Appendix B

optimal stormwater

Optimal Stormwater Pty Ltd
ABN 53139725894

Level 5, 79 Victoria Avenue
Chatswood, New South Wales 2067
Telephone +61 2 9417 8369
Facsimile +61 2 9417 8337
www.optimalstormwater.com.au

CDS Unit Cleaning: P0708 – 2 Units

Property: Light Horse Interchange Business hub
Location: External Access Road

GPS: 301839.061, 6257938.534
GPS: 301910.387, 6257927.138

Designer: Henry & Hymas Consulting Engineers – NW

Signature: NICHOLAS WEBSTER

Monitoring:

Remove circular 600mm diameter manhole in the centre of the CDS lid. It will likely have 2 bolts requiring a 17 or 19mm socket, plus a gatic lifter.

Use a ***Survey Staff*** (7m is best) to measure the depth from ground to pollution.

Use the ***Data Sheet*** for the device to determine how full it is, and if cleaning is required.

Regular Cleaning:

Open 600mm manhole lid.

Use the ***Survey Staff*** and ***Data Sheet*** to measure and record the Percentage full.

Decant water to grassed area nearby if possible (water the largest area possible, don't concentrate the water, or find a site that's close for decanting water to, or remove then decant back into device).

Take a photo once dewatered. Suck pollution from the sump (via **sucker truck**). Take a photo when empty.

Replace lids, (make sure site is clean including 10m around device), then recycle or dispose of waste.

Annual or Comprehensive Clean: (once per year)

Smaller central lid, and larger outer lid to both be removed.

Use the ***Survey Staff*** and ***Data Sheet*** to measure and record the percentage full.

Remove the internal fibreglass or polymer riser, so you can inspect the weir and outlet hole in the slab. Use the survey staff to measure any accumulated sediments behind the screen. If there is more than 200mm of sediment, this needs to be sucked out as well.

Suction clean as per a "regular clean". Take photo after dewatering showing pollution, take another photo after cleaning to show an empty sump and clean screens.

Inspect and clean the weir and surrounds, and behind the screens if required. Replace the riser, replace the lids, (clean the site), then recycle or dispose of waste. **Grease** lids annually.

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CDS Unit Cleaning: P1009

Property: Light Horse Interchange Business hub
Location: External Access Road **GPS: 302340.211, 6257836.686**
Designer: Henry & Hymas Consulting Engineers – NW **Signature:**

NICHOLAS WETZLER

Monitoring:

Remove circular 600mm diameter manhole in the centre of the CDS lid. It will likely have 2 bolts requiring a 17 or 19mm socket, plus a gatic lifter.

Use a ***Survey Staff*** (7m is best) to measure the depth from ground to pollution.

Use the ***Data Sheet*** for the device to determine how full it is, and if cleaning is required.

Regular Cleaning:

Open 600mm manhole lid.

Use the ***Survey Staff*** and ***Data Sheet*** to measure and record the percentage full.

Decant water to grassed area nearby if possible (water the largest area possible, don't concentrate it, or find a site nearby for decanting water to, or remove then decant back into device). Take a photo before you start suction cleaning. If there is a low flow, enter the diversion chamber and open the "**Capped Lowflow Bypass Pipe**", and put a sandbag over the CDS inlet to bypass low flows. NOTE: this is a confined space, so use a gas detector and full confined spaces entry procedures.

Suck pollution from the sump (via **sucker truck**). You shouldn't have to clean the screens, but jet them if required. Take a photo again when the sump is clean.

Replace lids, (make sure the site is clean) then recycle or dispose of waste.

Annual or Comprehensive Clean: (once per year)

Remove the smaller central lid, and the larger outer lid. Remove the diversion chamber lid.

Suction clean as per a "regular clean". Take photo after dewatering showing pollution, take another photo after cleaning to show an empty sump and clean screens.

Using a gas detector and full confined spaces entry procedures, enter the diversion chamber and inspect for any debris or sediment in upstream pipes and diversion chamber. Using a survey staff, measure the height of sediment (if any) behind the screens. If more than 20% of the way up the screens, then suck out, or raise the screen cage and clean behind it.

Grease any gatic lids, ensure all bolts are present, ensure cap is back on.

Replace the lids, (ensure the site is clean) recycle or dispose of waste.

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CDS Unit Cleaning: P1012

Property: Light Horse Interchange Business hub
Location: External Access Road **GPS: 302178.568, 6257857.455**
Designer: Henry & Hymas Consulting Engineers – NW **Signature:**

NICHOLAS WETZCAR

Monitoring:

Remove circular 600mm diameter manhole in the centre of the CDS lid. It will likely have 2 bolts requiring a 17 or 19mm socket, plus a gatic lifter.

Use a ***Survey Staff*** (7m is best) to measure the depth from ground to pollution.

Use the ***Data Sheet*** for the device to determine how full it is, and if cleaning is required.

Regular Cleaning:

Open 600mm manhole lid.

Use the ***Survey Staff*** and ***Data Sheet*** to measure and record the percentage full.

Decant water to grassed area nearby if possible (water the largest area possible, don't concentrate it, or find a site nearby for decanting water to, or remove then decant back into device). Take a photo before you start suction cleaning. If there is a low flow, enter the diversion chamber and open the "**Capped Lowflow Bypass Pipe**", and put a sandbag over the CDS inlet to bypass low flows. NOTE: this is a confined space, so use a gas detector and full confined spaces entry procedures.

Suck pollution from the sump (via **sucker truck**). You shouldn't have to clean the screens, but jet them if required. Take a photo again when the sump is clean.

Replace lids, (make sure the site is clean) then recycle or dispose of waste.

Annual or Comprehensive Clean: (once per year)

Remove the smaller central lid, and the larger outer lid. Remove the diversion chamber lid.

Suction clean as per a "regular clean". Take photo after dewatering showing pollution, take another photo after cleaning to show an empty sump and clean screens.

Using a gas detector and full confined spaces entry procedures, enter the diversion chamber and inspect for any debris or sediment in upstream pipes and diversion chamber. Using a survey staff, measure the height of sediment (if any) behind the screens. If more than 20% of the way up the screens, then suck out, or raise the screen cage and clean behind it.

Grease any gatic lids, ensure all bolts are present, ensure cap is back on.

Replace the lids, (ensure the site is clean) recycle or dispose of waste.

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CDS Unit Cleaning: P2028

Property: Light Horse Interchange Business hub
Location: North of OSD basin
Designer: Henry & Hymas Consulting Engineers – NW

GPS: 301864.017, 6257803.653
Signature: Nick
NICHOLAS NETZLAR

Monitoring:

Remove circular 600mm diameter manhole in the centre of the CDS lid. It will likely have 2 bolts requiring a 17 or 19mm socket, plus a gatic lifter. It could also have a checkerplate steel lid, requiring a Council key to open the padlock. Or it could have gatics.

Use a ***Survey Staff*** (7m is best) to measure the depth from ground to pollution.

Use the ***Data Sheet*** for the device to determine how full it is, and if cleaning is required.

Regular Cleaning: (to be confirmed through monitoring, usually every 3-6 montths)

Open 600mm manhole lid, or other manhole access over the device (depends on device)

Use the ***Survey Staff*** and ***Data Sheet*** to measure and record the volume of pollution.

Decant water to grassed area nearby if possible (water the largest area possible, don't concentrate)(or find a nearby area for decanting water to, or remove then decant back into device). Take a photo before you start suction cleaning. If there is a low flow, enter the diversion chamber and open the "**capped Low Flow Bypass Pipe**", and put a sandbag or two over the CDS inlet to bypass low flows. NOTE: this is a confined space, so use a gas detector and full confined spaces entry procedures.

Suck pollution from the sump (via **sucker truck**). You shouldn't have to clean the screens, but jet them if required.

Alternatively, don't dewater, remove the full lid, and just use a clamshell grab to remove the pollution.

Replace lids, then recycle or dispose of waste.

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Annual or Comprehensive Clean: (once per year)

Remove the CDS lid. Remove the diversion chamber lid.

Suction clean as per a "regular suction clean". Take photo after dewatering showing pollution, take another photo after cleaning to show an empty sump and clean screens.

Using a gas detector and full confined spaces entry procedures, enter the diversion chamber and inspect for any debris or sediment in upstream pipes and diversion chamber. Using the survey staff, measure the height of sediment (if any) behind the screens. If more than 20% of the way up the screens, send a man and suction hose behind the screens to suck it clean.

Grease lids annually, both CDS lids and any gatic lids.

Replace the lids, recycle or dispose of waste.

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Graduated Trash Rack Cleaning

Property: Light Horse Interchange Business hub
Location: Southern end of OSD
Designer: Henry & Hymas Consulting Engineers – NW

Signature: NICHOLAS WATSLAR

Monitoring:

Walk to the device. View the racks from downstream.

Use the ***Data Sheet*** for the device to determine how full it is, and if cleaning is required.

Unblocking:

If time permits when monitoring, use a stick or spade to push the pollution away from the rack. This is to free up rack area for the start of the next event.

Clear an area of rack to allow the rack to drain dry. Clear pollution to the sides if possible.

Regular Cleaning:

Use details on the ***Data Sheet*** to measure and record the volume of pollution. Estimate the volume of pollution in m^3. Take a photo before cleaning.

Clear pollution from the rack, and allow any pooled water to drain through. Ideally, unblock the device the day before cleaning.

Suck pollution from the treatment/storage area (via **sucker truck**), or use a bobcat or backhoe. If there is a drying area, pollution can be transported there to dry. Otherwise put into a truck for transport offsite. Take a photo after the cleaning.

Annual or Comprehensive Clean: (once per year)

As per above for regular clean

Additionally, spend 30 minutes tidying up the local vegetation around the device and on any access tracks.

Additionally, spend 30 minutes in the creek downstream doing a litter pick of bypassed litter.

Note any rack damage, corrosion, vandalism, areas of bypassing, etc. Photograph and report to Council for their action.

1 LONG TERM MAINTENANCE TASKS

1.1 Schedule of visits

1.1.1 Schedule of Site Visits (Regular Inspec & Maint)	
Purpose of visit	Frequency
Inspection	Regular inspection and maintenance should be carried out to ensure the system functions as designed. It is recommended that these checks be undertaken on a three monthly basis during the initial period of operating the system. A less frequent schedule might be determined after the system has established.
Maintenance	

1.2 Tasks

The scope of maintenance tasks should include verifying the function and condition of the following elements:

- Filter media
- Horticultural
- Drainage infrastructure
- Other routine tasks

1.2.1 FILTER MEDIA TASKS	
Sediment deposition	Remove sediment build up from forebays in raingardens and from the surface of bioretention street trees. Frequency – 3 MONTHLY AFTER RAIN
Holes or scour	Infill any holes in the filter media. Check for erosion or scour and repair, provide energy dissipation (e.g. rocks and pebbles at inlet) if necessary. Frequency – 3 MONTHLY AFTER RAIN
Filter media surface porosity	Inspect for the accumulation of an impermeable layer (such as oily or clayey sediment) that may have formed on the surface of the filter media. A symptom may be that water remains ponded in the raingarden or tree pit for more than a few hours after a rain event. Repair minor accumulations by raking away any mulch on the surface and scarifying the surface of the filter media between plants. For bioretention tree pits without understorey vegetation, any accumulation of leaf litter should be removed to help maintain the surface porosity of the filter media. Frequency – 3 MONTHLY AFTER RAIN
Litter Control	Check for litter (including organic litter) in and around treatment areas. Remove both organic and anthropogenic litter to ensure flow paths and infiltration through the filter media are not hindered. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS

1.2.2 HORTICULTURAL TASKS	
Pests and Diseases	Assess plants for disease, pest infection, stunted growth or senescent plants. Treat or replace as necessary. Reduced plant density reduces pollutant removal and infiltration performance. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS
Maintain original plant densities	Infill planting: Between 6 and 10 plants per square metre should (depending on species) be adequate to maintain a density where the plant's roots touch each other. Planting should be evenly spaced to help prevent scouring due to a concentration of flow. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS
Weeds	It is important to identify the presence of any rapidly spreading weeds as they occur. The presence of such weeds can reduce dominant species distributions and diminish aesthetics. Weed species can also compromise the systems long term performance. Inspect for and manually remove weed species. Application of herbicide should be limited to a wand or restrictive spot spraying due to the fact that raingardens and bioretention tree pits are directly connected to the stormwater system. Frequency – 3 MONTHLY OR AS DESIRED FOR AESTHETICS
1.2.3 DRAINAGE TASKS	
Perforated pipe	Ensure that perforated pipes are not blocked to prevent filter media and plants from becoming waterlogged. A small steady clear flow of water may be observed discharging from the perforated pipe at its connection into the downstream pit some hours after rainfall. Note that smaller rainfall events after dry weather may be completely absorbed by the filter media and not result in flow. Remote camera (e.g. CCTV) inspection of pipelines for blockage and structural integrity could be useful. Frequency – 6 MONTHLY AFTER RAIN
High flow inlet pits, overflow pits and other stormwater junction pits	Ensure inflow areas and grates over pits are clear of litter and debris and in good and safe condition. A blocked grate would cause nuisance flooding of streets. Inspect for dislodged or damaged pit covers and ensure general structural integrity. Remove sediment from pits and entry sites etc. (likely to be an irregular occurrence in mature catchment). Frequency – MONTHLY AND OCCASIONALLY AFTER RAIN
1.2.4 OTHER ROUTINE TASKS	
Inspection after rainfall	Occasionally observe raingarden or bioretention tree pit after a rainfall event to check infiltration. Identify signs of poor drainage (extended ponding on the filter media surface). If poor drainage is identified, check landuse and assess whether is has altered from design capacity (e.g. unusually high sediment loads may require installation of a sediment forebay). Frequency – TWICE A YEAR AFTER RAIN

1.2.5 FORM (REGULAR INSPECTION & MAINTENANCE)			
Location	**Raingarden/Tree Pit**		
Site Visit Date:		Site Visit By:	
Weather:			
Purpose of the Site Visit	Routine Inspection	☐	Complete section 1 (below)
	Routine Maintenance	☐	Complete sections 1 and 2 (below)

NOTE: Where maintenance is required ('yes' in Section 2), details should be recorded in the 'Additional Comments' section at the end of this document.

