | 16.5 | 17.0 | 9.5 | 8.5 | 7.0 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.0 |
| 8:15 | 1 | 16.3 | 17.1 | 16.6 | 17.0 | 9.5 | 8.5 | 7.0 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.1 |
| 8:30 | 1 | 16.3 | 17.1 | 16.6 | 17.1 | 9.5 | 8.5 | 7.0 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.1 |
| 8:45 | 1 | 16.3 | 17.1 | 16.7 | 17.1 | 9.5 | 8.4 | 7.1 | 8.0 | 15.0 | 16.2 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.2 |
| 9:00 | 1 | 16.3 | 17.0 | 16.7 | 17.2 | 9.5 | 8.4 | 7.1 | 8.0 | 14.9 | 16.2 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.3 |
| 9:15 | 1 | 16.3 | 17.0 | 16.8 | 17.2 | 9.5 | 8.4 | 7.1 | 8.0 | 14.9 | 16.1 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.3 |
| 9:30 | 1 | 16.3 | 17.0 | 16.9 | 17.3 | 9.5 | 8.4 | 7.1 | 8.0 | 14.9 | 16.1 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.4 |
| 9:45 | 1 | 16.2 | 17.0 | 16.9 | 17.4 | 9.5 | 8.4 | 7.1 | 8.1 | 14.9 | 16.1 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.4 |
| 10:00 | 1 | 16.2 | 16.9 | 17.0 | 17.5 | 9.5 | 8.4 | 7.1 | 8.1 | 14.9 | 16.1 | 17.0 | 17.1 | 9.8 | 9.1 | 8.0 | 8.4 |
| 10:15 | 1 | 16.2 | 16.9 | 17.0 | 17.6 | 9.5 | 8.4 | 7.1 | 8.1 | 14.9 | 16.1 | 17.1 | 17.1 | 9.8 | 9.0 | 8.0 | 8.5 |
| 10:30 | 1 | 16.1 | 16.8 | 17.0 | 17.7 | 9.5 | 8.4 | 7.1 | 8.1 | 14.8 | 16.1 | 17.1 | 17.2 | 9.8 | 9.0 | 8.0 | 8.5 |
| 10:45 | 1 | 16.1 | 16.8 | 17.1 | 17.8 | 9.5 | 8.3 | 7.1 | 8.2 | 14.8 | 16.1 | 17.1 | 17.2 | 9.8 | 9.0 | 8.0 | 8.6 |
| 11:00 | 1 | 16.1 | 16.8 | 17.1 | 17.8 | 9.5 | 8.3 | 7.1 | 8.2 | 14.8 | 16.1 | 17.2 | 17.2 | 9.8 | 9.0 | 8.0 | 8.6 |
| 11:15 | 1 | 16.0 | 16.7 | 17.2 | 17.9 | 9.5 | 8.3 | 7.1 | 8.2 | 14.8 | 16.1 | 17.2 | 17.2 | 9.8 | 9.0 | 8.0 | 8.7 |
| 11:30 | 1 | 16.0 | 16.7 | 17.3 | 17.9 | 9.5 | 8.3 | 7.1 | 8.2 | 14.8 | 16.1 | 17.3 | 17.3 | 9.8 | 9.0 | 8.0 | 8.8 |
| 11:45 | 1 | 15.9 | 16.7 | 17.4 | 18.0 | 9.5 | 8.3 | 7.1 | 8.2 | 14.8 | 16.1 | 17.4 | 17.4 | 9.8 | 9.0 | 8.0 | 8.8 |
| 12:00 | 1 | 15.9 | 16.6 | 17.5 | 18.1 | 9.5 | 8.3 | 7.1 | 8.2 | 14.7 | 16.1 | 17.5 | 17.6 | 9.8 | 9.0 | 8.0 | 8.8 |
| 12:15 | 1 | 15.8 | 16.6 | 17.6 | 18.2 | 9.5 | 8.3 | 7.2 | 8.2 | 14.7 | 16.0 | 17.6 | 17.7 | 9.8 | 9.0 | 8.0 | 8.8 |
| 12:30 | 1 | 15.8 | 16.6 | 17.7 | 18.3 | 9.5 | 8.3 | 7.2 | 8.1 | 14.7 | 16.0 | 17.7 | 17.8 | 9.8 | 9.0 | 8.0 | 8.8 |
| 12:45 | 1 | 15.7 | 16.6 | 17.8 | 18.4 | 9.5 | 8.3 | 7.2 | 8.1 | 14.7 | 16.0 | 17.8 | 17.9 | 9.8 | 9.0 | 8.0 | 8.7 |
| 13:00 | 1 | 15.7 | 16.5 | 17.9 | 18.5 | 9.5 | 8.3 | 7.2 | 8.0 | 14.7 | 16.0 | 17.9 | 18.0 | 9.8 | 9.0 | 8.0 | 8.6 |
| 13:15 | 1 | 15.6 | 16.5 | 18.0 | 18.6 | 9.5 | 8.3 | 7.2 | 7.9 | 14.7 | 16.0 | 18.0 | 18.1 | 9.8 | 9.0 | 8.0 | 8.5 |
| 13:30 | 1 | 15.6 | 16.5 | 18.0 | 18.8 | 9.5 | 8.3 | 7.2 | 7.9 | 14.7 | 16.0 | 18.1 | 18.1 | 9.8 | 9.0 | 8.0 | 8.4 |
| 13:45 | 1 | 15.6 | 16.4 | 18.1 | 18.9 | 9.5 | 8.3 | 7.2 | 7.8 | 14.7 | 16.0 | 18.2 | 18.3 | 9.8 | 9.0 | 8.0 | 8.3 |
| 14:00 | 1 | 15.6 | 16.4 | 18.2 | 18.9 | 9.5 | 8.3 | 7.1 | 7.8 | 14.8 | 16.0 | 18.3 | 18.5 | 9.8 | 9.0 | 8.0 | 8.3 |
| 14:15 | 1 | 15.6 | 16.3 | 18.3 | 19.0 | 9.5 | 8.3 | 7.1 | 7.7 | 14.8 | 16.0 | 18.5 | 18.6 | 9.8 | 9.0 | 8.0 | 8.2 |
| 14:30 | 1 | 15.5 | 16.3 | 18.3 | 19.1 | 9.5 | 8.3 | 7.1 | 7.7 | 14.8 | 16.0 | 18.6 | 18.8 | 9.8 | 9.0 | 8.0 | 8.2 |
| 14:45 | 1 | 15.5 | 16.3 | 18.3 | 19.1 | 9.5 | 8.3 | 7.1 | 7.6 | 14.8 | 16.0 | 18.7 | 18.9 | 9.8 | 9.0 | 8.0 | 8.1 |
| 15:00 | 1 | 15.5 | 16.3 | 18.4 | 19.1 | 9.5 | 8.3 | 7.1 | 7.6 | 14.8 | 16.0 | 18.8 | 18.9 | 9.8 | 9.0 | 7.9 | 8.1 |
| 15:15 | 1 | 15.5 | 16.3 | 18.4 | 19.1 | 9.5 | 8.3 | 7.0 | 7.5 | 14.8 | 16.0 | 18.9 | 19.0 | 9.8 | 9.0 | 7.9 | 8.0 |
| 15:30 | 1 | 15.4 | 16.3 | 18.4 | 19.1 | 9.5 | 8.2 | 7.0 | 7.5 | 14.8 | 16.0 | 19.0 | 19.2 | 9.8 | 9.0 | 7.9 | 7.9 |
| 15:45 | 1 | 15.4 | 16.3 | 18.5 | 19.1 | 9.5 | 8.2 | 7.0 | 7.4 | 14.8 | 16.0 | 19.1 | 19.3 | 9.8 | 9.0 | 7.8 | 7.8 |
| 16:00 | 1 | 15.4 | 16.4 | 18.5 | 19.1 | 9.5 | 8.2 | 7.0 | 7.4 | 14.8 | 16.0 | 19.1 | 19.4 | 9.8 | 9.0 | 7.8 | 7.8 |
