

APPENDIX 7-B
Irvine Ranch Water District – Water Shortage Contingency Plan

WATER SHORTAGE CONTINGENCY PLAN

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IRVINE RANCH WATER DISTRICT
15600 SAND CANYON AVENUE
IRVINE, CA 92618

Background

Normally, the first step in developing a response or set of responses to a water shortage involves projections of future demand measured against estimates of the range of severity in supply cutbacks. This requires extensive research into both supply and demand, a great deal of which becomes assumptive and or speculative.

While the potential cutback in deliveries from Metropolitan Water District of Southern California (MWD) can be mitigated to some extent (at least in the short run) by the addition of other sources of supply, such as increased pumping from the Dyer Road Well field or the construction of treatment facilities at Irvine Lake (see IRWD's Water Resources Master Plan and Urban Water Management Plan), the range of shortages projected herein is assumed to be net of those supply augmentation measures. That is, a supply shortage identified as, say 20%, is the actual shortage confronted by the District's customers after supply augmentation factors have been considered. In short, this plan is intended to develop a set of options to reduce demand; it is not within the scope of this analysis to develop ways to augment supply.

Given the assumption that the degree of water shortages experienced at any point in time is net of mitigating supply factors, two basic considerations emerge in formulating a water shortage opinion plan: (1) the shortage must be offset by demand reduction, and (2) the demand reduction program must be sequential in nature since drought conditions are normally progressive. This means that a drought contingency plan should be designed to address varying levels of supply deficits with recommended actions predicated upon the actual deficit level. Therefore this analysis develops a drought response based upon four levels of supply cutbacks:

- A. Level One should be considered a drought warning and low level shortage condition with cutbacks in supplies of up to 10%.
- B. Level Two is a significant drought condition indicated by shortages of 10 to 25%.
- C. Level Three is an emergency condition indicated by shortages ranging from 25 to 40%.
- D. Level Four is a crisis condition resulting when shortages exceed 40%.

Each drought level requires a specific set of responses aimed at reducing demand to the level of supply cutbacks. Steps taken within each level should be considered cumulative; that is, Level Two responses will include most if not all the responses included in Level One plus the additional actions necessary to meet a Level Two condition. Level Three will include most if not all the responses included in Level Two plus the additional measures necessary to meet a Level Three condition, and so on.

However, if a drought condition persisted over an extended period of time, it may be necessary to implement a higher level response to sustain required cutbacks. Thus both the severity of supply cutbacks and the duration over which the cutbacks are experienced will determine the appropriate response.

In general terms, a Level One and Level Two drought, as identified in this plan, can be met with a set of customer responses that are voluntary in nature. Droughts in the Level Three and Four range will usually require all the voluntary responses expected in Levels One and Two plus additional District-mandated responses.

A. Level One: Drought Warning (up to 10% shortage)

As a result of the 1976-77 drought, a good deal of information was collected by those agencies involved in meeting the supply deficit (i.e. State Department of Water Resources, Los Angeles Department of Water and Power, East Bay Municipal Utility District, Metropolitan Water District of Southern California, etc.). Among the more important conclusions drawn from that experience was that demand reductions of 25% or more could be sustained for a one to two year period by essentially voluntary responses on the part of water users. However, to generate that kind of public support requires an intensive public information and education program on the part of the utility and willingness by the utility to set an aggressive example. The following represent specific actions that should be taken by the District during a Level One drought:

1. Make the general public and influential local decision-makers understand what the situation is, what actions are proposed to be taken and what they are intended to achieve, and,

how these actions are to be implemented. This should be accomplished by having key District personnel (i.e. those with publicly recognized credentials/authority) give presentations to such groups as the city council, community associations, the chamber of commerce, business groups, etc. An endorsement of proposed District plans by these groups will greatly assist in obtaining the support of the general public that is essential in confronting water shortages.

It is crucial that the District elicit the undivided support of the above-mentioned groups at the outset of a water shortage situation so they can be of timely value in forming public opinion. The drought potential need not be aggrandized, but should be represented accurately with clear indications of the consequences and the actions required if conditions deteriorate.

2. School programs should be focused on the water shortage situation. In addition to the usual background information about the District (i.e. what it does and how it functions), the supply situation and conservation methods should be highlighted. Demonstrations using sample water-saving devices can be given; literature should be distributed.