1. Filter media				
*In addition to regular inspections, it is recommended that inspection for damage and blockage is made after significant rainfall events that might occur once or twice a year.	Section 1		Section 2	
	Maintenance Required?		Maintenance Performed	
	Yes	No	Yes	No
Filter media (CIRCLE – pooling water/accumulation of silt & clay layer/scour/holes/sediment build up)	☐	☐	☐	☐
Litter (CIRCLE – large debris/accumulated vegetation/anthropogenic)	☐	☐	☐	☐
2. Vegetation				
Vegetation health (CIRCLE – signs of disease/pests/poor growth)	☐	☐	☐	☐
Vegetation densities (CIRCLE – low densities– infill planting required)	☐	☐	☐	☐
Build up of organic matter, leaf litter (CIRCLE – requires removal) BIORETENTION TREE PITS ONLY	☐	☐	☐	☐
Weeds (CIRCLE – isolated plants/infestation) (SPECIES – ……..)	☐	☐	☐	☐

3. Pits, pipes and inflow areas				
	Section 2		Section 3	
	Maintenance Required?		Maintenance Performed	
	Yes	No	Yes	No
Perforated pipes (CIRCLE – full blockage/partial blockade/damage)	☐	☐	☐	☐
Inflow areas (CIRCLE – scour/excessive sediment deposition/litter blockage)	☐	☐	☐	☐
Over flow grates (CIRCLE – damage/scour/blockage)	☐	☐	☐	☐
Pits (CIRCLE – poor general integrity/sediment build up/litter/blockage)	☐	☐	☐	☐
Other stormwater pipes and junction pits (CIRCLE – poor general integrity/sediment build up/litter/blockage)	☐	☐	☐	☐

4. Additional Comments

Note: Each year on the 1st September the occupier or body corporate is to provide to Council's Assets Design Services Section an annual collation of all maintenance carried out from the previous year. This includes the bio retention maintenance as well as the Enviropod Pit basket maintenance.

Number of GPT	Catchment designation - name	Catchment Area	1- Year Flow (m^3/s)	6 Month Flow (m^3/s)	3 Month Flow (m^3/s)	GTP Specification	GPT Tested Treatable flow rate (m^3/s)	Diversion flow rate (m^3/s)
WQ-2	Subdivision North	4.712	0.942	0.693	0.471	Rocla CDS P2028	0.800	0.471
WQ-13	Access Road Reserve - C7	0.187ha	0.039	0.029	0.020	Rocla CDS P0708	0.053	0.020
WQ-14	Access Road Reserve - C9	0.378ha	0.079	0.059	0.040	Rocal CDS P0708	0.053	0.040
WQ-15	Access Road Reserve - C10	0.759ha	0.159	0.119	0.080	Rocal CDS P1012	0.140	0.080
WQ-16	Access Road Reserve - C11	0.488ha	0.102	0.077	0.051	Rocal CDS P1009	0.110	0.051

Custom graduated trash rack with silt trap	Subdivision South	24.926	4.61	3.46	2.31	NA	NA	2.31

Appendix C

CONDITION ASSESSMENT AND PERFORMANCE EVALUATION OF BIORETENTION SYSTEMS

PRACTICE NOTE 1: *In Situ* Measurement of Hydraulic Conductivity

Belinda Hatt, Sebastien Le Coustumer

April 2008

The Facility for Advancing Water Biofiltration (FAWB) aims to deliver its research findings in a variety of forms in order to facilitate widespread and successful implementation of biofiltration technologies. This Practice Note for *In Situ* Measurement of Hydraulic Conductivity is the first in a series of Practice Notes being developed to assist practitioners with the assessment of construction and operation of biofiltration systems.

1. SCOPE OF THE DOCUMENT

This Practice Note for *In Situ* Measurement of Hydraulic Conductivity is designed to complement FAWB's Guidelines for Soil Filter Media in Bioretention Systems, Version 2.01 (visit http://www.monash.edu.au/fawb/publications/index.html for a copy of these guidelines). However, the recommendations contained within this document are more widely applicable to assessing the hydraulic conductivity of filter media in existing biofiltration systems.

For new systems, this Practice Note ***does not*** remove the need to conduct laboratory testing of filter media prior to installation.

2. DETERMINATION OF HYDRAULIC CONDUCTIVITY

The recommended method for determining *in situ* hydraulic conductivity uses a single ring infiltrometer under constant head. The single ring infiltrometer consists of a small plastic or metal ring that is driven 50 mm into the soil filter media. It is a constant head test that is conducted for two different pressure heads (50 mm and 150 mm). The head is kept constant during all the experiments by pouring water into the ring. The frequency of readings of the volume poured depends on the filter media, but typically varies from 30 seconds to 5 minutes. The experiment is stopped when the infiltration rate is considered steady (i.e., when the volume poured per time interval remains constant for at least 30 minutes). This method has been used extensively (e.g. Reynolds and Elrick, 1990; Youngs *et al.*, 1993).

Note: This method measures the hydraulic conductivity at the surface of the soil filter media. In most cases, it is this top layer which controls the hydraulic conductivity of the system as a whole (i.e., the underlying drainage layer has a flow capacity several orders of magnitude higher than the filter media), as it is this layer where fine sediment will generally be deposited to form a "clogging layer". However this shallow test would not be appropriate for systems where the controlling layer

is not the surface layer (e.g. where migration of fine material down through the filter media has caused clogging within the media). In this case, a 'deep ring' method is required; for further information on this method, please consult FAWB's report "Hydraulic performance of biofilter systems for stormwater management: lessons from a field study", available at www.monash.edu.au/fawb/publications/index.html.

2.1 Selection of monitoring points

For bioretention systems with a surface area less than 50 m^2, *in situ* hydraulic conductivity testing should be conducted at three points that are spatially distributed (Figure 1). For systems with a surface area greater than 50 m^2,an extra monitoring point should be added for every additional 100 m^2. It is ***essential*** that the monitoring point is flat and level. Vegetation should not be included in monitoring points.

Figure 1. Spatially distributed monitoring points

2.2 Apparatus

The following is required:

- 100 mm diameter PVC rings with a height of at least 220 mm. The bottom edge of the ring should be bevelled and the inside of the ring should be marked to indicate 50 mm and 150 mm above the filter media surface (Figure 2).
- 40 L water
- 100 mL, 250 mL and 1000 mL measuring cylinders
- Stopwatch
- Thermometer

- Measuring tape
- Spirit level
- Hammer
- Block of wood, approximately 200 x 200 mm

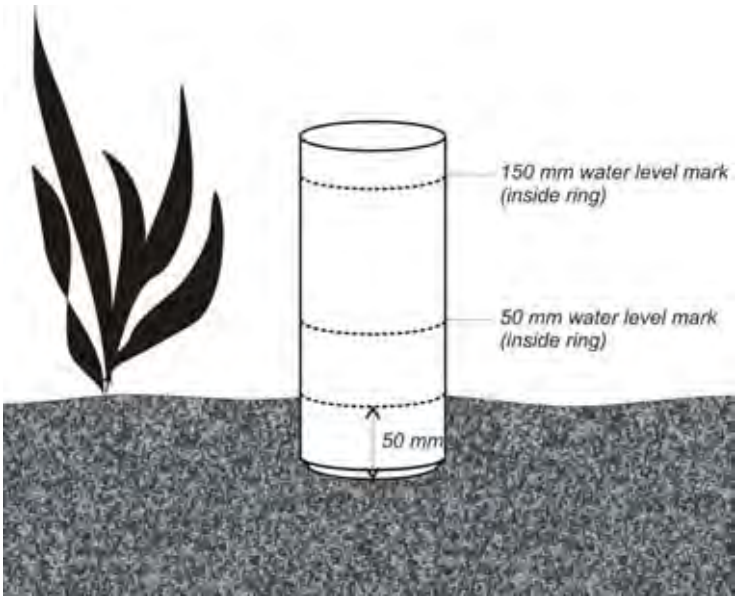


Figure 2. Diagram of single ring infiltrometer

2.3 Procedure

a. Carefully scrape away any surface covering (e.g. mulch, gravel, leaves) ***without disturbing*** the soil filter media surface (Figure 3b).

b. Locate the ring on the surface of the soil (Figure 3c), and then place the block of wood on top of the ring. Gently tap with the hammer to drive the ring 50 mm into the filter media (Figure 3d). Use the spirit level to check that the ring is level.

   Note: It is ***essential*** that this the ring is driven in slowly and carefully to minimise disturbance of the filter media profile.

c. Record the initial water temperature.

d. Fill the 1000 mL measuring cylinder.

e. Using a different pouring apparatus, slowly fill the ring to a ponding depth of 50 mm, taking care to minimise disturbance of the soil surface (Figure 3f). Start the stopwatch when the water level reaches 50 mm.

f. Using the 1000 mL measuring cylinder, maintain the water level at 50 mm (Figure 3g). After 30 seconds, record the volume poured.

g. Maintain the water level at 50 mm, recording the time interval and volume required to do so.

Note: The time interval between recordings will be determined by the infiltration capacity of the filter media. For fast draining media, the time interval should not be greater than one minute however, for slow draining media, the time between recordings may be up to five minutes.

Note: The smallest measuring cylinder that can pour the volume required to maintain a constant water level for the measured time interval should be used for greater accuracy. For example, if the volume poured over one minute is 750 mL, then the 1000 mL measuring cylinder should be used. Similarly, if the volume poured is 50 mL, then the 100 mL measuring cylinder should be used.

h. Continue to repeat Step f until the infiltration rate is steady i.e., the volume poured per time interval remains constant for at least 30 minutes.

i. Fill the ring to a ponding depth of 150 mm (Figure 3h). Restart the stopwatch. Repeat steps e – g for this ponding depth.

Note: Since the filter media is already saturated, the time required to reach steady infiltration should be less than for the first ponding depth.

j. Record the final water temperature.

k. Enter the temperature, time, and volume data into a calculation spreadsheet (see "Practice Note 1_Single Ring Infiltration Test_Example Calculations.xls", available at www.monash.edu.au/fawb/publications/index.html, as an example).

2.4 Calculations

In order to calculate K_{fs} a 'Gardner's' behaviour for the soil should be assumed (Gardner, 1958 in Youngs *et al.*, 1993):

$$K(h) = K_{fs} e^{\alpha h} \qquad \text{Eqn. 1}$$

where K is the hydraulic conductivity, α is a soil pore structure parameter (large for sands and small for clay), and h is the negative pressure head. K_{fs} is then found using the following analytical expression (for a steady flow) (Reynolds and Elrick, 1990):

$$K_{fs} = \frac{G}{a}\left(\frac{Q_2 - Q_1}{H_2 - H_1}\right) \qquad \text{Eqn. 2}$$

where a is the ring radius, H_1 and H_2 are the first (50 mm) and second (150 mm) pressure heads, respectively, Q_1 and Q_2 are the steady flows for the first and second pressure heads, respectively, and G is a shape factor estimated as:

$$G = 0.316\frac{d}{a} + 0.184 \qquad \text{Eqn. 3}$$

where d is the depth of insertion of the ring and a is the ring radius.