| 16:15 | 1 | 15.4 | 16.4 | 18.5 | 19.1 | 9.5 | 8.2 | 7.0 | 7.3 | 14.8 | 16.0 | 19.2 | 19.5 | 9.8 | 9.0 | 7.7 | 7.7 |
| 16:30 | 1 | 15.4 | 16.4 | 18.5 | 19.2 | 9.5 | 8.2 | 6.9 | 7.3 | 14.8 | 16.0 | 19.2 | 19.5 | 9.8 | 9.0 | 7.7 | 7.6 |
| 16:45 | 1 | 15.4 | 16.5 | 18.5 | 19.2 | 9.5 | 8.2 | 6.9 | 7.2 | 14.8 | 16.1 | 19.2 | 19.6 | 9.8 | 9.0 | 7.6 | 7.5 |
| 17:00 | 1 | 15.4 | 16.5 | 18.5 | 19.2 | 9.5 | 8.2 | 6.9 | 7.1 | 14.8 | 16.1 | 19.3 | 19.6 | 9.8 | 9.0 | 7.5 | 7.5 |
| 17:15 | 1 | 15.4 | 16.5 | 18.6 | 19.2 | 9.5 | 8.2 | 6.9 | 7.0 | 14.8 | 16.1 | 19.3 | 19.6 | 9.8 | 9.0 | 7.5 | 7.4 |
| 17:30 | 1 | 15.4 | 16.6 | 18.6 | 19.2 | 9.5 | 8.2 | 6.9 | 6.9 | 14.8 | 16.1 | 19.3 | 19.6 | 9.7 | 9.0 | 7.4 | 7.2 |
| 17:45 | 1 | 15.4 | 16.6 | 18.6 | 19.2 | 9.5 | 8.2 | 6.8 | 6.8 | 14.8 | 16.1 | 19.4 | 19.6 | 9.7 | 9.0 | 7.3 | 7.1 |
| 18:00 | 1 | 15.5 | 16.7 | 18.7 | 19.2 | 9.5 | 8.2 | 6.8 | 6.6 | 14.8 | 16.1 | 19.4 | 19.6 | 9.7 | 9.0 | 7.2 | 6.9 |
| 18:15 | 1 | 15.5 | 16.7 | 18.7 | 19.3 | 9.5 | 8.2 | 6.8 | 6.5 | 14.8 | 16.2 | 19.3 | 19.7 | 9.7 | 9.0 | 7.1 | 6.8 |
| 18:30 | 1 | 15.5 | 16.7 | 18.7 | 19.3 | 9.5 | 8.2 | 6.7 | 6.4 | 14.8 | 16.2 | 19.3 | 19.6 | 9.7 | 9.0 | 7.1 | 6.6 |
| 18:45 | 1 | 15.6 | 16.7 | 18.7 | 19.3 | 9.4 | 8.2 | 6.7 | 6.3 | 14.8 | 16.2 | 19.3 | 19.6 | 9.7 | 9.0 | 7.0 | 6.5 |
| 19:00 | 1 | 15.6 | 16.8 | 18.7 | 19.3 | 9.4 | 8.2 | 6.7 | 6.2 | 14.8 | 16.2 | 19.2 | 19.5 | 9.7 | 9.0 | 7.0 | 6.5 |
| 19:15 | 1 | 15.7 | 16.8 | 18.8 | 19.3 | 9.4 | 8.2 | 6.7 | 6.1 | 14.8 | 16.2 | 19.2 | 19.4 | 9.7 | 9.0 | 7.0 | 6.5 |
| 19:30 | 1 | 15.7 | 16.9 | 18.8 | 19.3 | 9.4 | 8.2 | 6.7 | 6.0 | 14.8 | 16.2 | 19.2 | 19.3 | 9.7 | 9.0 | 7.0 | 6.5 |
| 19:45 | 1 | 15.8 | 16.9 | 18.8 | 19.3 | 9.4 | 8.2 | 6.7 | 5.9 | 14.8 | 16.3 | 19.1 | 19.2 | 9.7 | 9.0 | 7.0 | 6.4 |
| 20:00 | 1 | 15.8 | 16.9 | 18.8 | 19.2 | 9.4 | 8.2 | 6.6 | 5.9 | 14.8 | 16.3 | 19.1 | 19.1 | 9.7 | 9.0 | 6.9 | 6.4 |
| 20:15 | 1 | 15.8 | 16.9 | 18.8 | 19.2 | 9.4 | 8.2 | 6.6 | 5.8 | 14.8 | 16.3 | 19.0 | 19.1 | 9.7 | 9.0 | 6.9 | 6.4 |
| 20:30 | 1 | 15.8 | 17.0 | 18.8 | 19.1 | 9.4 | 8.2 | 6.6 | 5.8 | 14.8 | 16.3 | 19.0 | 19.1 | 9.7 | 9.0 | 6.8 | 6.4 |
| 20:45 | 1 | 15.9 | 17.0 | 18.8 | 19.1 | 9.4 | 8.2 | 6.6 | 5.7 | 14.8 | 16.3 | 19.0 | 19.1 | 9.7 | 9.0 | 6.7 | 6.3 |
| 21:00 | 1 | 15.9 | 17.0 | 18.7 | 19.0 | 9.4 | 8.2 | 6.6 | 5.7 | 14.8 | 16.3 | 19.0 | 19.1 | 9.7 | 9.0 | 6.7 | 6.3 |
| 21:15 | 1 | 15.9 | 17.1 | 18.6 | 18.9 | 9.4 | 8.2 | 6.5 | 5.6 | 14.9 | 16.4 | 19.0 | 19.1 | 9.7 | 9.0 | 6.6 | 6.2 |

# Appendix B  Temperature survey data

| time 24 hr clock | day no. | 5A-60 | 5A-35 | 5A-10 | 5A+15 | 5B-60 | 5B-35 | 5B-10 | 5B+15 | 6A-60 | 6A-35 | 6A-10 | 6A+15 | 6B-60 | 6B-35 | 6B-10 | 6B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21:30 | 1 | 15.9 | 17.1 | 18.5 | 18.8 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.4 | 19.0 | 19.1 | 9.7 | 9.0 | 6.6 | 6.2 |
| 21:45 | 1 | 15.9 | 17.1 | 18.4 | 18.8 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.4 | 19.0 | 19.0 | 9.7 | 9.0 | 6.5 | 6.2 |
| 22:00 | 1 | 15.9 | 17.1 | 18.3 | 18.7 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.4 | 19.0 | 19.0 | 9.7 | 8.9 | 6.5 | 6.1 |
| 22:15 | 1 | 15.9 | 17.1 | 18.2 | 18.7 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.4 | 19.0 | 18.9 | 9.7 | 8.9 | 6.5 | 6.1 |
| 22:30 | 1 | 15.9 | 17.2 | 18.1 | 18.6 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.4 | 18.9 | 18.8 | 9.7 | 8.9 | 6.5 | 6.1 |
| 22:45 | 1 | 15.9 | 17.2 | 18.0 | 18.5 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.4 | 18.8 | 18.7 | 9.7 | 8.9 | 6.5 | 6.1 |
| 23:00 | 1 | 16.0 | 17.2 | 18.0 | 18.5 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.4 | 18.7 | 18.6 | 9.7 | 8.9 | 6.4 | 6.1 |
| 23:15 | 1 | 16.0 | 17.2 | 18.0 | 18.4 | 9.4 | 8.3 | 6.5 | 5.6 | 14.9 | 16.5 | 18.7 | 18.6 | 9.7 | 8.9 | 6.4 | 6.1 |
| 23:30 | 1 | 16.0 | 17.2 | 17.9 | 18.4 | 9.4 | 8.3 | 6.4 | 5.5 | 15.0 | 16.5 | 18.7 | 18.6 | 9.7 | 8.9 | 6.4 | 6.1 |