3. The public at large should be informed of the situation and what must be done. Contact can be made through billing inserts, water conservation booths, community association meetings, newsletters, church groups, etc. Literature should be provided on the drought condition, conservation methods, and water-saving devices and distributed through the fire and police stations, libraries, city hall, schools, shopping center, recreation facilities, etc. The public should be counseled that, even under low-level drought conditions, they must change their water use habits since this has proven to be the single most effective way to reduce total water demand. A change in use habits is different than conserving water through the employment of devices or fixtures and would include recommendations such as the following:

- a. Make a survey of all plumbing every two months and eliminate any water loss that results from leaky plumbing fixtures.
- b. Restrict showers to five minutes or less; or, fill the bath tub no more than one-quarter full.

- c. Do not run water unnecessarily while shaving, brushing teeth, bathing, shampooing, preparing food, etc.
- d. Do only full loads of laundry and dishes.
- e. Reduce landscape watering to minimum levels only.
- f. Do not run a hose while washing car; use a bucket, rinse only with the hose.
- g. Fill swimming pools to a lower level to minimize water loss due to splashing.
- h. Do not use the toilet as a wastepaper basket.

(There are many other water-saving hints that can be provided to the customer. A detailed list would be developed by Public Affairs and made available for distribution when the need arises.)

4. Water conservation and drought literature should be disseminated on as wide a basis as possible. This would include brochures, billing inserts, mailers, bumper stickers, etc.

5. A water conservation or drought response logo should be adopted and vigorously promoted as a symbol to influence public attitude about water.

6. Extensive use of the media in all its available forms should be employed. This would include public service messages on radio and television and press releases in local newspapers. Television costs may be prohibitive unless networks donate air time for public service spots.

In sum, the single most important step the District can take during a drought warning or Level One condition is to develop the public consciousness such that voluntary compliance will reduce water demand to the extent necessary. This can be accomplished through education/information programs sponsored by the District, which must adopt an aggressive leadership roll at all times.

The cost to implement Level One responses should be minimal, especially considering the return (in reduced demand) on the investment. None of the recommended steps would be difficult to implement or administer and, in the Public Affairs Department, the District has the basic vehicle to pursue most Level One steps.

B. Level Two: Significant Drought Conditions (10 to 25% shortage)

Additional measures that may be required under a Level Two condition can be determined by the amount of reduced demand achieved in Level One. (Bear in mind that demand reductions of up to 25% have been realized under Level One measures when the public is aggressively committed to saving water.) Therefore, a Level Two drought may require only that Level One responses be sustained or, it may mean that further steps must be taken to increase demand reduction when supply cutbacks approach the upper range of a Level Two condition.

Assuming that requests/information/education programs pursued by the District reduced treated water demand by 20% for residential, commercial, public authority, landscape, agricultural, and construction/temporary users (industrial users are considered at 10% since their production modes are usually less amenable to reductions in water usage without capital expenditures), total demand would be reduced by approximately 13.74% as illustrated in Table 1 below (annual usage figures are based on the 2004-05 fiscal year):

User Class	Annual Usage	% of Total Use	% of Cutback	Annual Usage
Residential	30,972	36.3%	20.00%	6,194
Commercial	7,663	9.0%	20.00%	1,533
Industrial-Treated	6,047	7.1%	10.00%	605
Industrial-Recycled	57	0.1%	0.00%	0
Public Authority	2,842	3.3%	20.00%	568
Landscape-Treated	4,953	5.8%	20.00%	991
Landscape-Recycled	20,560	24.1%	0.00%	0
Treated Ag*	1,177	1.4%	20.00%	235
Untreated Ag	7,585	8.9%	20.00%	1,517
Construction/Temp.	489	0.6%	20.00%	98
RW sales to others	3,094	3.6%	0.00%	0
Total	85,440		13.74%	11,741

*Because of the geographic location of certain agricultural connections and/or because of water quality considerations, there is a certain amount of treated water used for agricultural purposes. In the future, this demand will decline to almost zero.