G is nearly independent of soil hydraulic conductivity (i.e. K_{fs} and α) and ponding, if the ponding is greater than 50 mm.

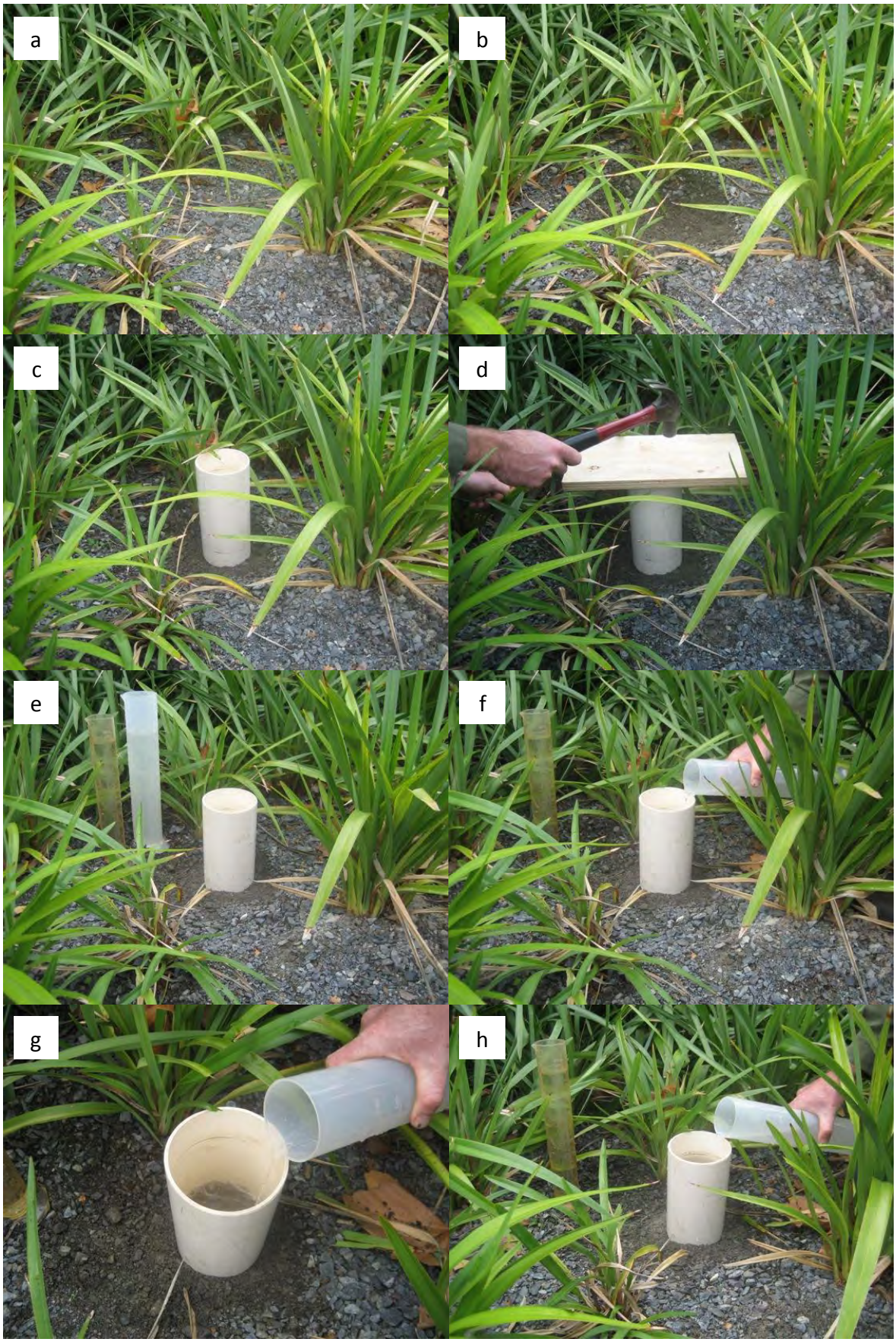


Figure 3. Measuring hydraulic conductivity

The possible limitations of the test are (Reynolds *et al.*, 2000): (1) the relatively small sample size due to the size of the ring, (2) soil disturbance during installation of the ring (compaction of the soil), and (3) possible edge flow during the experiments.

3 INTERPRETATION OF RESULTS

This test method has been shown to be relatively comparable to laboratory test methods (Le Coustumer *et al.*, 2008), taking into account the inherent variability in hydraulic conductivity testing and the heterogeneity of natural soil-based filter media. While correlation between the two test methods is low, results are not statistically different. In light of this, laboratory and field results are deemed comparable if they are within 50% of each other. In the same way, replicate field results are considered comparable if they differ by less than 50%. Where this is not the case, this is likely to be due to a localised inconsistency in the filter media, therefore additional measurement should be conducted at different monitoring points until comparable results are achieved. If this is not achieved, then an area-weighted average value may need to be calculated.

4 MONITORING FREQUENCY

Field testing of hydraulic conductivity should be carried out at least twice: (1) One month following commencement of operation, and (2) In the second year of operation to assess the impact of vegetation on hydraulic conductivity. Following this, hydraulic conductivity testing should be conducted every two years or when there has been a significant change in catchment characteristics (e.g., construction without appropriate sediment control).

REFERENCES

Gardner, W. R. (1958). Some steady-state solutions of the unsaturated moisture flow equation with application to evaporation from a water table. *Soil Science* **85**: 228-232.

Le Coustumer, S., T. D. Fletcher, A. Deletic and M. Potter (2008). Hydraulic performance of biofilter systems for stormwater management: lessons from a field study, Melbourne Water Corporation.

Reynolds, W. D., B. T. Bowman, R. R. Brunke, C. F. Drury and C. S. Tan (2000). Comparison of tension infiltrometer, pressure infiltrometer, and soil core estimates of saturated hydraulic conductivity. *Soil Science Society of America journal* **64**(2): 478-484.

Reynolds, W. D. and D. E. Elrick (1990). Ponded infiltration from a single ring: Analysis of steady flow. *Soil Science Society of America journal* **54**: 1233-1241.

Youngs, E. G., D. E. Elrick and W. D. Reynolds (1993). Comparison of steady flows from infiltration rings in "Green and Ampt" and "Gardner" soils. *Water Resources Research* **29**(6): 1647-1650.

Single Ring Infiltration Test

Site: ____

Date: ____

Constant water level = 50 mm		
Time (min)	Volume (mL)	Q (mL/s)

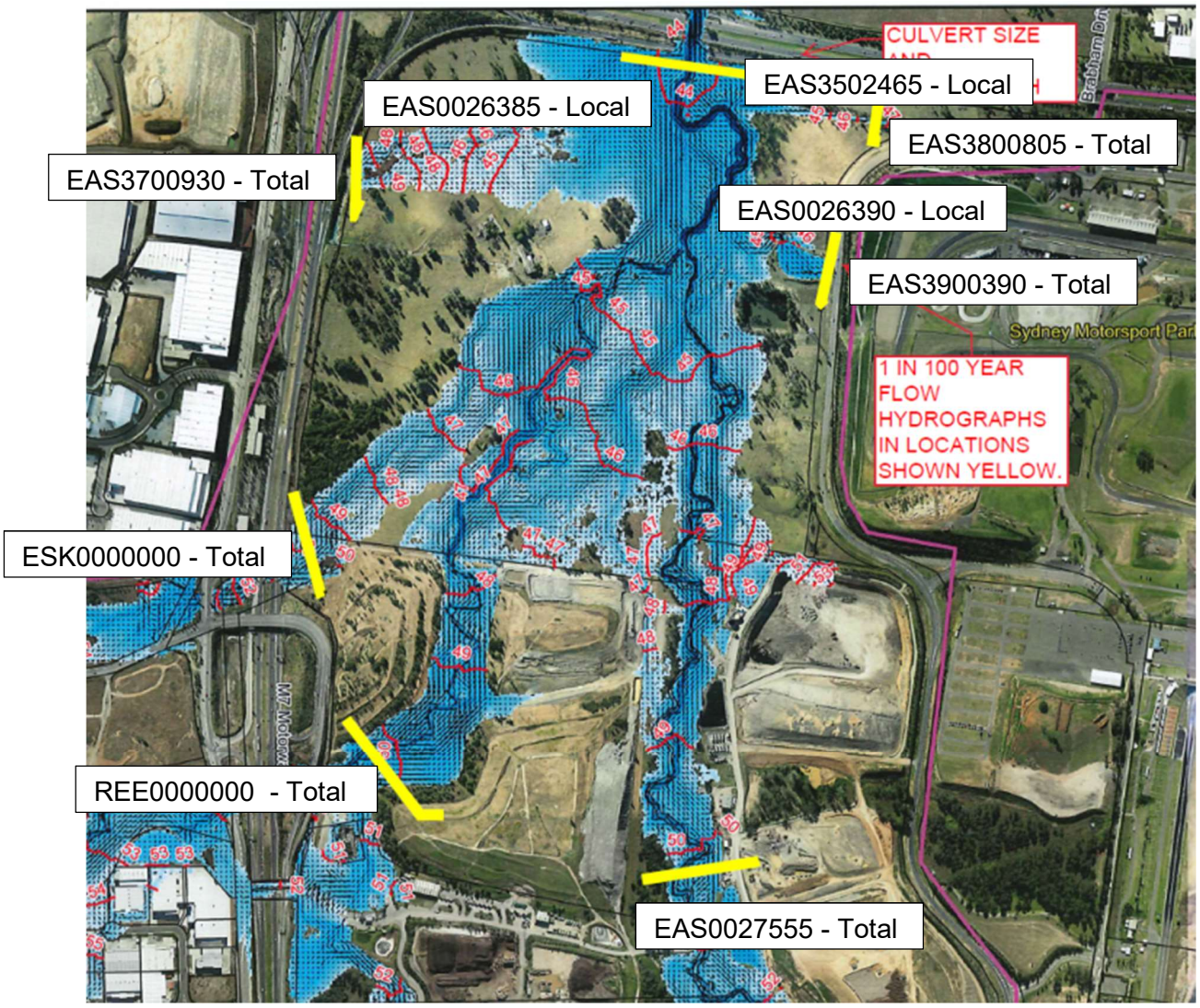
Constant water level = 150 mm		
Time (min)	Volume (mL)	Q (mL/s)

Appendix D

Above Ground OSD Summary with calculated values	
Site:	
Site Area	336294 m²
Site Area NOT Draining to OSD	18128 m²
Reduced Levels (AHD):	
RL of Top of Tank	47.22
RL of Bottom of OSD Tank	45
RL of 1.5 Year ARI Overflow Weir	46.22
RL of Emergency Overflow Weir	46.85
RL of 1.5 Year ARI Orifice Centerline	44.906
RL of 100 Year ARI Orifice Centreline	45.047
RL of Invert of Discharge to Council Drainage Pit	0
RL of obvert of Pit outlet pipe	44.95
Minium RL of Garage Floor	47.31
Minium RL of House Floor	47.41
OSD Volume:	
Required Storage BELOW 1.5 Year ARI Overflow Weir	10270.4 m³
Required Storage BELOW Emergency Overflow Weir	15576.8 m³
Discharge Details:	
Using Filter Cartridges to Manage Water Quality	No
Discharge Location	Council Drainage Pit
Length of Emergency Overflow Weir	35.00 m
Maximum 1.5 Year ARI Site Discharge	1236.41 L/s
1.5 Year ARI Orifice Discharge	1236.41 L/s
Maximum 100 Year ARI Site Discharge	5374.418
100 Year ARI Orifice Discharge	5374.42 L/s
Orifice Details:	
Number of 1.5 Year ARI Orifices	3
Number of 100 Year ARI Orifices	3
1.5 Year ARI Orifice Size (mm)	411.5 mm
100 Year ARI Orifice Size (mm)	793.0 mm
Notifications:	
Due to the Outlet Orifice being drowned by 2.4% during 100 ARI event an extra 1.8% of Storage volume has been added.	

Appendix E

EAS0026380 – Total D/S of M4



Hydrographs shown as “Total” are the total upstream hydrograph at the yellow locations.

Hydrographs shown as “Local” are the local hydrographs for the areas inside (D/S) the yellow locations.

EAS0026380 is the total D/S of the M4 and is the total of the other hydrographs shown.

All hydrographs are from Council’s XP-Rafts base model for Eastern Creek.