| 23:45 | 1 | 16.0 | 17.2 | 17.9 | 18.3 | 9.4 | 8.3 | 6.4 | 5.5 | 15.0 | 16.6 | 18.6 | 18.6 | 9.7 | 8.9 | 6.4 | 6.1 |
| 0:00 | 1 | 16.0 | 17.2 | 17.9 | 18.3 | 9.4 | 8.3 | 6.4 | 5.5 | 15.0 | 16.6 | 18.6 | 18.6 | 9.7 | 8.9 | 6.4 | 6.1 |
| 0:15 | 2 | 16.0 | 17.2 | 17.9 | 18.2 | 9.4 | 8.3 | 6.4 | 5.5 | 15.0 | 16.6 | 18.5 | 18.6 | 9.7 | 8.9 | 6.4 | 6.1 |
| 0:30 | 2 | 16.0 | 17.2 | 17.9 | 18.2 | 9.4 | 8.4 | 6.3 | 5.5 | 15.0 | 16.7 | 18.3 | 18.3 | 9.7 | 8.9 | 6.3 | 6.1 |
| 0:45 | 2 | 16.0 | 17.2 | 17.9 | 18.1 | 9.4 | 8.4 | 6.3 | 5.5 | 15.0 | 16.7 | 18.2 | 18.2 | 9.7 | 8.9 | 6.3 | 6.1 |
| 1:00 | 2 | 16.0 | 17.2 | 17.9 | 18.1 | 9.4 | 8.4 | 6.3 | 5.5 | 15.0 | 16.7 | 18.2 | 18.1 | 9.7 | 8.9 | 6.3 | 6.1 |
| 1:15 | 2 | 16.0 | 17.2 | 17.8 | 18.0 | 9.4 | 8.4 | 6.3 | 5.5 | 15.0 | 16.7 | 18.1 | 18.1 | 9.7 | 8.9 | 6.3 | 6.1 |
| 1:30 | 2 | 16.0 | 17.2 | 17.8 | 17.9 | 9.5 | 8.4 | 6.2 | 5.5 | 15.0 | 16.7 | 18.1 | 18.0 | 9.7 | 8.9 | 6.2 | 6.1 |
| 1:45 | 2 | 16.0 | 17.2 | 17.8 | 17.9 | 9.5 | 8.4 | 6.2 | 5.5 | 15.0 | 16.7 | 18.1 | 18.0 | 9.7 | 8.9 | 6.2 | 6.1 |
| 2:00 | 2 | 16.0 | 17.2 | 17.7 | 17.9 | 9.5 | 8.4 | 6.2 | 5.5 | 15.0 | 16.8 | 16.0 | 18.0 | 9.7 | 8.9 | 6.2 | 6.1 |
| 2:15 | 2 | 16.0 | 17.2 | 17.7 | 17.9 | 9.5 | 8.4 | 6.2 | 5.5 | 15.0 | 16.8 | 18.0 | 16.0 | 9.7 | 8.9 | 6.2 | 6.1 |
| 2:30 | 2 | 16.0 | 17.2 | 17.7 | 17.8 | 9.5 | 8.4 | 6.1 | 5.5 | 15.0 | 16.8 | 18.0 | 18.0 | 9.7 | 8.9 | 6.1 | 6.1 |
| 2:45 | 2 | 16.0 | 17.2 | 17.7 | 17.9 | 9.5 | 8.4 | 6.1 | 5.5 | 15.0 | 16.8 | 18.0 | 18.0 | 9.7 | 8.9 | 6.1 | 6.1 |
| 3:00 | 2 | 16.0 | 17.2 | 17.7 | 17.9 | 9.5 | 8.4 | 6.1 | 5.5 | 15.0 | 16.8 | 17.9 | 18.0 | 9.7 | 8.9 | 6.1 | 6.1 |
| 3:15 | 2 | 16.0 | 17.2 | 17.7 | 17.9 | 9.5 | 8.4 | 6.1 | 5.5 | 15.0 | 16.8 | 17.9 | 17.9 | 9.7 | 8.9 | 6.1 | 6.1 |
| 3:30 | 2 | 16.0 | 17.2 | 17.7 | 17.9 | 9.5 | 8.4 | 6.1 | 5.5 | 15.0 | 16.8 | 17.9 | 17.9 | 9.7 | 8.9 | 6.1 | 6.1 |
| 3:45 | 2 | 16.0 | 17.2 | 17.7 | 17.9 | 9.5 | 8.4 | 6.0 | 5.5 | 15.1 | 16.8 | 17.8 | 17.9 | 9.7 | 8.9 | 6.1 | 6.1 |
| 4:00 | 2 | 16.0 | 17.2 | 17.7 | 17.8 | 9.5 | 8.4 | 6.0 | 5.5 | 15.1 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.1 | 6.1 |
| 4:15 | 2 | 16.0 | 17.2 | 17.6 | 17.8 | 9.5 | 8.5 | 6.0 | 5.5 | 15.1 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.1 | 6.1 |
| 4:30 | 2 | 16.0 | 17.2 | 17.6 | 17.8 | 9.5 | 8.5 | 6.0 | 5.6 | 15.1 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.1 | 6.1 |
| 4:45 | 2 | 16.1 | 17.2 | 17.5 | 17.7 | 9.5 | 8.5 | 6.0 | 5.6 | 15.1 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.1 | 6.2 |
| 5:00 | 2 | 16.1 | 17.2 | 17.5 | 17.7 | 9.5 | 8.5 | 6.0 | 5.6 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.1 | 6.2 |
| 5:15 | 2 | 16.1 | 17.2 | 17.5 | 17.6 | 9.5 | 8.5 | 6.0 | 5.6 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.1 | 6.2 |
| 5:30 | 2 | 16.1 | 17.2 | 17.4 | 17.6 | 9.5 | 8.5 | 6.0 | 5.6 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.1 | 6.2 |
| 5:45 | 2 | 16.1 | 17.2 | 17.4 | 17.5 | 9.5 | 8.5 | 6.0 | 5.6 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.2 | 6.2 |
| 6:00 | 2 | 16.1 | 17.2 | 17.4 | 17.5 | 9.5 | 8.5 | 6.0 | 5.8 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.9 | 6.2 | 6.3 |
| 6:15 | 2 | 16.1 | 17.2 | 17.3 | 17.5 | 9.5 | 8.5 | 6.0 | 5.7 | 15.2 | 16.8 | 17.8 | 17.7 | 9.8 | 8.9 | 6.2 | 6.3 |
| 6:30 | 2 | 16.1 | 17.2 | 17.3 | 17.5 | 9.5 | 8.5 | 6.0 | 5.7 | 15.2 | 16.8 | 17.8 | 17.7 | 9.8 | 8.9 | 6.2 | 6.3 |
| 6:45 | 2 | 16.1 | 17.2 | 17.3 | 17.5 | 9.5 | 8.6 | 6.1 | 5.7 | 15.2 | 16.8 | 17.8 | 17.7 | 9.8 | 8.9 | 6.2 | 6.4 |
| 7:00 | 2 | 16.1 | 17.2 | 17.3 | 17.5 | 9.5 | 8.6 | 6.1 | 5.7 | 15.2 | 16.8 | 17.8 | 17.7 | 9.8 | 8.9 | 6.2 | 6.5 |
| 7:15 | 2 | 16.1 | 17.1 | 17.2 | 17.5 | 9.5 | 8.6 | 6.1 | 5.8 | 15.2 | 16.8 | 17.8 | 17.7 | 9.8 | 8.9 | 6.3 | 6.6 |
| 7:30 | 2 | 16.1 | 17.1 | 17.2 | 17.5 | 9.5 | 8.6 | 6.1 | 5.8 | 15.2 | 16.8 | 17.8 | 17.7 | 9.8 | 8.9 | 6.3 | 6.7 |
| 7:45 | 2 | 16.1 | 17.1 | 17.1 | 17.5 | 9.5 | 8.6 | 6.1 | 5.9 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.8 | 6.3 | 6.8 |