If a Level Two drought condition was at the severe end of the range, that is, nearing the 25% point, then the District might be required to take some additional measures to reduce demand further. While there are several steps that might be taken, perhaps the most acceptable would be to require irrigation users, both landscape and agricultural, to reduce their usage to 50% of normal. This step alone would increase the level of reduced treated water demand to 21.51%, as illustrated in Table 2 below:

Table 2				
User Class	Annual Usage/AF	% of Total Use	% of Cutback	Annual Usage/AF
Residential	30,972	36.3%	25.00%	7,743
Commercial	7,663	9.0%	25.00%	1,916
Industrial-Treated	6,047	7.1%	15.00%	907
Industrial-Recycled	57	0.1%	0.00%	0
Public Authority	2,842	3.3%	25.00%	710
Landscape-Treated	4,953	5.8%	50.00%	2,477
Landscape-Recycled	20,560	24.1%	0.00%	0
Treated Ag*	1,177	1.4%	50.00%	588
Untreated Ag	7,585	8.9%	50.00%	3,793
Construction/Temp.	489	0.6%	50.00%	245
RW sales to others	3,094	3.6%	0.00%	0
Total	85,440	100.0%	21.51%	18,379

The 1976-77 drought experience indicated that a Level Two drought, as defined here, can be offset by voluntary public compliance and perhaps one or two additional measures, such as mandated reductions in irrigation water use. However, should requests by the District fail to reduce demand to the desired levels, it may be appropriate to institute a penalty or excess use charge (hopefully, this step would not be required until a Level Three condition existed).

A penalty charge assesses a flat fee for usage above a certain amount; an excess use charge increases the price per ccf above a specific usage per billing period. Both of these approaches, when fairly applied, have been shown to be effective, particularly the penalty charge method when backed by the threat of service disconnection for repeated offenses. However, the difficulty in using either one of these approaches arises in determining the parameters that would

define excess use. Because of differences within a user class (i.e. residential family of three compared to residential family of six), it would not be equitable to limit usage per month to the same amount for all members of the same user class.

There are three basic approaches that should be considered to solve the inequity problem: one, determine the penalty or excess use point based upon a per capita allocation for each residence; two, raise the basic commodity rate to all customers high enough to encourage conservation; or, three, make the determination, on an individual account basis, calculated upon a percentage allocation of a prior period use.

Option one, while theoretically the most likely to achieve fairness and equity, would, in practical terms, be almost impossible to implement and administer. The major problem would be to obtain accurate demographic data on the District's customer base that could be used to determine a per capita allocation. The accuracy and validity of survey research data would be suspect since there is no independent method to verify the results; any existing data would probably be too old to be accurate and current data would have to be constantly updated to remain useful. A possible means of implementing this option would be to arbitrarily set each residence at a population of three. For those customers burdened by this assumption, it would be their responsibility to declare, in writing, as to the correct occupancy. Administering this scheme could be expensive because of the large number of declarations likely to be filed resulting in the probable need for an additional customer service clerk. In short, the per capita allocation method would be difficult to administer and costly.

Option two would simply raise the cost per ccf to all customers, regardless of their usage. If the current rate of \$.88/ccf was increased to, say, \$1.60/ccf it is likely that this increase would act as a strong incentive for all classes of users to reduce their demand. Since the District recovers its cost of water through the commodity assessment, the increased revenue would not be required to meet increased District operating costs (unless MWD raised its charges to the District) and it could be ear-marked for a specific purpose, such as funding the distribution of water-saving devices; or the revenue could be returned to the customer when the drought has ended (through some other method).

The major problem with uniformly raising the commodity rate is the inherent unfairness to low-volume users who number approximately 30% of the District's customer base, and who have already reduced their demand so as to conserve water on an on-going basis. For these users, the increased commodity rate would be punitive as opposed to acting as an incentive.

Option three, while not without problems, would be a more attractive method than either option one or two. The current billing system has an ascending block rate structure built into it and, with historical usage data for the prior twelve month period maintained, all existing accounts could be factored at a certain percentage with use above that point assessed at either a higher rate or on a flat fee basis. For example, it is probably reasonable to assume that most, if not all, of the difference between water demand in August compared to January is attributable to outside use. If the District requested that all customers reduce their demand to winter levels (i.e. eliminate most outside use), the billing system could, with less than major modifications, apply January usage as the parameter for the current months not-to-exceed point. An analysis of past usage indicates that the average variance in usage between the four month period December-March and the eight month period April-November is approximately 20.4%. Using this factor to determine the point-to-exceed would allow for the first 80% of current month's usage to be billed at current rates and usage beyond that point to be billed either at a higher rate per ccf (excess use charge) or billed at current rates plus a flat charge. This method would have to be modified for new accounts (since there is no historical data to reveal prior usage) and resales (new tenants) which would need to be handled on an individual basis. The current billing system is configured to a five-tiered rate structure, this option, with certain programming modifications (i.e. ability to calculate parameters based upon a prior period usage applied to current usage and ability to add credits or subtract debits based on accuracy of estimated month) would provide a reasonably equitable format for a penalty or excess use charge.