Time	EAS0027555	EAS3900390	EAS3700930	REE0000000	ESK0000000	EAS3800805	EAS0026380
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0.002	0	0	0	0
9	0	0	0.004	0	0	0	0
10	0	0	0.007	0	0	0	0
11	0	0	0.01	0	0	0	0
12	0	0	0.019	0	0	0	0
13	0	0	0.029	0	0	0	0
14	0	0	0.038	0	0	0	0
15	0	0	0.048	0	0.019	0	0
16	0	0	0.057	0	0.115	0	0.025
17	0	0	0.067	0	0.25	0	0.151
18	0	0	0.078	0	0.326	0	0.33
19	0	0	0.088	0	0.334	0	0.434
20	0	0	0.099	0	0.327	0	0.447
21	0	0	0.107	0	0.393	0	0.437
22	0	0	0.114	0	0.439	0	0.437
23	0	0	0.122	0	0.582	0	0.458
24	0	0	0.129	0.7	0.673	0	0.555
25	0	0	0.136	0.635	0.72	0	0.692
26	0	0	0.145	0.576	0.762	0	0.771
27	0	0	0.154	0.523	0.8	0	0.783
28	0.01	0.012	0.164	0.478	0.824	0.005	0.795
29	0.049	0.06	0.173	0.452	0.857	0.023	0.916
30	0.101	0.122	0.183	0.441	0.915	0.044	1.031
31	0.183	0.228	0.194	0.443	1.035	0.075	1.279
32	0.286	0.368	0.208	0.452	1.217	0.108	2.203
33	0.356	0.477	0.225	0.453	1.375	0.127	2.287
34	0.396	0.555	0.243	0.449	1.495	0.134	2.334
35	0.424	0.644	0.263	0.453	1.547	0.135	2.35
36	0.445	0.731	0.283	0.457	1.584	0.134	2.345
37	0.472	0.86	0.305	0.463	1.614	0.134	2.365
38	0.505	1.037	0.327	0.471	1.641	0.134	2.448
39	0.524	1.205	0.35	0.482	1.664	0.134	2.647
40	0.538	1.332	0.369	0.999	1.774	0.134	2.939
41	0.563	1.459	0.389	1.025	1.948	0.134	3.371
42	0.595	1.599	0.41	1.055	2.035	0.134	3.9
43	0.655	1.701	0.431	1.086	2.051	0.134	4.231
44	0.725	1.759	0.452	1.116	2.055	0.134	4.45
45	0.787	1.783	0.472	1.148	2.069	0.134	4.672
46	0.837	1.789	0.492	1.191	2.11	0.134	4.876
47	0.873	1.789	0.512	1.27	2.177	0.134	5.092
48	0.926	1.788	0.532	1.483	2.233	0.134	5.936
49	0.985	1.788	0.552	1.749	2.276	0.134	6.341
50	1.075	1.788	0.571	1.959	2.317	0.134	6.633
51	1.191	1.788	0.591	2.109	2.348	0.134	6.859
52	1.285	1.788	0.609	2.266	2.376	0.134	7.071
53	1.346	1.788	0.626	2.447	2.406	0.134	7.256
54	1.419	1.788	0.642	2.598	2.439	0.134	7.448
55	1.555	1.788	0.659	2.717	2.482	0.134	7.68
56	1.699	1.788	0.675	2.828	2.55	0.134	8.041
57	1.905	1.789	0.692	2.925	2.636	0.135	8.449

58	2.17	1.794	0.708	3.037	2.722	0.137	8.799
59	2.385	1.801	0.725	3.172	2.802	0.139	9.075
60	2.528	1.809	0.741	3.291	2.875	0.143	9.341
61	2.642	1.858	0.758	3.418	2.948	0.159	9.694
62	2.747	1.944	0.775	3.557	3.027	0.187	10.061
63	2.824	2.018	0.795	3.688	3.098	0.207	10.427
64	2.882	2.078	0.815	3.831	3.159	0.219	10.818
65	2.927	2.122	0.837	3.997	3.211	0.226	11.174
66	2.966	2.157	0.859	4.179	3.259	0.233	11.506
67	3.022	2.243	0.883	4.365	3.304	0.242	11.871
68	3.094	2.379	0.908	4.544	3.349	0.251	12.281
69	3.165	2.498	0.932	4.716	3.394	0.26	12.711
70	3.237	2.591	0.956	4.884	3.519	0.27	13.234
71	3.314	2.7	0.981	5.096	3.692	0.28	13.962
72	3.402	2.833	1.005	5.434	3.789	0.29	14.738
73	3.521	2.953	1.029	5.863	3.836	0.301	15.334
74	3.665	3.056	1.053	6.182	3.884	0.312	15.828
75	3.826	3.141	1.077	6.361	3.942	0.323	16.296
76	3.999	3.217	1.1	6.483	4.02	0.334	16.733
77	4.17	3.293	1.124	6.589	4.115	0.346	17.196
78	4.339	3.372	1.148	6.698	4.195	0.358	17.769
79	4.51	3.454	1.172	6.827	4.268	0.37	18.416
80	4.72	3.537	1.197	6.991	4.346	0.382	19.106
81	4.968	3.623	1.222	7.174	4.424	0.394	19.869
82	5.205	3.71	1.247	7.378	4.502	0.407	20.549
83	5.428	3.799	1.271	7.602	4.583	0.419	21.086
84	5.663	3.89	1.295	7.813	4.667	0.432	21.576
85	5.918	3.982	1.319	8.022	4.764	0.444	22.06
86	6.176	4.077	1.343	8.23	4.875	0.457	22.553
87	6.511	4.172	1.367	8.441	4.989	0.469	23.088
88	6.917	4.269	1.392	8.689	5.114	0.481	23.681
89	7.306	4.367	1.416	8.972	5.256	0.493	24.308
90	7.674	4.466	1.44	9.255	5.404	0.504	24.956
91	8.177	4.76	1.468	9.61	5.623	0.579	25.826
92	8.814	5.237	1.505	10.038	5.914	0.705	26.88
93	9.376	5.634	1.551	10.446	6.179	0.786	27.906
94	9.837	5.902	1.601	10.844	6.4	0.821	28.866
95	10.239	6.069	1.659	11.249	6.587	0.842	29.74
96	10.644	6.209	1.733	11.68	6.762	0.87	30.633
97	11.141	6.61	1.826	12.13	6.938	0.899	31.604
98	11.712	7.248	1.923	12.588	7.118	0.925	32.605
99	12.25	7.764	2.018	13.049	7.301	0.952	33.755
100	12.754	8.115	2.112	13.516	7.847	0.978	35.193
101	13.253	8.53	2.204	14.007	8.602	1.003	37.386
102	13.766	9.087	2.294	14.617	8.945	1.028	39.933
103	14.383	9.575	2.383	15.325	9.091	1.052	41.762
104	15.089	9.939	2.476	15.971	9.315	1.076	43.33
105	15.834	10.202	2.567	16.553	9.58	1.099	45.03
106	16.603	10.44	2.649	17.122	9.911	1.121	46.676
107	17.317	10.687	2.73	17.685	10.328	1.142	48.456
108	18	10.934	2.809	18.313	10.663	1.163	50.804
109	18.68	11.176	2.888	19.013	10.976	1.183	53.279
110	19.543	11.414	2.966	19.807	11.363	1.202	55.384
111	20.569	11.65	3.05	20.672	11.744	1.22	57.54
112	21.506	11.881	3.121	21.618	12.108	1.237	59.833
113	22.325	12.107	3.191	22.664	12.472	1.254	62.017
114	23.169	12.329	3.259	23.656	12.832	1.269	64.128
115	24.097	12.545	3.327	24.59	13.235	1.284	66.227

116	24.997	12.756	3.397	25.471	13.694	1.297	68.383
117	26.214	12.961	3.468	26.347	14.177	1.31	70.679
118	27.756	13.159	3.539	27.372	14.717	1.321	73.177
119	29.161	13.351	3.608	28.526	15.352	1.332	75.754
120	30.366	13.537	3.675	29.605	16.013	1.342	78.335
121	31.296	13.565	3.739	30.639	16.552	1.303	80.812
122	32.099	13.477	3.795	31.69	17	1.233	83.087
123	32.981	13.459	3.843	32.796	17.467	1.196	85.594
124	33.931	13.508	3.886	33.996	17.958	1.183	88.324
125	34.916	13.601	3.919	35.282	18.473	1.177	91.014
126	35.911	13.706	3.944	36.66	18.999	1.168	93.795
127	36.848	13.608	3.965	38.085	19.506	1.158	96.817
128	37.746	13.361	3.986	39.512	19.948	1.148	99.848
129	38.682	13.211	4.006	40.914	20.347	1.139	102.67
130	39.649	13.148	4.028	42.239	20.487	1.129	105.674
131	40.635	13.004	4.05	43.658	20.537	1.118	108.539
132	41.635	12.778	4.07	45.622	20.836	1.108	111.173
133	42.579	12.619	4.09	48.034	21.24	1.098	114.139
134	43.496	12.524	4.109	50.095	21.608	1.088	117.149
135	44.409	12.474	4.127	51.819	21.943	1.078	120.078
136	45.327	12.438	4.144	53.47	22.219	1.068	123.003
137	46.313	12.397	4.161	55.033	22.464	1.059	125.731
138	47.34	12.349	4.178	56.63	22.766	1.05	127.998
139	48.389	12.299	4.193	58.421	23.065	1.041	130.36
140	49.317	12.247	4.209	60.214	23.332	1.032	133.54
141	50.161	12.192	4.224	61.992	23.599	1.024	137.138
142	51.088	12.135	4.238	63.734	23.868	1.016	140.295
143	52.087	12.077	4.252	65.386	24.13	1.008	143.174
144	53.055	12.017	4.267	67.056	24.384	1.001	146.002
145	53.983	11.957	4.282	68.721	24.601	0.994	148.767
146	54.949	11.897	4.297	70.381	24.784	0.987	151.58
147	55.662	11.836	4.311	72.045	24.967	0.981	154.549
148	56.185	11.775	4.325	73.607	25.097	0.976	157.477
149	56.858	11.715	4.338	75.11	25.149	0.97	160.389
150	57.662	11.656	4.351	76.687	25.189	0.965	163.331
151	58.457	11.475	4.363	78.215	25.202	0.922	166.078
152	59.223	11.203	4.37	79.69	25.183	0.854	168.748
153	60.052	10.989	4.369	81.213	25.177	0.81	171.304
154	60.935	10.83	4.361	82.789	25.18	0.785	173.786
155	61.86	10.715	4.343	84.38	25.184	0.77	176.391
156	62.804	10.625	4.318	85.925	25.186	0.757	178.932
157	63.701	10.385	4.289	87.429	25.188	0.743	181.307
158	64.555	10.03	4.26	88.92	25.184	0.73	183.706
159	65.426	9.752	4.231	90.422	25.173	0.717	186.066
160	66.308	9.545	4.203	91.923	24.944	0.705	188.052
161	67.189	9.285	4.175	93.312	24.625	0.693	189.48
162	68.061	8.974	4.146	94.289	24.491	0.681	190.939
163	68.859	8.726	4.118	94.976	24.452	0.67	192.869
164	69.6	8.532	4.09	95.856	24.406	0.659	194.944
165	70.298	8.382	4.063	96.99	24.329	0.649	197.01
166	70.963	8.257	4.036	98.223	24.195	0.639	199.124
167	71.65	8.142	4.011	99.503	24.039	0.629	201.147
168	72.345	8.029	3.986	100.721	23.926	0.62	202.88
169	73.038	7.92	3.96	101.866	23.815	0.611	204.5
170	73.615	7.814	3.928	102.976	23.687	0.603	205.912
171	74.106	7.711	3.898	104.086	23.56	0.595	207.026
172	74.643	7.611	3.867	105.167	23.438	0.587	208.285
173	75.22	7.514	3.838	106.219	23.317	0.58	209.842