| 8:00 | 2 | 16.1 | 17.1 | 17.1 | 17.5 | 9.5 | 8.6 | 6.2 | 5.9 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.8 | 6.3 | 7.0 |
| 8:15 | 2 | 16.2 | 17.1 | 17.1 | 17.6 | 9.5 | 8.6 | 6.2 | 5.9 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.8 | 6.4 | 7.1 |
| 8:30 | 2 | 16.2 | 17.1 | 17.1 | 17.6 | 9.5 | 8.6 | 6.2 | 5.9 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.8 | 6.5 | 7.2 |
| 8:45 | 2 | 16.2 | 17.1 | 17.1 | 17.6 | 9.6 | 8.6 | 6.2 | 6.0 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.8 | 6.6 | 7.3 |
| 9:00 | 2 | 16.2 | 17.1 | 17.2 | 17.6 | 9.6 | 8.6 | 6.2 | 6.0 | 15.2 | 16.8 | 17.8 | 17.8 | 9.8 | 8.8 | 6.7 | 7.3 |
| 9:15 | 2 | 16.2 | 17.1 | 17.2 | 17.7 | 9.6 | 8.7 | 6.2 | 6.0 | 15.2 | 16.7 | 17.8 | 17.8 | 9.8 | 8.7 | 6.8 | 7.4 |
| 9:30 | 2 | 16.2 | 17.1 | 17.2 | 17.8 | 9.6 | 8.7 | 6.3 | 6.0 | 15.2 | 16.7 | 17.8 | 17.8 | 9.8 | 8.7 | 6.9 | 7.5 |
| 9:45 | 2 | 16.2 | 17.1 | 17.3 | 17.9 | 9.6 | 8.7 | 6.3 | 6.0 | 15.2 | 16.7 | 17.8 | 17.8 | 9.8 | 8.7 | 7.0 | 7.7 |
| 10:00 | 2 | 16.2 | 17.1 | 17.3 | 17.9 | 9.6 | 8.7 | 6.3 | 6.1 | 15.2 | 16.7 | 17.8 | 17.9 | 9.8 | 8.7 | 7.0 | 7.7 |
| 10:15 | 2 | 16.1 | 17.1 | 17.3 | 18.0 | 9.6 | 8.7 | 6.3 | 6.1 | 15.1 | 16.7 | 17.8 | 17.9 | 9.8 | 8.7 | 7.0 | 7.7 |
| 10:30 | 2 | 16.1 | 17.1 | 17.3 | 18.0 | 9.6 | 8.7 | 6.3 | 6.2 | 15.1 | 16.7 | 17.8 | 17.9 | 9.8 | 8.7 | 7.1 | 7.8 |
| 10:45 | 2 | 16.1 | 17.1 | 17.3 | 18.0 | 9.6 | 8.7 | 6.3 | 6.2 | 15.1 | 16.7 | 17.8 | 17.9 | 9.8 | 8.7 | 7.1 | 7.9 |
| 11:00 | 2 | 16.0 | 17.0 | 17.3 | 18.0 | 9.6 | 8.7 | 6.3 | 6.3 | 15.1 | 16.7 | 17.8 | 17.9 | 9.8 | 8.7 | 7.1 | 7.9 |
| 11:15 | 2 | 16.0 | 17.0 | 17.3 | 18.1 | 9.6 | 8.7 | 6.3 | 6.3 | 15.1 | 16.7 | 17.9 | 17.9 | 9.8 | 8.7 | 7.1 | 7.9 |
| 11:30 | 2 | 16.0 | 17.0 | 17.4 | 18.2 | 9.6 | 8.7 | 6.3 | 6.4 | 15.1 | 16.7 | 17.9 | 17.9 | 9.8 | 8.6 | 7.2 | 7.9 |
| 11:45 | 2 | 16.0 | 17.0 | 17.4 | 18.2 | 9.6 | 8.7 | 6.4 | 6.4 | 15.1 | 16.6 | 17.9 | 18.0 | 9.7 | 8.6 | 7.2 | 7.9 |
| 12:00 | 2 | 15.9 | 17.0 | 17.5 | 18.2 | 9.6 | 8.7 | 6.4 | 6.5 | 15.1 | 16.6 | 18.0 | 18.0 | 9.7 | 8.6 | 7.2 | 8.0 |
| 12:15 | 2 | 15.9 | 16.9 | 17.5 | 18.3 | 9.6 | 8.7 | 6.4 | 6.6 | 15.1 | 16.6 | 18.0 | 18.0 | 9.7 | 8.6 | 7.3 | 8.0 |
| 12:30 | 2 | 15.9 | 16.9 | 17.6 | 18.5 | 9.6 | 8.7 | 6.4 | 6.7 | 15.1 | 16.6 | 18.1 | 18.1 | 9.7 | 8.6 | 7.3 | 8.0 |
| 12:45 | 2 | 15.9 | 16.9 | 17.7 | 18.6 | 9.6 | 8.7 | 6.4 | 6.8 | 15.1 | 16.6 | 18.2 | 18.2 | 9.7 | 8.6 | 7.4 | 8.0 |
| 13:00 | 2 | 15.8 | 16.8 | 17.8 | 18.6 | 9.6 | 8.7 | 6.4 | 6.9 | 15.1 | 16.6 | 18.3 | 18.3 | 9.7 | 8.6 | 7.4 | 8.0 |
| 13:15 | 2 | 15.8 | 16.8 | 17.9 | 18.6 | 9.6 | 8.7 | 6.4 | 7.0 | 15.1 | 16.6 | 18.4 | 16.3 | 9.7 | 8.6 | 7.5 | 8.0 |
| 13:30 | 2 | 15.8 | 16.8 | 17.9 | 18.7 | 9.6 | 8.7 | 6.5 | 7.1 | 15.1 | 16.6 | 18.5 | 18.5 | 9.7 | 8.6 | 7.5 | 8.0 |
| 13:45 | 2 | 15.7 | 16.8 | 17.9 | 18.7 | 9.6 | 8.7 | 6.5 | 7.1 | 15.1 | 16.6 | 18.6 | 18.5 | 9.7 | 8.6 | 7.5 | 8.0 |
| 14:00 | 2 | 15.7 | 16.7 | 18.0 | 18.8 | 9.6 | 8.7 | 6.5 | 7.1 | 15.0 | 16.6 | 18.7 | 18.7 | 9.7 | 8.6 | 7.5 | 8.0 |
| 14:15 | 2 | 15.7 | 16.7 | 18.1 | 18.8 | 9.6 | 8.7 | 6.6 | 7.1 | 15.0 | 16.6 | 18.8 | 18.8 | 9.7 | 8.6 | 7.5 | 8.0 |
| 14:30 | 2 | 15.7 | 16.7 | 18.2 | 18.8 | 9.6 | 8.7 | 6.6 | 7.1 | 15.0 | 16.6 | 18.9 | 18.9 | 9.7 | 8.6 | 7.5 | 8.0 |
| 14:45 | 2 | 15.7 | 16.7 | 18.3 | 18.9 | 9.6 | 8.7 | 6.6 | 7.1 | 15.0 | 16.6 | 18.9 | 18.9 | 9.7 | 8.6 | 7.5 | 8.0 |
| 15:00 | 2 | 15.7 | 16.7 | 18.4 | 18.9 | 9.6 | 8.7 | 6.6 | 7.1 | 15.0 | 16.5 | 19.0 | 19.0 | 9.7 | 8.6 | 7.5 | 8.0 |
| 15:15 | 2 | 15.7 | 16.7 | 18.5 | 19.0 | 9.6 | 8.8 | 6.6 | 7.0 | 15.0 | 16.5 | 19.1 | 18.9 | 9.7 | 8.6 | 7.5 | 8.0 |
| 15:30 | 2 | 15.6 | 16.7 | 18.5 | 19.0 | 9.6 | 8.8 | 6.6 | 7.0 | 15.0 | 16.5 | 19.2 | 19.0 | 9.7 | 8.6 | 7.5 | 8.0 |
| 15:45 | 2 | 15.6 | 16.7 | 18.5 | 19.1 | 9.6 | 8.8 | 6.7 | 7.0 | 15.0 | 16.4 | 19.2 | 19.0 | 9.7 | 8.6 | 7.6 | 8.0 |
| 16:00 | 2 | 15.6 | 16.7 | 18.5 | 19.1 | 9.6 | 8.8 | 6.7 | 7.0 | 15.0 | 16.4 | 19.2 | 19.1 | 9.7 | 8.6 | 7.6 | 8.0 |