Although any form of surcharge, excess use, or penalty charge would probably not have to be implemented until a Level Three drought condition occurred, a surcharge could be implemented at a Level Two condition for the purpose of generating revenue to finance the distribution of water-saving devices to households. This form of surcharge would thus have a dual benefit.

Finally, a District Task Force should be activated when a Level Two condition persists. The Task Force would have as its purpose to investigate and consult with high-volume users (i.e. public authorities, apartments, community associations, etc.) to assist them in reducing their water demands to the greatest extent possible.

Level Three: Emergency Drought Condition (25 to 40% shortage)

A Level Three drought condition would most likely entail, in addition to the voluntary measures taken in the Level One and Two responses, the implementation of mandatory measures on the part of the District. If a penalty or excess use charge had been previously avoided, it would almost certainly be needed at this level of supply deficiencies. Given the discussion above, an excess use charge based upon an ascending block rate structure sufficient to encourage demand reduction to required levels would be the most equitable surcharge.

In addition to an excess use charge, all common area landscape irrigation and agricultural irrigation should be reduced drastically, or eliminated completely if necessary. Complete elimination of treated water serving landscape would reduce total treated demand by approximately 9% and could be easily accomplished by locking off the service meter if one meter served landscape needs specifically. When one meter serves both internal use and landscaping, monitoring and public support would be needed to ensure that no irrigation takes place. An expanded irrigation group would be effective in these efforts. Untreated or recycled water use would only be reduced as needed based on impact of reduced wastewater flows to recycled water production.

More intensive efforts to reduce demand in residential, commercial, and public authority usage should be pursued and encouraged. All nonessential use such as outside irrigation, car washing, pool filling, washing down of sidewalks, etc., should be banned. Specific municipal uses such as street cleaning, hydrant flushing, water-based recreation, etc., should be eliminated.

While it is difficult to precisely estimate the total reduction in demand that would be realized from the cumulative measures taken in Levels One, Two, and Three, Table 3 illustrates the projected reduction in demand that would occur when each user class reduces their demand by

the percentages indicated:

Table 3				
User Class	Annual Usage/AF	% of Total Use	% of Cutback	Annual Usage/AF
Residential	30,972	36.3%	25.00%	7,743
Commercial	7,663	9.0%	25.00%	1,916
Industrial-Treated	6,047	7.1%	25.00%	1,512
Industrial-Recycled	57	0.1%	0.00%	0
Public Authority	2,842	3.3%	25.00%	710
Landscape-Treated	4,953	5.8%	100.00%	4,953
Landscape-Recycled	20,560	24.1%	0.00%	0
Treated Ag*	1,177	1.4%	50.00%	588
Untreated Ag	7,585	8.9%	50.00%	3,793
Construction/Temp.	489	0.6%	50.00%	245
RW sales to others	3,094	3.6%	0.00%	0
Total	85,440		25.12%	21,460

Level Four: Crisis Drought Condition (greater than 40% shortage)

A Level Four or severe Level Three drought may require that the District ration water. This would be neither easy nor pleasant; any method of allocation could have as many exceptions as applications. Rationing is usually accomplished in one of two ways: a flat percentage reduction or a variable percentage reduction. The flat percentage reduction would not be appropriate for the IRWD given its current grouping of users into categories based upon prior-year consumption. An across-the-board reduction would unfairly impact low-volume users, who already use water more efficiently, and would create significant inequities.

A percentage reduction based upon prior year's usage, or average year's usage, would probably be the most equitable rationing method. The modified billing system (as discussed above) could provide the necessary information for existing users (new users could be allocated water based upon their per capita household compared to another user with usage history and households of equal size), and when modified so as to perform the necessary calculation (i.e. a percentage times

some prior period usage), could identify violators. Those users who exceed the rationed amount would be fined and, if they are consistent violators, threatened with termination of service.

Under extreme conditions of noncompliance, the District could install flow restrictors in individual service lines. Thus, water would be available for drinking, cooking, sponge baths, and slow fill of toilet tanks, but showers and other high volume type uses would not be possible.

Under these conditions individual customer reaction would be severe. It would probably be necessary to augment the meter reader crew to maintain surveillance of these services to assure that unauthorized changes are not made by the customer.