174	75.758	7.421	3.809	107.338	23.195	0.572	211.496
175	76.251	7.33	3.78	108.498	23.047	0.566	213.21
176	76.755	7.242	3.752	109.682	22.876	0.559	214.863
177	77.023	7.157	3.725	110.885	22.711	0.553	216.398
178	77.104	7.075	3.698	112.002	22.508	0.547	217.846
179	77.265	6.996	3.672	113.041	22.244	0.542	219.264
180	77.49	6.92	3.646	114.105	21.977	0.536	220.688
181	77.738	6.83	3.62	115.124	21.731	0.526	222.081
182	77.984	6.729	3.594	116.101	21.498	0.513	223.526
183	78.225	6.636	3.567	117.087	21.275	0.502	224.884
184	78.449	6.553	3.537	118.05	21.057	0.495	226.171
185	78.655	6.479	3.506	118.967	20.837	0.489	227.538
186	78.84	6.412	3.474	119.824	20.618	0.484	228.824
187	78.995	6.328	3.443	120.62	20.407	0.479	229.94
188	79.12	6.229	3.413	121.339	20.2	0.475	231.038
189	79.223	6.141	3.384	122.05	19.993	0.47	232.13
190	79.303	6.063	3.357	122.75	19.74	0.466	232.957
191	79.36	5.983	3.33	123.36	19.477	0.462	233.562
192	79.39	5.897	3.304	123.626	19.244	0.459	234.204
193	79.383	5.821	3.278	123.614	19.032	0.455	234.907
194	79.338	5.754	3.254	123.693	18.827	0.452	235.611
195	79.257	5.695	3.23	123.93	18.622	0.449	236.278
196	79.14	5.642	3.206	124.2	18.414	0.446	236.87
197	78.997	5.593	3.183	124.441	18.206	0.443	237.424
198	78.826	5.546	3.161	124.615	18.008	0.441	237.89
199	78.63	5.501	3.139	124.704	17.815	0.438	238.247
200	78.394	5.458	3.118	124.723	17.624	0.436	238.268
201	78.125	5.416	3.097	124.7	17.435	0.434	238.001
202	77.841	5.376	3.077	124.641	17.252	0.432	237.805
203	77.544	5.338	3.057	124.55	17.074	0.43	237.758
204	77.227	5.302	3.038	124.441	16.9	0.428	237.726
205	76.889	5.267	3.019	124.311	16.728	0.426	237.651
206	76.536	5.234	3.001	124.156	16.556	0.424	237.491
207	76.138	5.202	2.983	123.968	16.39	0.423	237.22
208	75.697	5.172	2.966	123.729	16.222	0.421	236.848
209	75.25	5.143	2.949	123.438	16.051	0.42	236.405
210	74.795	5.115	2.932	123.108	15.882	0.419	235.909
211	74.333	5.088	2.916	122.734	15.721	0.417	235.361
212	73.861	5.063	2.901	122.318	15.567	0.416	234.779
213	73.376	5.039	2.885	121.866	15.418	0.415	234.142
214	72.879	5.016	2.871	121.378	15.277	0.414	233.449
215	72.37	4.994	2.856	120.852	15.141	0.413	232.718
216	71.851	4.973	2.842	120.29	15.009	0.412	231.926
217	71.324	4.953	2.828	119.695	14.88	0.412	231.061
218	70.79	4.934	2.815	119.071	14.741	0.411	230.14
219	70.251	4.916	2.802	118.421	14.58	0.41	229.172
220	69.708	4.899	2.789	117.748	14.424	0.409	228.126
221	69.162	4.883	2.777	117.039	14.273	0.409	227.011
222	68.614	4.867	2.764	116.262	14.127	0.408	225.861
223	68.064	4.852	2.753	115.42	13.987	0.408	224.676
224	67.511	4.838	2.741	114.569	13.851	0.407	223.453
225	66.956	4.825	2.73	113.724	13.72	0.407	222.193
226	66.398	4.812	2.719	112.87	13.593	0.406	220.884
227	65.839	4.8	2.708	111.998	13.471	0.406	219.516
228	65.277	4.789	2.698	111.109	13.353	0.406	218.12
229	64.715	4.778	2.688	110.199	13.238	0.405	216.687
230	64.152	4.768	2.678	109.278	13.126	0.405	215.183
231	63.59	4.759	2.668	108.35	13.019	0.405	213.616

232	63.029	4.75	2.659	107.414	12.915	0.404	212.04
233	62.47	4.741	2.65	106.471	12.814	0.404	210.475
234	61.914	4.733	2.642	105.526	12.717	0.404	208.902
235	61.362	4.725	2.634	104.58	12.624	0.404	207.317
236	60.813	4.718	2.627	103.633	12.534	0.404	205.717
237	60.269	4.711	2.619	102.686	12.447	0.403	204.099
238	59.73	4.705	2.612	101.739	12.364	0.403	202.471
239	59.196	4.699	2.605	100.794	12.283	0.403	200.841
240	58.668	4.693	2.598	99.849	12.206	0.403	199.206
241	58.125	4.662	2.59	98.896	12.121	0.394	197.538
242	57.57	4.609	2.581	97.939	12.028	0.379	195.846
243	57.031	4.565	2.57	96.987	11.941	0.369	194.167
244	56.509	4.532	2.558	96.044	11.861	0.363	192.502
245	56.002	4.509	2.544	95.109	11.786	0.359	190.853
246	55.508	4.493	2.529	94.182	11.717	0.357	189.217
247	55.014	4.448	2.514	93.262	11.653	0.355	187.591
248	54.52	4.376	2.498	92.351	11.595	0.352	185.975
249	54.038	4.316	2.483	91.45	11.538	0.35	184.349
250	53.569	4.271	2.469	90.558	11.436	0.347	182.707
251	53.113	4.215	2.456	89.678	11.31	0.345	180.988
252	52.667	4.149	2.443	88.809	11.225	0.343	179.236
253	52.217	4.095	2.43	87.952	11.169	0.341	177.57
254	51.767	4.052	2.417	87.109	11.121	0.338	175.953
255	51.32	4.02	2.404	86.279	11.069	0.336	174.362
256	50.877	3.994	2.392	85.463	11.005	0.334	172.804
257	50.452	3.973	2.38	84.663	10.934	0.332	171.242
258	50.041	3.953	2.369	83.868	10.874	0.33	169.634
259	49.643	3.933	2.358	83.081	10.817	0.328	168.037
260	49.231	3.913	2.346	82.298	10.766	0.326	166.505
261	48.81	3.893	2.335	81.523	10.717	0.324	165.004
262	48.406	3.874	2.324	80.753	10.669	0.322	163.525
263	48.021	3.856	2.313	79.987	10.625	0.321	162.081
264	47.64	3.837	2.303	79.247	10.581	0.319	160.663
265	47.262	3.819	2.292	78.529	10.532	0.317	159.274
266	46.898	3.801	2.282	77.834	10.476	0.315	157.909
267	46.496	3.784	2.271	77.16	10.419	0.314	156.558
268	46.063	3.766	2.261	76.487	10.353	0.312	155.221
269	45.656	3.749	2.251	75.817	10.276	0.311	153.9
270	45.274	3.733	2.241	75.171	10.198	0.309	152.603
271	44.925	3.729	2.232	74.541	10.132	0.312	151.344
272	44.604	3.738	2.223	73.926	10.078	0.318	150.138
273	44.293	3.743	2.215	73.329	10.026	0.323	148.933
274	43.988	3.743	2.208	72.739	9.973	0.325	147.73
275	43.687	3.739	2.202	72.15	9.918	0.325	146.561
276	43.39	3.73	2.196	71.564	9.862	0.325	145.4
277	43.105	3.736	2.191	70.984	9.806	0.325	144.234
278	42.83	3.757	2.187	70.415	9.751	0.325	143.094
279	42.56	3.773	2.182	69.863	9.697	0.325	141.998
280	42.293	3.782	2.178	69.332	9.667	0.325	140.895
281	42.028	3.796	2.173	68.803	9.654	0.326	139.83
282	41.768	3.816	2.169	68.218	9.623	0.326	138.829
283	41.516	3.83	2.165	67.586	9.576	0.326	137.821
284	41.273	3.839	2.161	66.992	9.527	0.327	136.819
285	41.035	3.844	2.157	66.461	9.483	0.327	135.84
286	40.801	3.844	2.153	65.964	9.446	0.327	134.883
287	40.565	3.843	2.149	65.486	9.414	0.328	133.966
288	40.328	3.841	2.145	65.024	9.378	0.328	133.112
289	40.091	3.84	2.141	64.573	9.342	0.329	132.279

290	39.868	3.84	2.138	64.133	9.307	0.329	131.378
291	39.658	3.839	2.134	63.707	9.273	0.33	130.429
292	39.448	3.839	2.131	63.297	9.239	0.33	129.528
293	39.236	3.839	2.128	62.905	9.206	0.331	128.693
294	39.028	3.839	2.125	62.521	9.173	0.331	127.898
295	38.827	3.839	2.121	62.146	9.145	0.332	127.125
296	38.626	3.84	2.118	61.779	9.121	0.332	126.37
297	38.451	3.841	2.115	61.418	9.1	0.333	125.632
298	38.298	3.842	2.112	61.071	9.083	0.333	124.913
299	38.14	3.843	2.109	60.738	9.074	0.334	124.212
300	37.975	3.845	2.107	60.406	9.066	0.335	123.526
301	37.771	3.807	2.103	60.066	9.039	0.322	122.815
302	37.536	3.737	2.098	59.722	8.996	0.301	122.077
303	37.312	3.681	2.09	59.386	8.957	0.285	121.38
304	37.1	3.639	2.081	59.062	8.923	0.276	120.723
305	36.9	3.611	2.07	58.755	8.895	0.27	120.086
306	36.71	3.593	2.056	58.461	8.872	0.267	119.476
307	36.51	3.53	2.042	58.179	8.852	0.264	118.897
308	36.3	3.428	2.027	57.904	8.834	0.261	118.33
309	36.1	3.347	2.012	57.634	8.817	0.258	117.738
310	35.909	3.285	1.999	57.366	8.729	0.255	117.138
311	35.727	3.205	1.986	57.106	8.602	0.252	116.427
312	35.551	3.109	1.973	56.885	8.532	0.249	115.652
313	35.361	3.033	1.961	56.701	8.502	0.246	114.984
314	35.163	2.974	1.949	56.507	8.484	0.244	114.366
315	34.959	2.929	1.937	56.289	8.462	0.241	113.771
316	34.754	2.894	1.925	56.061	8.419	0.238	113.206
317	34.565	2.865	1.913	55.833	8.365	0.235	112.609
318	34.391	2.84	1.902	55.591	8.326	0.233	111.916
319	34.226	2.815	1.89	55.343	8.289	0.23	111.223
320	34.034	2.791	1.879	55.083	8.25	0.227	110.632
321	33.818	2.767	1.867	54.815	8.214	0.225	110.088
322	33.621	2.744	1.856	54.531	8.18	0.222	109.538
323	33.441	2.721	1.844	54.232	8.146	0.22	108.99
324	33.257	2.698	1.833	53.95	8.113	0.217	108.436
325	33.069	2.675	1.822	53.681	8.071	0.215	107.892
326	32.896	2.653	1.811	53.423	8.017	0.213	107.347
327	32.657	2.631	1.8	53.174	7.96	0.211	106.796
328	32.363	2.609	1.789	52.908	7.889	0.208	106.231
329	32.102	2.588	1.779	52.629	7.798	0.206	105.661
330	31.869	2.567	1.768	52.368	7.706	0.204	105.094
331	31.65	2.533	1.758	52.104	7.618	0.198	104.512
332	31.441	2.487	1.746	51.834	7.531	0.188	103.946
333	31.25	2.445	1.735	51.575	7.458	0.18	103.36
334	31.073	2.408	1.722	51.313	7.391	0.174	102.755
335	30.906	2.375	1.709	51.039	7.325	0.169	102.179
336	30.747	2.346	1.696	50.753	7.259	0.166	101.592
337	30.588	2.303	1.682	50.458	7.196	0.163	100.973
338	30.427	2.247	1.668	50.163	7.135	0.16	100.37
339	30.269	2.197	1.654	49.876	7.076	0.157	99.783
340	30.113	2.153	1.641	49.6	6.992	0.155	99.122
341	29.959	2.104	1.627	49.314	6.894	0.152	98.383
342	29.805	2.05	1.614	48.93	6.813	0.15	97.649
343	29.644	2.003	1.599	48.461	6.747	0.147	96.96
344	29.474	1.962	1.585	48.032	6.689	0.145	96.298
345	29.298	1.926	1.572	47.68	6.631	0.143	95.657
346	29.115	1.895	1.561	47.373	6.565	0.14	95.044
347	28.933	1.867	1.549	47.082	6.495	0.138	94.438