| 16:15 | 2 | 15.6 | 16.7 | 18.4 | 19.1 | 9.6 | 8.8 | 6.7 | 7.0 | 15.0 | 16.4 | 19.3 | 19.1 | 9.7 | 8.6 | 7.6 | 7.9 |
| 16:30 | 2 | 15.6 | 16.7 | 18.4 | 19.1 | 9.6 | 8.8 | 6.7 | 7.0 | 15.0 | 16.4 | 19.3 | 19.2 | 9.7 | 8.6 | 7.6 | 7.9 |
| 16:45 | 2 | 15.6 | 16.7 | 18.4 | 19.1 | 9.6 | 8.8 | 6.7 | 7.0 | 15.0 | 16.4 | 19.3 | 19.4 | 9.7 | 8.6 | 7.6 | 7.8 |
| 17:00 | 2 | 15.6 | 16.7 | 18.4 | 19.1 | 9.6 | 8.8 | 6.7 | 7.0 | 15.0 | 16.5 | 19.3 | 19.2 | 9.7 | 8.6 | 7.6 | 7.8 |
| 17:15 | 2 | 15.6 | 16.8 | 18.4 | 19.1 | 9.6 | 8.8 | 6.7 | 7.0 | 15.0 | 16.5 | 19.3 | 19.4 | 9.7 | 8.6 | 7.6 | 7.8 |
| 17:30 | 2 | 15.7 | 16.8 | 18.4 | 19.1 | 9.6 | 8.8 | 6.7 | 6.9 | 15.0 | 16.6 | 19.3 | 19.3 | 9.7 | 8.6 | 7.6 | 7.7 |
| 17:45 | 2 | 15.7 | 16.8 | 18.5 | 19.1 | 9.6 | 8.8 | 6.7 | 6.9 | 15.0 | 16.6 | 19.3 | 19.4 | 9.7 | 8.6 | 7.6 | 7.6 |
| 18:00 | 2 | 15.7 | 16.8 | 18.5 | 19.1 | 9.6 | 8.8 | 6.7 | 6.9 | 15.0 | 16.6 | 19.3 | 19.2 | 9.7 | 8.7 | 7.6 | 7.5 |
| 18:15 | 2 | 15.8 | 16.9 | 18.5 | 19.1 | 9.7 | 8.8 | 6.7 | 6.9 | 15.0 | 16.6 | 19.3 | 19.1 | 9.7 | 8.7 | 7.5 | 7.4 |
| 18:30 | 2 | 15.8 | 16.9 | 18.5 | 19.1 | 9.7 | 8.8 | 6.7 | 6.9 | 15.0 | 16.6 | 19.3 | 19.2 | 9.7 | 8.7 | 7.5 | 7.3 |
| 18:45 | 2 | 15.8 | 17.0 | 18.6 | 19.1 | 9.7 | 8.8 | 6.6 | 6.8 | 15.0 | 16.6 | 19.3 | 19.1 | 9.7 | 8.7 | 7.4 | 7.2 |

# Appendix B Temperature survey data

| time | day | 5A-60 | 5A-35 | 5A-10 | 5A+15 | 5B-60 | 5B-35 | 5B-10 | 5B+15 | 6A-60 | 6A-35 | 6A-10 | 6A+15 | 6B-60 | 6B-35 | 6B-10 | 6B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 hr clock | no. | | | | | | | | | | | | | | | | |
| 19:00 | 2 | 15.9 | 17.0 | 18.6 | 19.0 | 9.7 | 8.8 | 6.6 | 6.8 | 15.0 | 16.7 | 19.2 | 19.1 | 9.7 | 8.7 | 7.4 | 7.2 |
| 19:15 | 2 | 15.9 | 17.0 | 18.6 | 19.0 | 9.7 | 8.8 | 6.6 | 6.7 | 15.0 | 16.7 | 19.2 | 19.0 | 9.7 | 8.7 | 7.4 | 7.1 |
| 19:30 | 2 | 15.9 | 17.0 | 18.6 | 19.0 | 9.7 | 8.8 | 6.6 | 6.6 | 15.0 | 16.7 | 19.2 | 19.0 | 9.7 | 8.7 | 7.3 | 7.0 |
| 19:45 | 2 | 15.9 | 17.0 | 18.6 | 19.0 | 9.7 | 8.7 | 6.6 | 6.5 | 15.0 | 16.7 | 19.2 | 18.9 | 9.7 | 8.7 | 7.2 | 6.9 |
| 20:00 | 2 | 16.0 | 17.0 | 18.6 | 19.0 | 9.7 | 8.7 | 6.6 | 6.4 | 15.0 | 16.7 | 19.1 | 18.9 | 9.7 | 8.8 | 7.1 | 6.8 |
| 20:15 | 2 | 16.0 | 17.1 | 18.6 | 19.0 | 9.7 | 8.7 | 6.5 | 6.3 | 15.0 | 16.7 | 19.1 | 18.9 | 9.7 | 8.8 | 7.0 | 6.7 |
| 20:30 | 2 | 16.0 | 17.1 | 18.6 | 18.9 | 9.7 | 8.7 | 6.5 | 6.2 | 15.0 | 16.8 | 19.0 | 18.8 | 9.7 | 8.8 | 7.0 | 6.6 |
| 20:45 | 2 | 16.0 | 17.1 | 18.6 | 18.9 | 9.7 | 8.7 | 6.5 | 6.1 | 15.0 | 16.8 | 19.0 | 18.8 | 9.7 | 8.8 | 6.9 | 6.5 |
| 21:00 | 2 | 16.0 | 17.1 | 18.6 | 18.8 | 9.7 | 8.7 | 6.5 | 6.0 | 15.0 | 16.8 | 19.0 | 18.8 | 9.7 | 8.8 | 6.9 | 6.4 |
| 21:15 | 2 | 16.0 | 17.1 | 18.5 | 18.8 | 9.7 | 8.7 | 6.5 | 5.9 | 15.0 | 16.8 | 19.0 | 18.8 | 9.7 | 8.8 | 6.8 | 6.3 |
| 21:30 | 2 | 16.0 | 17.2 | 18.4 | 18.7 | 9.7 | 8.7 | 6.4 | 5.8 | 15.0 | 16.8 | 18.9 | 18.7 | 9.7 | 8.9 | 6.7 | 6.2 |
| 21:45 | 2 | 16.0 | 17.2 | 18.3 | 18.6 | 9.7 | 8.7 | 6.4 | 5.8 | 15.0 | 16.8 | 18.9 | 18.7 | 9.7 | 8.9 | 6.6 | 6.2 |
| 22:00 | 2 | 16.0 | 17.2 | 18.2 | 18.5 | 9.7 | 8.7 | 6.4 | 5.7 | 15.0 | 16.8 | 18.8 | 18.6 | 9.7 | 8.9 | 6.6 | 6.2 |
| 22:15 | 2 | 16.0 | 17.2 | 18.1 | 18.4 | 9.7 | 8.6 | 6.4 | 5.7 | 15.0 | 16.8 | 18.7 | 18.5 | 9.7 | 8.9 | 6.5 | 6.1 |
| 22:30 | 2 | 16.0 | 17.2 | 18.1 | 18.3 | 9.7 | 8.6 | 6.3 | 5.7 | 15.0 | 16.8 | 18.6 | 18.4 | 9.7 | 8.9 | 6.5 | 6.0 |
| 22:45 | 2 | 16.1 | 17.3 | 18.0 | 18.2 | 9.7 | 8.6 | 6.3 | 5.6 | 15.0 | 16.8 | 18.5 | 18.3 | 9.7 | 8.9 | 6.4 | 5.9 |
| 23:00 | 2 | 16.1 | 17.3 | 18.0 | 18.1 | 9.6 | 8.6 | 6.3 | 5.6 | 15.0 | 16.9 | 18.4 | 18.2 | 9.7 | 8.9 | 6.3 | 5.9 |
| 23:15 | 2 | 16.1 | 17.3 | 17.9 | 18.1 | 9.6 | 8.6 | 6.3 | 5.6 | 15.0 | 16.9 | 18.3 | 18.1 | 9.7 | 8.9 | 6.2 | 5.9 |
| 23:30 | 2 | 16.1 | 17.3 | 17.9 | 18.0 | 9.6 | 8.6 | 6.2 | 5.6 | 15.0 | 16.9 | 18.2 | 18.0 | 9.7 | 8.9 | 6.1 | 5.8 |
| 23:45 | 2 | 16.1 | 17.3 | 17.9 | 18.0 | 9.6 | 8.6 | 6.2 | 5.6 | 15.1 | 16.9 | 18.1 | 17.9 | 9.7 | 8.9 | 6.1 | 5.7 |