The District's ability to establish restrictions on water use and to discontinue service in the case of repeat violators is provided for under the Water Code of the State of California Chapters 3 and 3.5). Fines of up to \$1,000 may be assessed, imprisonment of up to 30 days may be given and service may be terminated to consumers who willfully violate the regulations and restrictions.

CONCLUSION

The District's Water Shortage Contingency Plan is sequential in nature and is aimed at reducing treated water demand primarily through modifying the water use patterns of its customers. It places heavy emphasis on the steps to be taken during pre- and low-level drought conditions, focusing particularly on forming public attitudes.

The Plan also includes provisions for implementing mandatory measures under a severe drought condition, including a ban on certain types of usage, penalty charges, and, if need be, rationing options.

The Water Shortage Contingency Plan has been adopted and by amending the District's Rules and Regulation so as to allow the Plan to be implemented as required.

Section 15

PROHIBITION OF WATER WASTAGE

15.1 APPLICATION

The provisions of this section shall apply to all persons using water in this District, regardless of whether any person using water shall have a contract for such service, and shall apply to all potable and recycled water supplied by the District.

15.2 CONTINGENCY PLAN

The District's Contingency Plan provides representative measures that may be implemented during water shortage or drought conditions. The measures may be applied singly or in combination and may vary according to the severity and duration of the shortage. Other measures may be applied in lieu of or in addition to those described in the Contingency Plan. The following are the levels of shortage which may be declared by the Board and the approximate ranges of conditions they represent:

Level One (Drought Warning)-Up to 10% shortage.

Level Two (Significant Drought Condition)-10-25% shortage.

Level Three (Emergency Drought Condition)-25-40% shortage.

Level Four (Crisis Drought Condition)-More than 40% shortage.

Generally, the conservation measures which the District will place in effect during Levels One and Two are anticipated to be voluntary and during Levels Three and Four are anticipated to be mandatory, including surcharges and rationing, but this will be determined by the District in its discretion at time of implementation.

15.3 GENERAL PROHIBITIONS

The following prohibitions are in effect at all times, regardless of whether any declared shortage condition is in effect.

(1) Gutter Flooding

No person shall cause or permit any water furnished to any property within the District to run or to escape from any hose, pipe, valve, faucet, sprinkler, or irrigation device into any gutter or otherwise to escape from the property if such running or escaping can reasonably be prevented.

(2) Leaks

No person shall permit leaks of water that he has the authority to eliminate.

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(3) Waste

No person shall cause or permit water under his control to be wasted. Wasteful usage includes, but is not limited to, the uses listed in Section 13(A) of Exhibit 1 to the Memorandum of Understanding Regarding Urban Water Conservation in California, dated December 11, 2002, as amended from time to time, or the counterpart of said list contained in any successor document.

15.4 EXEMPTIONS

Persons may be exempted from application of the restrictions set forth in 15.4. to a certain use or restrictions which may be implemented pursuant to the Contingency Plan if the General Manager of the District or his designee issues a permit allowing such use, and if such permit issuance is based on a finding that enforcement of the applicable restriction would either (1) cause an unnecessary and undue hardship to the applicant or the public, or (2) would cause or threaten an emergency condition affecting the health, sanitation, fire protection, or safety of the applicant or the public.

The General Manager of the District or his designee may require the use of such water conservation devices or practices as he deems appropriate as a condition of the exemption permit. He shall promulgate a list of approved devices.

15.5 ENFORCEMENT AND PENALTIES

- (1) Prior to enforcement of the restrictions pursuant to Section 15.4, any person who is suspected of violating the restrictions hereby imposed shall be given a preliminary notice in writing of such violation, with the description of violation set forth in such preliminary notices. Such person shall have 24 hours to correct such violation, or terminate the use. If the violation is not corrected or the use not terminated, the General Manager of the District or his designee may forthwith either (a) disconnect service, (b) install flow-restricting devices restricting water service, or (c) order issued a second preliminary notice. (Service disconnected or restricted pursuant to (a) or (b) above shall be restored only upon payment of the turn-on and other charges fixed by the Board of Directors as provided in these Rules and Regulations.)

Any other sanctions or penalties that the District is presently authorized to impose or that the District may at some future time be authorized to impose may be imposed to enforce this prohibition of water wastage.

- (2) From and after the publication or posting of any ordinance or resolution implementing any restrictions or mandatory measures under the Contingency Plan, violations thereof shall be misdemeanors punishable by imprisonment in the County Jail for not more than 30 days or by fine of not more than \$1,000, or both, or as otherwise provided by law or such resolution or ordinance.