348	28.752	1.841	1.538	46.791	6.429	0.136	93.818
349	28.571	1.817	1.526	46.497	6.364	0.134	93.187
350	28.379	1.793	1.515	46.195	6.3	0.132	92.481
351	28.177	1.77	1.504	45.888	6.238	0.131	91.697
352	27.979	1.748	1.493	45.578	6.177	0.129	90.959
353	27.785	1.726	1.482	45.268	6.114	0.127	90.308
354	27.59	1.705	1.472	44.97	6.048	0.125	89.701
355	27.392	1.684	1.461	44.682	5.981	0.124	89.113
356	27.198	1.664	1.451	44.403	5.913	0.122	88.526
357	26.979	1.644	1.44	44.129	5.846	0.121	87.934
358	26.739	1.625	1.43	43.848	5.775	0.119	87.33
359	26.505	1.606	1.42	43.559	5.699	0.118	86.717
360	26.276	1.587	1.41	43.273	5.623	0.117	86.105
361	26.037	1.552	1.4	42.978	5.538	0.11	85.475
362	25.79	1.503	1.389	42.674	5.451	0.099	84.842
363	25.55	1.459	1.378	42.375	5.369	0.09	84.213
364	25.316	1.421	1.367	42.076	5.291	0.084	83.587
365	25.086	1.388	1.354	41.775	5.216	0.079	82.977
366	24.859	1.36	1.34	41.47	5.141	0.075	82.366
367	24.627	1.312	1.326	41.163	5.069	0.072	81.743
368	24.392	1.248	1.312	40.856	5	0.069	81.123
369	24.159	1.194	1.298	40.551	4.927	0.067	80.491
370	23.929	1.148	1.284	40.249	4.822	0.065	79.821
371	23.702	1.093	1.269	39.942	4.7	0.063	79.073
372	23.476	1.032	1.254	39.599	4.602	0.061	78.298
373	23.243	0.979	1.239	39.219	4.521	0.059	77.566
374	23.004	0.935	1.224	38.846	4.449	0.057	76.848
375	22.761	0.897	1.21	38.496	4.381	0.056	76.14
376	22.513	0.864	1.195	38.162	4.307	0.054	75.453
377	22.27	0.836	1.181	37.832	4.223	0.053	74.755
378	22.03	0.811	1.167	37.494	4.128	0.051	74.018
379	21.792	0.787	1.152	37.151	4.032	0.05	73.272
380	21.541	0.766	1.139	36.797	3.939	0.048	72.518
381	21.279	0.746	1.125	36.44	3.837	0.047	71.731
382	21.024	0.726	1.112	36.083	3.73	0.045	70.955
383	20.776	0.708	1.099	35.716	3.581	0.044	70.22
384	20.525	0.691	1.087	35.357	3.531	0.043	69.504
385	20.273	0.674	1.075	35.004	3.477	0.042	68.792
386	20.027	0.657	1.064	34.66	3.422	0.041	68.059
387	19.753	0.641	1.052	34.319	3.364	0.039	67.318
388	19.456	0.626	1.04	33.968	3.297	0.038	66.567
389	19.172	0.611	1.029	33.61	3.223	0.037	65.804
390	18.899	0.597	1.018	33.256	3.148	0.036	65.042
391	18.635	0.583	1.007	32.897	3.078	0.035	64.233
392	18.379	0.569	0.996	32.536	3.004	0.034	63.534
393	18.13	0.555	0.985	32.179	2.948	0.033	62.826
394	17.886	0.542	0.974	31.824	2.852	0.032	62.116
395	17.647	0.53	0.963	31.463	2.817	0.031	61.414
396	17.413	0.517	0.953	31.097	2.699	0.031	60.701
397	17.182	0.505	0.942	30.726	2.692	0.03	59.972
398	16.954	0.494	0.932	30.353	2.559	0.029	59.246
399	16.729	0.482	0.922	29.982	2.556	0.028	58.529
400	16.507	0.471	0.912	29.615	2.415	0.027	57.778
401	16.286	0.46	0.902	29.244	2.416	0.027	57.028
402	16.068	0.45	0.892	28.829	2.281	0.026	56.251
403	15.851	0.439	0.882	28.375	2.267	0.025	55.545
404	15.634	0.429	0.873	27.936	2.12	0.025	54.757
405	15.418	0.419	0.864	27.529	2.113	0.024	54.086

406	15.202	0.41	0.856	27.143	1.948	0.023	53.294
407	14.986	0.401	0.847	26.77	1.909	0.023	52.639
408	14.771	0.391	0.839	26.406	1.717	0.022	51.857
409	14.556	0.383	0.831	26.047	1.689	0.021	51.217
410	14.341	0.374	0.821	25.691	1.564	0.021	50.402
411	14.128	0.366	0.812	25.338	1.586	0.02	49.672
412	13.916	0.357	0.802	24.988	1.486	0.02	48.829
413	13.705	0.349	0.793	24.641	1.522	0.019	48.16
414	13.497	0.341	0.784	24.297	1.43	0.019	47.357
415	13.29	0.334	0.776	23.958	1.466	0.018	46.695
416	13.085	0.326	0.767	23.622	1.376	0.018	45.891
417	12.881	0.319	0.758	23.289	1.41	0.017	45.258
418	12.679	0.312	0.75	22.958	1.321	0.017	44.532
419	12.478	0.305	0.741	22.628	1.357	0.016	43.956
420	12.279	0.298	0.733	22.3	1.269	0.016	43.262
421	12.081	0.292	0.725	21.972	1.305	0.016	42.708
422	11.883	0.285	0.717	21.646	1.22	0.015	42.032
423	11.687	0.279	0.709	21.322	1.257	0.015	41.488
424	11.493	0.273	0.701	21.001	1.172	0.014	40.823
425	11.299	0.267	0.693	20.681	1.209	0.014	40.286
426	11.108	0.261	0.685	20.365	1.126	0.014	39.631
427	10.918	0.256	0.678	20.052	1.164	0.013	39.102
428	10.73	0.25	0.67	19.742	1.082	0.013	38.455
429	10.545	0.245	0.663	19.434	1.119	0.013	37.934
430	10.362	0.239	0.655	19.129	1.041	0.012	37.294
431	10.182	0.234	0.649	18.827	1.074	0.012	36.782
432	10.004	0.229	0.642	18.527	1.001	0.012	36.152
433	9.829	0.224	0.636	18.23	1.031	0.011	35.648
434	9.657	0.22	0.629	17.935	0.963	0.011	35.028
435	9.488	0.215	0.623	17.642	0.991	0.011	34.534
436	9.32	0.211	0.617	17.353	0.926	0.011	33.924
437	9.156	0.206	0.611	17.065	0.952	0.01	33.437
438	8.993	0.202	0.605	16.78	0.891	0.01	32.84
439	8.833	0.198	0.599	16.498	0.915	0.01	32.36
440	8.675	0.193	0.593	16.219	0.857	0.01	31.777
441	8.519	0.189	0.587	15.943	0.88	0.009	31.303
442	8.365	0.186	0.581	15.67	0.825	0.009	30.735
443	8.214	0.182	0.575	15.401	0.846	0.009	30.269
444	8.065	0.178	0.57	15.135	0.795	0.009	29.715
445	7.918	0.174	0.564	14.875	0.814	0.009	29.258
446	7.774	0.171	0.559	14.622	0.765	0.008	28.719
447	7.632	0.167	0.553	14.372	0.783	0.008	28.272
448	7.493	0.164	0.548	14.127	0.737	0.008	27.749
449	7.357	0.161	0.543	13.885	0.754	0.008	27.312
450	7.223	0.157	0.537	13.647	0.71	0.008	26.804
451	7.092	0.154	0.532	13.413	0.726	0.007	26.378
452	6.963	0.151	0.527	13.182	0.685	0.007	25.885
453	6.838	0.148	0.523	12.955	0.699	0.007	25.471
454	6.714	0.145	0.519	12.731	0.66	0.007	24.998
455	6.594	0.142	0.515	12.511	0.673	0.007	24.598
456	6.476	0.14	0.51	12.294	0.636	0.007	24.141
457	6.361	0.137	0.506	12.08	0.649	0.007	23.753
458	6.248	0.134	0.502	11.87	0.614	0.006	23.311
459	6.138	0.131	0.498	11.662	0.625	0.006	22.934
460	6.03	0.129	0.494	11.459	0.592	0.006	22.507
461	5.924	0.126	0.49	11.258	0.603	0.006	22.142
462	5.821	0.124	0.486	11.062	0.571	0.006	21.73
463	5.72	0.122	0.482	10.868	0.581	0.006	21.376

464	5.621	0.119	0.478	10.679	0.551	0.006	20.978
465	5.523	0.117	0.474	10.493	0.561	0.005	20.636
466	5.428	0.115	0.471	10.311	0.532	0.005	20.253
467	5.335	0.113	0.467	10.132	0.541	0.005	19.922
468	5.243	0.11	0.463	9.957	0.514	0.005	19.553
469	5.154	0.108	0.459	9.786	0.522	0.005	19.235
470	5.066	0.106	0.456	9.618	0.496	0.005	18.881
471	4.979	0.104	0.452	9.454	0.504	0.005	18.575
472	4.895	0.102	0.448	9.293	0.479	0.005	18.234
473	4.812	0.101	0.443	9.136	0.487	0.005	17.94
474	4.73	0.099	0.439	8.982	0.463	0.005	17.613
475	4.65	0.097	0.435	8.831	0.47	0.004	17.331
476	4.571	0.095	0.431	8.683	0.447	0.004	17.017
477	4.494	0.093	0.427	8.538	0.454	0.004	16.746
478	4.419	0.092	0.423	8.396	0.432	0.004	16.446
479	4.345	0.09	0.419	8.257	0.439	0.004	16.185
480	4.272	0.088	0.415	8.121	0.418	0.004	15.897
481	4.2	0.087	0.411	7.988	0.424	0.004	15.646
482	4.13	0.085	0.408	7.857	0.404	0.004	15.37
483	4.061	0.084	0.404	7.729	0.41	0.004	15.13
484	3.993	0.082	0.4	7.603	0.391	0.004	14.864
485	3.927	0.081	0.396	7.48	0.396	0.004	14.633
486	3.862	0.079	0.393	7.359	0.378	0.004	14.378
487	3.798	0.078	0.389	7.24	0.383	0.003	14.156
488	3.735	0.077	0.386	7.124	0.366	0.003	13.91
489	3.673	0.075	0.382	7.01	0.371	0.003	13.696
490	3.613	0.074	0.379	6.898	0.354	0.003	13.46
491	3.553	0.073	0.375	6.788	0.358	0.003	13.253
492	3.495	0.071	0.372	6.68	0.343	0.003	13.026
493	3.438	0.07	0.369	6.574	0.347	0.003	12.827
494	3.382	0.069	0.365	6.47	0.332	0.003	12.609
495	3.326	0.068	0.362	6.368	0.336	0.003	12.417
496	3.272	0.067	0.359	6.268	0.321	0.003	12.207
497	3.219	0.066	0.355	6.17	0.325	0.003	12.022
498	3.167	0.064	0.352	6.074	0.311	0.003	11.82
499	3.116	0.063	0.349	5.98	0.315	0.003	11.642
500	3.065	0.062	0.346	5.887	0.302	0.003	11.447
501	3.016	0.061	0.343	5.796	0.305	0.003	11.275
502	2.967	0.06	0.34	5.707	0.292	0.003	11.088
503	2.92	0.059	0.337	5.619	0.295	0.003	10.922
504	2.873	0.058	0.334	5.534	0.283	0.003	10.742
505	2.827	0.057	0.331	5.449	0.286	0.002	10.583
506	2.782	0.056	0.328	5.366	0.275	0.002	10.409
507	2.738	0.055	0.325	5.285	0.277	0.002	10.255
508	2.694	0.055	0.322	5.206	0.266	0.002	10.088
509	2.652	0.054	0.32	5.127	0.269	0.002	9.94
510	2.61	0.053	0.317	5.051	0.258	0.002	9.778
511	2.569	0.052	0.314	4.975	0.261	0.002	9.636
512	2.528	0.051	0.311	4.902	0.25	0.002	9.48
513	2.489	0.05	0.309	4.829	0.253	0.002	9.343
514	2.45	0.05	0.306	4.758	0.243	0.002	9.193
515	2.412	0.049	0.303	4.688	0.245	0.002	9.06
516	2.374	0.048	0.301	4.619	0.236	0.002	8.916
517	2.337	0.047	0.298	4.552	0.238	0.002	8.788
518	2.301	0.047	0.296	4.486	0.229	0.002	8.649
519	2.265	0.046	0.293	4.421	0.231	0.002	8.526
520	2.231	0.045	0.291	4.358	0.222	0.002	8.392
521	2.196	0.044	0.288	4.295	0.224	0.002	8.273