| 0:00 | 2 | 16.1 | 17.3 | 17.9 | 18.0 | 9.6 | 8.6 | 6.2 | 5.6 | 15.1 | 16.9 | 18.0 | 17.8 | 9.7 | 8.8 | 6.0 | 5.6 |
| 0:15 | 3 | 16.1 | 17.3 | 17.8 | 18.0 | 9.6 | 8.6 | 6.1 | 5.6 | 15.1 | 16.9 | 18.0 | 17.9 | 9.7 | 8.8 | 6.0 | 5.6 |
| 0:30 | 3 | 16.1 | 17.3 | 17.8 | 18.0 | 9.6 | 8.6 | 6.1 | 5.5 | 15.1 | 16.9 | 18.0 | 17.8 | 9.6 | 8.8 | 6.0 | 5.5 |
| 0:45 | 3 | 16.1 | 17.3 | 17.8 | 18.0 | 9.6 | 8.6 | 6.1 | 5.5 | 15.1 | 17.0 | 18.0 | 17.8 | 9.6 | 8.8 | 6.0 | 5.5 |
| 1:00 | 3 | 16.2 | 17.3 | 17.8 | 18.0 | 9.6 | 8.6 | 6.2 | 5.5 | 15.1 | 17.0 | 18.0 | 17.9 | 9.6 | 8.7 | 6.0 | 5.5 |
| 1:15 | 3 | 16.2 | 17.3 | 17.8 | 17.9 | 9.6 | 8.6 | 6.0 | 5.5 | 15.2 | 17.0 | 18.0 | 18.0 | 9.6 | 8.7 | 6.0 | 5.5 |
| 1:30 | 3 | 16.2 | 17.3 | 17.8 | 17.9 | 9.6 | 8.5 | 6.0 | 5.5 | 15.2 | 17.0 | 18.0 | 17.9 | 9.6 | 8.7 | 6.0 | 5.5 |
| 1:45 | 3 | 16.2 | 17.3 | 17.8 | 17.9 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 18.0 | 18.0 | 9.6 | 8.6 | 6.0 | 5.5 |
| 2:00 | 3 | 16.2 | 17.3 | 17.7 | 17.9 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.9 | 17.9 | 9.6 | 8.6 | 6.0 | 5.5 |
| 2:15 | 3 | 16.2 | 17.3 | 17.7 | 17.9 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.8 | 17.9 | 9.6 | 8.6 | 5.9 | 5.5 |
| 2:30 | 3 | 16.2 | 17.3 | 17.7 | 17.9 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.8 | 17.8 | 9.6 | 8.6 | 5.9 | 5.5 |
| 2:45 | 3 | 16.2 | 17.3 | 17.6 | 17.8 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.7 | 17.8 | 9.6 | 8.6 | 5.9 | 5.5 |
| 3:00 | 3 | 16.2 | 17.3 | 17.6 | 17.8 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.7 | 17.6 | 9.6 | 8.6 | 5.9 | 5.5 |
| 3:15 | 3 | 16.2 | 17.3 | 17.5 | 17.7 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.7 | 17.7 | 9.6 | 8.6 | 5.9 | 5.5 |
| 3:30 | 3 | 16.2 | 17.3 | 17.5 | 17.7 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.7 | 17.5 | 9.5 | 8.6 | 5.9 | 5.5 |
| 3:45 | 3 | 16.2 | 17.3 | 17.4 | 17.6 | 9.6 | 8.5 | 5.9 | 5.5 | 15.2 | 17.0 | 17.7 | 17.5 | 9.5 | 8.5 | 5.9 | 5.5 |
| 4:00 | 3 | 16.3 | 17.3 | 17.4 | 17.6 | 9.6 | 8.5 | 5.8 | 5.5 | 15.2 | 17.0 | 17.7 | 17.4 | 9.5 | 8.5 | 5.9 | 5.5 |
| 4:15 | 3 | 16.3 | 17.3 | 17.3 | 17.5 | 9.6 | 8.5 | 5.8 | 5.5 | 15.3 | 17.0 | 17.7 | 17.6 | 9.5 | 8.5 | 5.8 | 5.5 |
| 4:30 | 3 | 16.3 | 17.3 | 17.3 | 17.5 | 9.6 | 8.5 | 5.8 | 5.5 | 15.3 | 17.0 | 17.6 | 17.5 | 9.5 | 8.5 | 5.8 | 5.5 |
| 4:45 | 3 | 16.3 | 17.3 | 17.3 | 17.5 | 9.6 | 8.5 | 5.8 | 5.5 | 15.3 | 17.0 | 17.6 | 17.4 | 9.5 | 8.5 | 5.8 | 5.5 |
| 5:00 | 3 | 16.3 | 17.3 | 17.3 | 17.5 | 9.6 | 8.5 | 5.8 | 5.5 | 15.3 | 17.0 | 17.6 | 17.4 | 9.5 | 8.5 | 5.8 | 5.5 |
| 5:15 | 3 | 16.3 | 17.3 | 17.3 | 17.5 | 9.6 | 8.5 | 5.8 | 5.5 | 15.3 | 17.0 | 17.6 | 17.4 | 9.5 | 8.5 | 5.8 | 5.5 |
| 5:30 | 3 | 16.3 | 17.3 | 17.2 | 17.5 | 9.6 | 8.5 | 5.8 | 5.5 | 15.3 | 17.0 | 17.5 | 17.4 | 9.5 | 8.5 | 5.8 | 5.5 |
| 5:45 | 3 | 16.3 | 17.3 | 17.2 | 17.5 | 9.6 | 8.5 | 5.8 | 5.6 | 15.3 | 17.0 | 17.5 | 17.4 | 9.5 | 8.5 | 5.8 | 5.6 |
| 6:00 | 3 | 16.3 | 17.3 | 17.2 | 17.5 | 9.6 | 8.5 | 5.8 | 5.7 | 15.3 | 17.0 | 17.5 | 17.4 | 9.5 | 8.5 | 5.8 | 5.7 |
| 6:15 | 3 | 16.3 | 17.3 | 17.2 | 17.5 | 9.6 | 8.5 | 5.8 | 5.7 | 15.3 | 17.0 | 17.5 | 17.4 | 9.5 | 8.5 | 5.8 | 5.7 |
| 6:30 | 3 | 16.3 | 17.3 | 17.2 | 17.5 | 9.6 | 8.5 | 5.8 | 5.8 | 15.3 | 17.0 | 17.5 | 17.4 | 9.5 | 8.5 | 5.9 | 5.8 |
| 6:45 | 3 | 16.3 | 17.3 | 17.2 | 17.5 | 9.6 | 8.5 | 5.8 | 5.9 | 15.3 | 16.9 | 17.6 | 17.4 | 9.5 | 8.5 | 5.9 | 5.9 |
| 7:00 | 3 | 16.3 | 17.3 | 17.2 | 17.5 | 9.6 | 8.4 | 5.8 | 6.0 | 15.3 | 16.9 | 17.6 | 17.4 | 9.5 | 8.4 | 6.0 | 6.0 |
| 7:15 | 3 | 16.3 | 17.3 | 17.2 | 17.6 | 9.6 | 8.4 | 5.8 | 6.1 | 15.3 | 16.9 | 17.6 | 17.4 | 9.5 | 8.4 | 6.0 | 6.1 |
| 7:30 | 3 | 16.3 | 17.3 | 17.2 | 17.6 | 9.6 | 8.4 | 5.8 | 6.2 | 15.3 | 16.8 | 17.6 | 17.4 | 9.5 | 8.4 | 6.1 | 6.2 |
| 7:45 | 3 | 16.3 | 17.3 | 17.2 | 17.6 | 9.6 | 8.4 | 5.8 | 6.3 | 15.3 | 16.8 | 17.7 | 17.4 | 9.5 | 8.4 | 6.1 | 6.3 |
| 8:00 | 3 | 16.3 | 17.3 | 17.2 | 17.7 | 9.6 | 8.4 | 5.8 | 6.3 | 15.3 | 16.8 | 17.7 | 17.5 | 9.4 | 8.4 | 6.2 | 6.3 |
| 8:15 | 3 | 16.3 | 17.2 | 17.2 | 17.7 | 9.6 | 8.4 | 5.8 | 6.4 | 15.3 | 16.8 | 17.8 | 17.5 | 9.4 | 8.3 | 6.2 | 6.4 |
| 8:30 | 3 | 16.3 | 17.2 | 17.2 | 17.7 | 9.5 | 8.4 | 5.9 | 6.6 | 15.3 | 16.8 | 17.8 | 17.5 | 9.4 | 8.3 | 6.3 | 6.6 |
| 8:45 | 3 | 16.3 | 17.2 | 17.2 | 17.8 | 9.5 | 8.4 | 5.9 | 6.8 | 15.3 | 16.8 | 17.8 | 17.4 | 9.4 | 8.3 | 6.3 | 6.8 |
| 9:00 | 3 | 16.3 | 17.2 | 17.2 | 17.8 | 9.5 | 8.4 | 5.9 | 7.0 | 15.3 | 16.8 | 17.9 | 17.5 | 9.4 | 8.3 | 6.4 | 7.0 |
| 9:15 | 3 | 16.2 | 17.2 | 17.2 | 17.8 | 9.5 | 8.4 | 5.9 | 7.1 | 15.3 | 16.8 | 17.9 | 17.6 | 9.4 | 8.3 | 6.5 | 7.1 |
| 9:30 | 3 | 16.2 | 17.2 | 17.2 | 17.8 | 9.5 | 8.4 | 6.0 | 7.2 | 15.3 | 16.8 | 17.9 | 17.7 | 9.4 | 8.3 | 6.6 | 7.2 |
| 9:45 | 3 | 16.2 | 17.1 | 17.2 | 17.8 | 9.5 | 8.4 | 6.0 | 7.2 | 15.3 | 16.8 | 17.9 | 17.7 | 9.4 | 8.3 | 6.7 | 7.2 |
| 10:00 | 3 | 16.2 | 17.1 | 17.3 | 17.8 | 9.5 | 8.4 | 6.0 | 7.3 | 15.3 | 16.8 | 17.9 | 17.8 | 9.4 | 8.3 | 6.8 | 7.3 |
| 10:15 | 3 | 16.2 | 17.1 | 17.3 | 17.9 | 9.5 | 8.4 | 6.0 | 7.4 | 15.3 | 16.8 | 18.0 | 17.8 | 9.4 | 8.3 | 6.8 | 7.4 |
| 10:30 | 3 | 16.2 | 17.1 | 17.4 | 17.9 | 9.5 | 8.4 | 6.0 | 7.5 | 15.3 | 16.8 | 18.0 | 17.9 | 9.3 | 8.3 | 6.8 | 7.5 |
| 10:45 | 3 | 16.1 | 17.1 | 17.4 | 17.9 | 9.5 | 8.4 | 6.1 | 7.5 | 15.3 | 16.7 | 18.0 | 17.9 | 9.3 | 8.2 | 6.9 | 7.5 |
| 11:00 | 3 | 16.1 | 17.1 | 17.5 | 18.0 | 9.5 | 8.4 | 6.1 | 7.5 | 15.2 | 16.7 | 18.1 | 18.1 | 9.3 | 8.2 | 6.9 | 7.5 |
| 11:15 | 3 | 16.1 | 17.1 | 17.6 | 18.1 | 9.5 | 8.4 | 6.1 | 7.6 | 15.2 | 16.7 | 18.2 | 18.1 | 9.3 | 8.2 | 6.9 | 7.5 |
| 11:30 | 3 | 16.1 | 17.0 | 17.6 | 18.1 | 9.5 | 8.3 | 6.2 | 7.6 | 15.2 | 16.7 | 18.3 | 18.2 | 9.3 | 8.2 | 6.9 | 7.4 |
| 11:45 | 3 | 16.1 | 17.0 | 17.7 | 18.2 | 9.5 | 8.3 | 6.2 | 7.6 | 15.2 | 16.7 | 18.4 | 18.2 | 9.3 | 8.2 | 6.9 | 7.2 |
| 12:00 | 3 | 16.1 | 17.0 | 17.8 | 18.3 | 9.5 | 8.3 | 6.3 | 7.6 | 15.2 | 16.7 | 18.5 | 18.4 | 9.3 | 8.2 | 6.9 | 7.0 |
| 12:15 | 3 | 16.1 | 16.9 | 17.8 | 18.5 | 9.4 | 8.3 | 6.3 | 7.6 | 15.2 | 16.6 | 18.6 | 18.6 | 9.3 | 8.2 | 6.9 | 6.8 |
| 12:30 | 3 | 16.0 | 16.9 | 17.8 | 18.6 | 9.4 | 8.3 | 6.4 | 7.5 | 15.2 | 16.6 | 18.7 | 18.7 | 9.3 | 8.2 | 6.8 | 6.7 |
| 12:45 | 3 | 16.0 | 16.9 | 17.9 | 18.5 | 9.4 | 8.3 | 6.4 | 7.5 | 15.1 | 16.6 | 18.9 | 18.9 | 9.3 | 8.2 | 6.7 | 6.5 |
| 13:00 | 3 | 16.0 | 16.9 | 17.9 | 18.5 | 9.4 | 8.3 | 6.5 | 7.5 | 15.1 | 16.5 | 18.9 | 19.0 | 9.3 | 8.2 | 6.6 | 6.4 |
| 13:15 | 3 | 16.0 | 16.9 | 18.0 | 18.5 | 9.4 | 8.3 | 6.5 | 7.5 | 15.1 | 16.5 | 19.0 | 19.1 | 9.3 | 8.2 | 6.5 | 6.3 |
| 13:30 | 3 | 16.0 | 16.9 | 18.0 | 18.5 | 9.4 | 8.3 | 6.6 | 7.4 | 15.1 | 16.5 | 19.1 | 19.2 | 9.3 | 8.2 | 6.5 | 6.2 |
| 13:45 | 3 | 16.0 | 16.9 | 18.0 | 18.5 | 9.4 | 8.3 | 6.6 | 7.4 | 15.1 | 16.5 | 19.2 | 19.3 | 9.3 | 8.2 | 6.4 | 6.2 |
| 14:00 | 3 | 16.0 | 16.9 | 18.0 | 18.5 | 9.4 | 8.3 | 6.7 | 7.4 | 15.1 | 16.5 | 19.3 | 19.4 | 9.3 | 8.2 | 6.3 | 6.2 |
| 14:15 | 3 | 16.0 | 16.9 | 18.0 | 18.5 | 9.4 | 8.3 | 6.7 | 7.3 | 15.1 | 16.5 | 19.5 | 19.6 | 9.3 | 8.2 | 6.3 | 6.2 |
| 14:30 | 3 | 16.0 | 16.9 | 18.0 | 18.6 | 9.4 | 8.3 | 6.8 | 7.3 | 15.1 | 16.5 | 19.6 | 19.8 | 9.3 | 8.2 | 6.2 | 6.2 |
| 14:45 | 3 | 16.0 | 16.9 | 18.0 | 18.6 | 9.4 | 8.3 | 6.8 | 7.2 | 15.1 | 16.5 | 19.7 | 19.8 | 9.3 | 8.2 | 6.2 | 6.2 |
| 15:00 | 3 | 16.0 | 16.9 | 18.0 | 18.7 | 9.4 | 8.3 | 6.8 | 7.2 | 15.1 | 16.5 | 19.8 | 19.9 | 9.3 | 8.2 | 6.2 | 6.1 |
| 15:15 | 3 | 16.0 | 16.9 | 18.1 | 18.8 | 9.4 | 8.4 | 6.8 | 7.2 | 15.1 | 16.6 | 19.9 | 19.9 | 9.3 | 8.2 | 6.1 | 6.1 |
| 15:30 | 3 | 15.9 | 16.9 | 18.1 | 18.8 | 9.4 | 8.4 | 6.8 | 7.1 | 15.1 | 16.6 | 20.0 | 20.0 | 9.3 | 8.2 | 6.1 | 6.1 |
| 15:45 | 3 | 15.9 | 16.9 | 18.1 | 18.8 | 9.4 | 8.4 | 6.8 | 7.1 | 15.1 | 16.6 | 20.0 | 20.1 | 9.3 | 8.3 | 6.0 | 6.0 |
| 16:00 | 3 | 15.9 | 16.8 | 18.1 | 18.8 | 9.4 | 8.4 | 6.8 | 7.1 | 15.1 | 16.6 | 20.0 | 20.1 | 9.3 | 8.3 | 6.0 | 6.0 |
| 16:15 | 3 | 15.9 | 16.8 | 18.0 | 18.8 | 9.4 | 8.4 | 6.7 | 7.1 | 15.1 | 16.6 | 20.0 | 20.2 | 9.3 | 8.3 | 6.0 | 6.0 |