522	2.163	0.044	0.286	4.234	0.216	0.002	8.144
523	2.129	0.043	0.283	4.174	0.218	0.002	8.03
524	2.097	0.042	0.281	4.115	0.209	0.002	7.905
525	2.065	0.042	0.278	4.057	0.211	0.002	7.795
526	2.034	0.041	0.276	4	0.203	0.002	7.675
527	2.003	0.04	0.273	3.944	0.205	0.002	7.568
528	1.973	0.04	0.27	3.889	0.198	0.002	7.453
529	1.943	0.039	0.267	3.836	0.199	0.002	7.35
530	1.914	0.039	0.264	3.783	0.192	0.002	7.239
531	1.885	0.038	0.261	3.731	0.194	0.002	7.14
532	1.857	0.038	0.258	3.68	0.187	0.002	7.033
533	1.829	0.037	0.255	3.629	0.188	0.002	6.937
534	1.802	0.036	0.253	3.58	0.181	0.002	6.834
535	1.775	0.036	0.25	3.532	0.183	0.002	6.742
536	1.749	0.035	0.247	3.484	0.176	0.001	6.642
537	1.723	0.035	0.245	3.438	0.178	0.001	6.553
538	1.698	0.034	0.242	3.392	0.172	0.001	6.456
539	1.673	0.034	0.239	3.347	0.173	0.001	6.371
540	1.649	0.033	0.237	3.302	0.167	0.001	6.278
541	1.625	0.033	0.234	3.259	0.168	0.001	6.195
542	1.601	0.032	0.232	3.216	0.162	0.001	6.105
543	1.578	0.032	0.229	3.174	0.164	0.001	6.024
544	1.555	0.032	0.227	3.133	0.158	0.001	5.937
545	1.532	0.031	0.224	3.092	0.159	0.001	5.859
546	1.51	0.031	0.222	3.052	0.154	0.001	5.774
547	1.489	0.03	0.22	3.013	0.155	0.001	5.699
548	1.467	0.03	0.217	2.974	0.15	0.001	5.617
549	1.446	0.029	0.215	2.936	0.151	0.001	5.545
550	1.426	0.029	0.213	2.899	0.146	0.001	5.466
551	1.406	0.029	0.21	2.862	0.147	0.001	5.396
552	1.386	0.028	0.208	2.826	0.142	0.001	5.32
553	1.366	0.028	0.206	2.791	0.143	0.001	5.252
554	1.347	0.027	0.204	2.756	0.138	0.001	5.178
555	1.328	0.027	0.201	2.722	0.139	0.001	5.113
556	1.31	0.027	0.199	2.688	0.134	0.001	5.042
557	1.291	0.026	0.197	2.655	0.135	0.001	4.978
558	1.273	0.026	0.195	2.622	0.131	0.001	4.91
559	1.256	0.026	0.193	2.59	0.132	0.001	4.848
560	1.238	0.025	0.191	2.559	0.128	0.001	4.782
561	1.221	0.025	0.189	2.528	0.129	0.001	4.723
562	1.204	0.025	0.187	2.497	0.124	0.001	4.659
563	1.188	0.024	0.185	2.467	0.125	0.001	4.601
564	1.172	0.024	0.183	2.438	0.121	0.001	4.539
565	1.156	0.024	0.181	2.409	0.122	0.001	4.484
566	1.14	0.023	0.179	2.38	0.118	0.001	4.424
567	1.124	0.023	0.177	2.352	0.119	0.001	4.37
568	1.109	0.023	0.175	2.324	0.115	0.001	4.312
569	1.094	0.022	0.174	2.297	0.116	0.001	4.26
570	1.08	0.022	0.172	2.27	0.112	0.001	4.204
571	1.065	0.022	0.17	2.244	0.113	0.001	4.153
572	1.051	0.022	0.168	2.218	0.11	0.001	4.099
573	1.037	0.021	0.166	2.193	0.11	0.001	4.05
574	1.023	0.021	0.165	2.168	0.107	0.001	3.998
575	1.01	0.021	0.163	2.143	0.108	0.001	3.95
576	0.996	0.02	0.161	2.118	0.104	0.001	3.899
577	0.983	0.02	0.16	2.094	0.105	0.001	3.854
578	0.97	0.02	0.158	2.071	0.102	0.001	3.804
579	0.957	0.02	0.157	2.048	0.102	0.001	3.76

580	0.945	0.019	0.155	2.025	0.099	0.001	3.712
581	0.933	0.019	0.153	2.003	0.1	0.001	3.67
582	0.921	0.019	0.152	1.981	0.097	0.001	3.623
583	0.909	0.019	0.151	1.959	0.098	0.001	3.582
584	0.897	0.019	0.149	1.938	0.095	0.001	3.537
585	0.885	0.018	0.148	1.917	0.095	0.001	3.497
586	0.874	0.018	0.146	1.896	0.092	0.001	3.453
587	0.863	0.018	0.145	1.876	0.093	0.001	3.414
588	0.852	0.018	0.143	1.855	0.09	0.001	3.372
589	0.841	0.017	0.142	1.836	0.091	0.001	3.335
590	0.83	0.017	0.141	1.816	0.088	0.001	3.294
591	0.82	0.017	0.139	1.797	0.089	0.001	3.257
592	0.809	0.017	0.138	1.778	0.086	0.001	3.218
593	0.799	0.017	0.137	1.76	0.087	0.001	3.183
594	0.789	0.016	0.135	1.741	0.084	0.001	3.145
595	0.779	0.016	0.134	1.723	0.085	0.001	3.11
596	0.77	0.016	0.133	1.705	0.082	0.001	3.073
597	0.76	0.016	0.131	1.688	0.083	0.001	3.04
598	0.751	0.016	0.13	1.67	0.08	0.001	3.004
599	0.741	0.015	0.129	1.653	0.081	0.001	2.972
600	0.732	0.015	0.128	1.637	0.078	0.001	2.937

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6	0.025	0	0
7	0.151	0	0
8	0.33	0	0
9	0.434	0	0
10	0.447	0	0
11	0.437	0	0
12	0.437	0	0
13	0.439	0	0
14	0.438	0	0
15	0.438	0	0
16	0.438	0	0
17	0.438	0	0
18	0.438	0	0
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22	0.438	0	0
23	0.438	0	0
24	0.438	0	0
25	0.438	0	0
26	0.438	0	0
27	0.438	0	0
28	0.438	0.005	0.007
29	0.438	0.024	0.033
30	0.438	0.048	0.068
31	0.555	0.085	0.126
32	0.76	0.129	0.206
33	0.86	0.157	0.271
34	0.865	0.17	0.31
35	0.852	0.173	0.328
36	0.854	0.173	0.333
37	0.856	0.173	0.333
38	0.854	0.173	0.333
39	0.855	0.173	0.333
40	0.855	0.173	0.333
41	0.855	0.173	0.333
42	0.855	0.173	0.333
43	0.855	0.173	0.333
44	0.859	0.173	0.333
45	0.864	0.173	0.333
46	0.871	0.173	0.333
47	0.879	0.173	0.333
48	0.887	0.173	0.333
49	0.896	0.173	0.333

50	0.906	0.173	0.333
51	0.916	0.173	0.333
52	0.927	0.173	0.333
53	0.938	0.173	0.333
54	0.95	0.173	0.333
55	0.962	0.173	0.333
56	0.975	0.173	0.333
57	0.987	0.174	0.334
58	1	0.178	0.339
59	1.014	0.185	0.346
60	1.027	0.193	0.354
61	1.147	0.217	0.387
62	1.331	0.256	0.442
63	1.414	0.289	0.491
64	1.428	0.314	0.53
65	1.438	0.334	0.558
66	1.46	0.352	0.581
67	1.478	0.372	0.601
68	1.493	0.393	0.624
69	1.51	0.415	0.647
70	1.524	0.437	0.671
71	1.538	0.46	0.696
72	1.551	0.484	0.721
73	1.563	0.509	0.748
74	1.574	0.534	0.775
75	1.583	0.56	0.802
76	1.592	0.587	0.831
77	1.6	0.614	0.86
78	1.607	0.642	0.89
79	1.614	0.67	0.92
80	1.619	0.699	0.951
81	1.624	0.728	0.982
82	1.629	0.758	1.014
83	1.632	0.789	1.046
84	1.636	0.819	1.079
85	1.638	0.851	1.113
86	1.641	0.883	1.146
87	1.643	0.915	1.181
88	1.644	0.948	1.216
89	1.646	0.981	1.251
90	1.647	1.014	1.287
91	2.13	1.131	1.441
92	2.897	1.323	1.71
93	3.118	1.474	1.938
94	3.069	1.576	2.099
95	3.091	1.653	2.202
96	3.147	1.733	2.286
97	3.166	1.82	2.375
98	3.197	1.907	2.468
99	3.231	1.994	2.562

100	3.257	2.084	2.658
101	3.288	2.175	2.755
102	3.315	2.266	2.853
103	3.341	2.359	2.952
104	3.367	2.453	3.053
105	3.389	2.548	3.154
106	3.411	2.643	3.256
107	3.43	2.74	3.359
108	3.446	2.836	3.463
109	3.461	2.934	3.567
110	3.474	3.031	3.672
111	3.484	3.129	3.777
112	3.493	3.227	3.882
113	3.5	3.325	3.987
114	3.506	3.422	4.092
115	3.511	3.52	4.197
116	3.515	3.616	4.301
117	3.518	3.713	4.405
118	3.52	3.808	4.508
119	3.522	3.902	4.61
120	3.524	3.996	4.711
121	3.178	4.021	4.716
122	2.71	3.997	4.646
123	2.573	4.004	4.616
124	2.583	4.037	4.625
125	2.574	4.082	4.661
126	2.541	4.126	4.709
127	2.522	4.166	4.755
128	2.505	4.203	4.797
129	2.483	4.239	4.837
130	2.467	4.273	4.875
131	2.449	4.304	4.91
132	2.433	4.334	4.943
133	2.419	4.361	4.974
134	2.405	4.386	5.003
135	2.392	4.408	5.029
136	2.381	4.429	5.053
137	2.37	4.447	5.074
138	2.361	4.463	5.093
139	2.353	4.478	5.111
140	2.346	4.49	5.126
141	2.34	4.5	5.138
142	2.335	4.509	5.149
143	2.33	4.515	5.158
144	2.326	4.52	5.165
145	2.323	4.524	5.17
146	2.32	4.525	5.174
147	2.318	4.526	5.176
148	2.316	4.525	5.176
149	2.314	4.522	5.175

150	2.313	4.519	5.173
151	2.027	4.458	5.09
152	1.627	4.353	4.943
153	1.476	4.272	4.825
154	1.46	4.21	4.735
155	1.46	4.162	4.669
156	1.438	4.117	4.616
157	1.418	4.072	4.568
158	1.405	4.027	4.521
159	1.388	3.981	4.473
160	1.373	3.936	4.425
161	1.359	3.891	4.377
162	1.345	3.846	4.329
163	1.333	3.801	4.282
164	1.321	3.757	4.234
165	1.309	3.713	4.187
166	1.299	3.669	4.141
167	1.289	3.626	4.095
168	1.28	3.583	4.049
169	1.272	3.541	4.004
170	1.265	3.5	3.96
171	1.258	3.459	3.916
172	1.252	3.418	3.872
173	1.247	3.379	3.83
174	1.242	3.339	3.788
175	1.237	3.301	3.746
176	1.233	3.263	3.706
177	1.23	3.226	3.666
178	1.227	3.19	3.627
179	1.225	3.154	3.588
180	1.222	3.119	3.55
181	1.182	3.077	3.503
182	1.121	3.03	3.447
183	1.092	2.986	3.395
184	1.087	2.946	3.347
185	1.087	2.909	3.304
186	1.084	2.873	3.264
187	1.08	2.838	3.227
188	1.078	2.805	3.19
189	1.075	2.771	3.154
190	1.072	2.739	3.119
191	1.07	2.708	3.085
192	1.068	2.677	3.051
193	1.066	2.647	3.018
194	1.064	2.617	2.987
195	1.062	2.589	2.955
196	1.06	2.561	2.925
197	1.058	2.534	2.896
198	1.056	2.508	2.867
199	1.055	2.482	2.839