# Appendix B  Temperature survey data

| time | day | 5A-60 | 5A-35 | 5A-10 | 5A+15 | 5B-60 | 5B-35 | 5B-10 | 5B+15 | 6A-60 | 6A-35 | 6A-10 | 6A+15 | 6B-60 | 6B-35 | 6B-10 | 6B+15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 hr clock | no. | | | | | | | | | | | | | | | | |
| 16:30 | 3 | 15.8 | 16.8 | 18.0 | 18.8 | 9.4 | 8.4 | 6.7 | 7.0 | 15.1 | 16.7 | 20.0 | 20.1 | 9.3 | 8.3 | 6.0 | 5.9 |
| 16:45 | 3 | 15.8 | 16.8 | 17.9 | 18.7 | 9.4 | 8.4 | 6.7 | 7.0 | 15.1 | 16.7 | 20.0 | 20.2 | 9.3 | 8.3 | 6.0 | 5.8 |
| 17:00 | 3 | 15.8 | 16.8 | 17.8 | 18.7 | 9.4 | 8.4 | 6.7 | 7.0 | 15.1 | 16.7 | 20.0 | 20.1 | 9.3 | 8.3 | 6.0 | 5.8 |
| 17:15 | 3 | 15.8 | 16.8 | 17.8 | 18.7 | 9.4 | 8.4 | 6.7 | 6.9 | 15.1 | 16.8 | 20.0 | 19.9 | 9.3 | 8.3 | 6.0 | 5.8 |
| 17:30 | 3 | 15.8 | 16.8 | 17.8 | 18.6 | 9.4 | 8.4 | 6.7 | 6.9 | 15.1 | 16.8 | 20.0 | 20.0 | 9.3 | 8.3 | 6.0 | 5.8 |
| 17:45 | 3 | 15.8 | 16.8 | 17.9 | 18.6 | 9.4 | 8.4 | 6.7 | 6.9 | 15.1 | 16.8 | 20.0 | 19.9 | 9.3 | 8.3 | 5.9 | 5.8 |
| 18:00 | 3 | 15.8 | 16.8 | 17.9 | 18.5 | 9.4 | 8.5 | 6.6 | 6.8 | 15.1 | 16.8 | 19.9 | 19.8 | 9.4 | 8.3 | 5.9 | 5.8 |
| 18:15 | 3 | 15.9 | 16.8 | 17.9 | 18.4 | 9.4 | 8.5 | 6.6 | 6.8 | 15.1 | 16.8 | 19.9 | 19.8 | 9.4 | 8.3 | 5.9 | 5.8 |
| 18:30 | 3 | 15.9 | 16.9 | 17.9 | 18.3 | 9.5 | 8.5 | 6.6 | 6.8 | 15.1 | 16.8 | 19.8 | 19.8 | 9.4 | 8.3 | 5.9 | 5.7 |
| 18:45 | 3 | 15.9 | 16.9 | 17.9 | 18.3 | 9.5 | 8.5 | 6.6 | 6.8 | 15.1 | 16.9 | 19.8 | 19.6 | 9.4 | 8.3 | 5.9 | 5.7 |
| 19:00 | 3 | 15.9 | 16.9 | 17.9 | 18.2 | 9.5 | 8.5 | 6.6 | 6.7 | 15.1 | 16.9 | 19.8 | 19.6 | 9.4 | 8.3 | 5.9 | 5.7 |
| 19:15 | 3 | 16.0 | 17.0 | 17.9 | 18.2 | 9.5 | 8.5 | 6.6 | 6.7 | 15.1 | 16.9 | 19.7 | 19.5 | 9.4 | 8.3 | 5.9 | 5.6 |
| 19:30 | 3 | 16.0 | 17.0 | 17.9 | 18.2 | 9.5 | 8.5 | 6.5 | 6.6 | 15.1 | 16.9 | 19.7 | 19.4 | 9.4 | 8.3 | 5.8 | 5.6 |
| 19:45 | 3 | 16.0 | 17.1 | 17.9 | 18.1 | 9.5 | 8.5 | 6.5 | 6.5 | 15.1 | 16.9 | 19.7 | 19.4 | 9.4 | 8.3 | 5.8 | 5.5 |
| 20:00 | 3 | 16.0 | 17.1 | 17.9 | 18.1 | 9.5 | 8.5 | 6.5 | 6.5 | 15.1 | 16.9 | 19.5 | 19.4 | 9.4 | 8.3 | 5.8 | 5.5 |
| 20:15 | 3 | 16.0 | 17.1 | 17.9 | 18.0 | 9.5 | 8.6 | 6.5 | 6.4 | 15.1 | 16.9 | 19.4 | 19.4 | 9.4 | 8.3 | 5.8 | 5.5 |
| 20:30 | 3 | 16.1 | 17.2 | 17.8 | 17.9 | 9.5 | 8.6 | 6.4 | 6.4 | 15.1 | 16.9 | 19.3 | 19.3 | 9.4 | 8.3 | 5.8 | 5.5 |
| 20:45 | 3 | 16.1 | 17.2 | 17.8 | 17.8 | 9.5 | 8.6 | 6.4 | 6.3 | 15.1 | 17.0 | 19.2 | 19.2 | 9.4 | 8.3 | 5.8 | 5.4 |
| 21:00 | 3 | 16.1 | 17.2 | 17.7 | 17.7 | 9.5 | 8.6 | 6.4 | 6.3 | 15.1 | 17.0 | 19.1 | 19.2 | 9.4 | 8.3 | 5.8 | 5.4 |
| 21:15 | 3 | 16.2 | 17.2 | 17.6 | 17.6 | 9.5 | 8.6 | 6.4 | 6.2 | 15.1 | 17.0 | 19.1 | 19.1 | 9.4 | 8.3 | 5.8 | 5.4 |
| 21:30 | 3 | 16.2 | 17.2 | 17.5 | 17.5 | 9.5 | 8.6 | 6.3 | 6.1 | 15.1 | 17.0 | 19.1 | 19.1 | 9.4 | 8.3 | 5.7 | 5.3 |
| 21:45 | 3 | 16.2 | 17.3 | 17.4 | 17.4 | 9.5 | 8.6 | 6.3 | 6.0 | 15.2 | 17.0 | 19.1 | 19.0 | 9.4 | 8.3 | 5.7 | 5.3 |
| 22:00 | 3 | 16.2 | 17.3 | 17.3 | 17.3 | 9.5 | 8.6 | 6.3 | 6.0 | 15.2 | 17.0 | 19.0 | 19.0 | 9.4 | 8.3 | 5.7 | 5.2 |
| 22:15 | 3 | 16.2 | 17.3 | 17.2 | 17.2 | 9.6 | 8.6 | 6.3 | 5.9 | 15.2 | 17.0 | 19.0 | 18.8 | 9.4 | 8.3 | 5.6 | 5.2 |
| 22:30 | 3 | 16.2 | 17.3 | 17.1 | 17.1 | 9.6 | 8.6 | 6.2 | 5.9 | 15.2 | 17.0 | 19.0 | 18.9 | 9.4 | 8.3 | 5.6 | 5.2 |
| 22:45 | 3 | 16.2 | 17.3 | 17.0 | 17.0 | 9.6 | 8.7 | 6.2 | 5.9 | 15.2 | 17.0 | 19.0 | 18.8 | 9.4 | 8.3 | 5.6 | 5.2 |
| 23:00 | 3 | 16.2 | 17.3 | 16.9 | 16.9 | 9.6 | 8.7 | 6.2 | 5.9 | 15.2 | 17.0 | 18.9 | 18.8 | 9.4 | 8.3 | 5.6 | 5.2 |
| 23:15 | 3 | 16.2 | 17.3 | 16.8 | 16.8 | 9.6 | 8.7 | 6.2 | 5.9 | 15.2 | 17.1 | 18.9 | 18.7 | 9.4 | 8.3 | 5.5 | 5.2 |
| 23:30 | 3 | 16.2 | 17.3 | 16.7 | 16.7 | 9.6 | 8.7 | 6.2 | 5.9 | 15.2 | 17.1 | 18.9 | 18.7 | 9.4 | 8.3 | 5.5 | 5.2 |
| 23:45 | 3 | 16.3 | 17.3 | 16.6 | 16.6 | 9.6 | 8.7 | 6.1 | 5.9 | 15.2 | 17.1 | 18.8 | 18.6 | 9.4 | 8.2 | 5.5 | 5.2 |
| 0:00 | 3 | 16.3 | 17.3 | 16.6 | 16.5 | 9.6 | 8.7 | 6.1 | 5.8 | 15.2 | 17.1 | 18.8 | 18.8 | 9.4 | 8.2 | 5.5 | 5.1 |