200	1.054	2.457	2.812
201	1.052	2.433	2.785
202	1.051	2.409	2.759
203	1.05	2.386	2.734
204	1.049	2.364	2.71
205	1.048	2.342	2.686
206	1.048	2.321	2.663
207	1.047	2.3	2.641
208	1.046	2.281	2.619
209	1.046	2.261	2.598
210	1.045	2.243	2.577
211	1.045	2.225	2.557
212	1.044	2.207	2.538
213	1.044	2.19	2.519
214	1.044	2.173	2.501
215	1.044	2.157	2.483
216	1.043	2.142	2.466
217	1.043	2.127	2.45
218	1.043	2.112	2.434
219	1.043	2.098	2.418
220	1.043	2.085	2.403
221	1.043	2.072	2.389
222	1.043	2.059	2.375
223	1.043	2.047	2.361
224	1.043	2.035	2.348
225	1.042	2.023	2.335
226	1.042	2.012	2.323
227	1.042	2.001	2.311
228	1.042	1.991	2.3
229	1.042	1.981	2.289
230	1.042	1.971	2.278
231	1.042	1.962	2.268
232	1.042	1.953	2.258
233	1.042	1.945	2.248
234	1.042	1.936	2.239
235	1.042	1.928	2.23
236	1.042	1.92	2.221
237	1.042	1.913	2.213
238	1.042	1.906	2.205
239	1.042	1.899	2.197
240	1.042	1.892	2.19
241	0.978	1.874	2.166
242	0.879	1.846	2.127
243	0.831	1.822	2.094
244	0.82	1.803	2.067
245	0.821	1.787	2.045
246	0.818	1.774	2.027
247	0.813	1.762	2.013
248	0.81	1.75	2
249	0.807	1.738	1.986

250	0.803	1.726	1.974
251	0.8	1.715	1.961
252	0.796	1.703	1.949
253	0.793	1.692	1.937
254	0.79	1.682	1.925
255	0.787	1.671	1.914
256	0.785	1.661	1.902
257	0.782	1.651	1.891
258	0.779	1.641	1.88
259	0.777	1.631	1.87
260	0.775	1.621	1.859
261	0.773	1.612	1.849
262	0.771	1.603	1.839
263	0.769	1.594	1.829
264	0.767	1.585	1.819
265	0.766	1.576	1.81
266	0.764	1.568	1.801
267	0.763	1.559	1.792
268	0.762	1.551	1.783
269	0.761	1.543	1.774
270	0.76	1.535	1.765
271	0.791	1.533	1.765
272	0.842	1.537	1.773
273	0.869	1.539	1.779
274	0.873	1.539	1.782
275	0.871	1.537	1.782
276	0.873	1.533	1.78
277	0.875	1.53	1.777
278	0.876	1.527	1.774
279	0.877	1.524	1.77
280	0.879	1.521	1.767
281	0.88	1.518	1.764
282	0.882	1.515	1.761
283	0.884	1.513	1.758
284	0.885	1.51	1.755
285	0.886	1.508	1.752
286	0.888	1.505	1.75
287	0.889	1.503	1.747
288	0.891	1.501	1.745
289	0.892	1.499	1.742
290	0.893	1.497	1.74
291	0.894	1.495	1.738
292	0.895	1.493	1.736
293	0.896	1.491	1.734
294	0.897	1.489	1.732
295	0.898	1.488	1.73
296	0.899	1.486	1.728
297	0.9	1.485	1.726
298	0.9	1.483	1.725
299	0.901	1.482	1.723

300	0.901	1.481	1.722
301	0.805	1.462	1.695
302	0.656	1.428	1.647
303	0.58	1.4	1.606
304	0.556	1.378	1.573
305	0.554	1.361	1.547
306	0.551	1.348	1.528
307	0.545	1.336	1.512
308	0.539	1.325	1.498
309	0.535	1.313	1.486
310	0.53	1.302	1.474
311	0.525	1.291	1.462
312	0.52	1.28	1.45
313	0.515	1.269	1.438
314	0.511	1.258	1.426
315	0.507	1.248	1.415
316	0.503	1.237	1.404
317	0.499	1.227	1.392
318	0.495	1.217	1.381
319	0.492	1.207	1.371
320	0.488	1.197	1.36
321	0.485	1.187	1.349
322	0.482	1.177	1.339
323	0.479	1.168	1.329
324	0.477	1.158	1.318
325	0.474	1.149	1.308
326	0.472	1.14	1.298
327	0.47	1.131	1.289
328	0.468	1.122	1.279
329	0.466	1.113	1.269
330	0.464	1.104	1.26
331	0.429	1.089	1.242
332	0.373	1.069	1.216
333	0.339	1.051	1.192
334	0.323	1.034	1.171
335	0.319	1.019	1.152
336	0.317	1.006	1.135
337	0.314	0.994	1.12
338	0.312	0.982	1.106
339	0.309	0.97	1.093
340	0.307	0.958	1.08
341	0.304	0.947	1.068
342	0.302	0.936	1.056
343	0.3	0.925	1.044
344	0.298	0.914	1.032
345	0.296	0.903	1.02
346	0.294	0.892	1.009
347	0.293	0.882	0.997
348	0.291	0.871	0.986
349	0.289	0.861	0.975

350	0.288	0.851	0.964
351	0.286	0.841	0.953
352	0.285	0.831	0.943
353	0.284	0.821	0.932
354	0.282	0.812	0.922
355	0.281	0.802	0.912
356	0.28	0.793	0.902
357	0.279	0.784	0.892
358	0.278	0.775	0.882
359	0.277	0.766	0.872
360	0.276	0.757	0.863
361	0.23	0.741	0.843
362	0.158	0.719	0.814
363	0.113	0.699	0.787
364	0.088	0.682	0.764
365	0.074	0.667	0.744
366	0.066	0.653	0.725
367	0.061	0.64	0.709
368	0.057	0.628	0.694
369	0.054	0.616	0.68
370	0.051	0.605	0.667
371	0.049	0.594	0.654
372	0.047	0.583	0.642
373	0.045	0.573	0.63
374	0.043	0.563	0.619
375	0.041	0.553	0.608
376	0.039	0.543	0.597
377	0.038	0.533	0.586
378	0.036	0.524	0.576
379	0.035	0.515	0.566
380	0.033	0.505	0.556
381	0.032	0.497	0.546
382	0.03	0.488	0.536
383	0.029	0.479	0.527
384	0.028	0.471	0.518
385	0.027	0.462	0.509
386	0.026	0.454	0.5
387	0.025	0.446	0.491
388	0.024	0.438	0.482
389	0.023	0.43	0.474
390	0.022	0.423	0.466
391	0.021	0.415	0.457
392	0.02	0.408	0.449
393	0.019	0.401	0.442
394	0.018	0.394	0.434
395	0.018	0.387	0.426
396	0.017	0.38	0.419
397	0.016	0.373	0.411
398	0.016	0.367	0.404
399	0.015	0.36	0.397

400	0.014	0.354	0.39
401	0.014	0.348	0.383
402	0.013	0.342	0.377
403	0.013	0.336	0.37
404	0.012	0.33	0.364
405	0.012	0.324	0.358
406	0.011	0.318	0.351
407	0.011	0.313	0.345
408	0.01	0.307	0.339
409	0.01	0.302	0.333
410	0.01	0.297	0.328
411	0.009	0.292	0.322
412	0.009	0.286	0.316
413	0.009	0.281	0.311
414	0.008	0.277	0.306
415	0.008	0.272	0.3
416	0.008	0.267	0.295
417	0.007	0.263	0.29
418	0.007	0.258	0.285
419	0.007	0.254	0.28
420	0.007	0.249	0.276
421	0.006	0.245	0.271
422	0.006	0.241	0.266
423	0.006	0.237	0.262
424	0.006	0.233	0.257
425	0.006	0.229	0.253
426	0.005	0.225	0.249
427	0.005	0.221	0.245
428	0.005	0.217	0.24
429	0.005	0.213	0.236
430	0.005	0.21	0.232
431	0.005	0.206	0.229
432	0.004	0.203	0.225
433	0.004	0.199	0.221
434	0.004	0.196	0.217
435	0.004	0.193	0.214
436	0.004	0.19	0.21
437	0.004	0.186	0.207
438	0.004	0.183	0.203
439	0.004	0.18	0.2
440	0.003	0.177	0.197
441	0.003	0.174	0.194
442	0.003	0.172	0.19
443	0.003	0.169	0.187
444	0.003	0.166	0.184
445	0.003	0.163	0.181
446	0.003	0.161	0.178
447	0.003	0.158	0.175
448	0.003	0.155	0.173
449	0.003	0.153	0.17

450	0.003	0.15	0.167
451	0.002	0.148	0.164
452	0.002	0.146	0.162
453	0.002	0.143	0.159
454	0.002	0.141	0.157
455	0.002	0.139	0.154
456	0.002	0.137	0.152
457	0.002	0.134	0.149
458	0.002	0.132	0.147
459	0.002	0.13	0.145
460	0.002	0.128	0.142
461	0.002	0.126	0.14
462	0.002	0.124	0.138
463	0.002	0.122	0.136
464	0.002	0.12	0.134
465	0.002	0.118	0.132
466	0.002	0.117	0.13
467	0.002	0.115	0.128
468	0.002	0.113	0.126
469	0.002	0.111	0.124
470	0.001	0.109	0.122
471	0.001	0.108	0.12
472	0.001	0.106	0.118
473	0.001	0.105	0.116
474	0.001	0.103	0.115
475	0.001	0.101	0.113
476	0.001	0.1	0.111
477	0.001	0.098	0.11
478	0.001	0.097	0.108
479	0.001	0.095	0.106
480	0.001	0.094	0.105
481	0.001	0.093	0.103
482	0.001	0.091	0.102
483	0.001	0.09	0.1
484	0.001	0.089	0.099
485	0.001	0.087	0.097
486	0.001	0.086	0.096
487	0.001	0.085	0.094
488	0.001	0.083	0.093
489	0.001	0.082	0.092
490	0.001	0.081	0.09
491	0.001	0.08	0.089
492	0.001	0.079	0.088
493	0.001	0.078	0.087
494	0.001	0.076	0.085
495	0.001	0.075	0.084
496	0.001	0.074	0.083
497	0.001	0.073	0.082
498	0.001	0.072	0.081
499	0.001	0.071	0.079

500	0.001	0.07	0.078
501	0.001	0.069	0.077
502	0.001	0.068	0.076
503	0.001	0.067	0.075
504	0.001	0.066	0.074
505	0.001	0.065	0.073
506	0.001	0.064	0.072
507	0.001	0.064	0.071
508	0.001	0.063	0.07
509	0.001	0.062	0.069
510	0.001	0.061	0.068
511	0.001	0.06	0.067
512	0.001	0.059	0.066
513	0.001	0.059	0.065
514	0.001	0.058	0.065
515	0.001	0.057	0.064
516	0.001	0.056	0.063
517	0.001	0.055	0.062
518	0.001	0.055	0.061
519	0.001	0.054	0.06
520	0	0.053	0.06
521	0	0.053	0.059
522	0	0.052	0.058
523	0	0.051	0.057
524	0	0.05	0.056
525	0	0.05	0.056
526	0	0.049	0.055
527	0	0.048	0.054
528	0	0.048	0.054
529	0	0.047	0.053
530	0	0.047	0.052
531	0	0.046	0.052
532	0	0.045	0.051
533	0	0.045	0.05
534	0	0.044	0.05
535	0	0.044	0.049
536	0	0.043	0.048
537	0	0.043	0.048
538	0	0.042	0.047
539	0	0.042	0.047
540	0	0.041	0.046
541	0	0.041	0.045
542	0	0.04	0.045
543	0	0.04	0.044
544	0	0.039	0.044
545	0	0.039	0.043
546	0	0.038	0.043
547	0	0.038	0.042
548	0	0.037	0.042
549	0	0.037	0.041

550	0	0.036	0.041
551	0	0.036	0.04
552	0	0.035	0.04
553	0	0.035	0.039
554	0	0.034	0.039
555	0	0.034	0.038
556	0	0.034	0.038
557	0	0.033	0.037
558	0	0.033	0.037
559	0	0.032	0.036
560	0	0.032	0.036
561	0	0.032	0.036
562	0	0.031	0.035
563	0	0.031	0.035
564	0	0.031	0.034
565	0	0.03	0.034
566	0	0.03	0.034
567	0	0.03	0.033
568	0	0.029	0.033
569	0	0.029	0.032
570	0	0.029	0.032
571	0	0.028	0.032
572	0	0.028	0.031
573	0	0.028	0.031
574	0	0.027	0.031
575	0	0.027	0.03
576	0	0.027	0.03
577	0	0.026	0.03
578	0	0.026	0.029
579	0	0.026	0.029
580	0	0.025	0.029
581	0	0.025	0.028
582	0	0.025	0.028
583	0	0.025	0.028
584	0	0.024	0.027
585	0	0.024	0.027
586	0	0.024	0.027
587	0	0.024	0.026
588	0	0.023	0.026
589	0	0.023	0.026
590	0	0.023	0.026
591	0	0.023	0.025
592	0	0.022	0.025
593	0	0.022	0.025
594	0	0.022	0.024
595	0	0.022	0.024
596	0	0.021	0.024
597	0	0.021	0.024
598	0	0.021	0.023
599	0	0.021	0.023

600	0	0.02	0.023